9.9 Hydrology and Water Quality Data



January 11, 2017
2017-336

BNSF Ono Lead Track Extension

San Bernardino, California

Hydrology Report

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Reference-1: *NOAA Altas14, Precipitations 4*

Reference-2: *Existing Flooding Pictures 5*

Hydrology Study Exhibit ..... Pocket

WestLAND Group, Inc.

INTRUDUCTION

1 PURPOSE AND SCOPE

This Hydrology Report is to demonstrate that the BNSF Ono Lead Track Extension project can be designed to provide adequate flood protections for the proposed railway extensions, existing streets and all adjacent properties along the railway. The scope of this analysis includes the 100-year storm runoff calculation for each sub-drainage area, determines whether runoff exceeds the existing drainage capacities at streets, catch basins & inlets; and also analyzes & recommends adequate drainage facilities for each reach between railway stations.

2 SITE DESCRIPTION AND EXISTING CONDITIONS

The site is located along the west side of the existing railway tracks and interstate freeway 215, a distance of approximately 5.5 miles from University Pkwy to West 5th Street, in the County of San Bernardino.

There are existing flooding, ponding, and erosion issues along the railway at several locations because existing drainage systems are inadequate, and do not provide flood protection to the tracks. Flooding and erosion occur along the railway right-of-way where the tracks parallel Cajon Boulevard. There are two 36" culverts that cross the tracks, and outlet approximately 38.8 cfs of runoff directly onto the shoulder of the street. These issues are compounded further because there is no storm drain system on Cajon Boulevard from West Highland Avenue to Spruce Street. Additional flooding, ponding, and erosion occur due to plugged catch basins, inadequate storm drain systems at streets next to the railway tracks, and plugged or sump conditions. Some streets have no storm drain system at all. See reference-2 for pictures of the existing flooding.

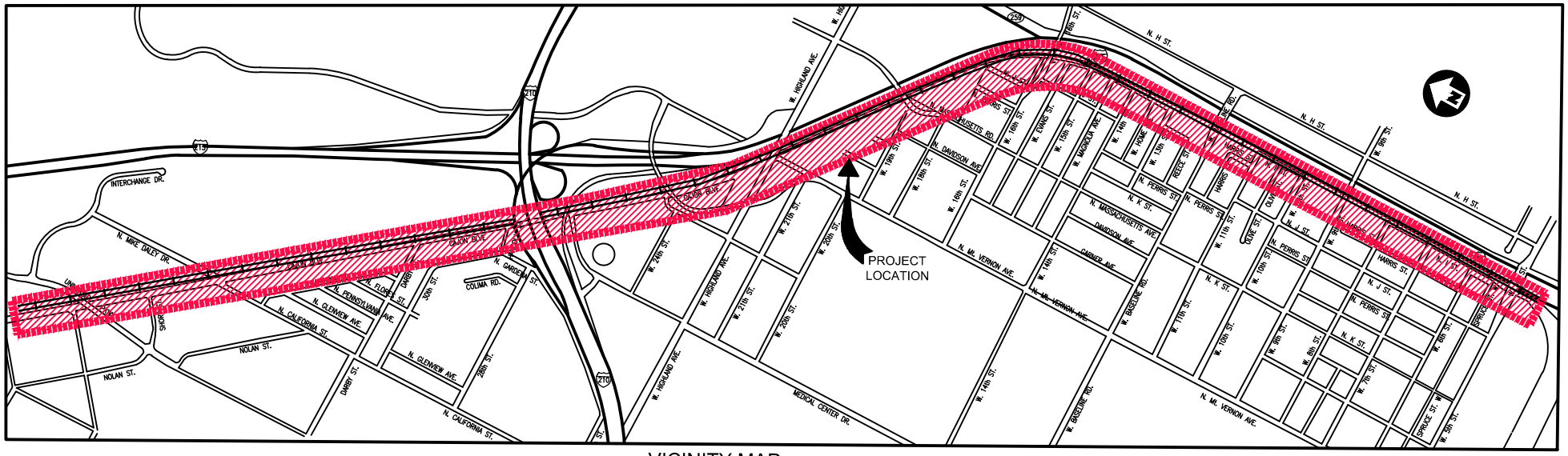
3 METHODOLOGY

The hydrologic data and methodology in this study is based on the San Bernardino County Hydrology Manual Rational Method, and the 100-year storm event precipitation based on the current NOAA Atlas 14 data sub-areas (details shown on reference-1 in this report). The impervious number for each drainage area is based on the engineers site visit and calculations. Civil Design Version 8.1, a Hydrology Computer Program was

used to calculate the 100-year storm runoff. Flow Master was used to size & analyze the proposed drainage channels.

*4 **SUMMARY***

The Hydrology Study shows that the 100-year storm water runoff for each area is calculated based on the San Bernardino County Hydrology Manual Rational Method. Evaluation of appropriateness of guidelines and accuracy of County data was beyond this scope of study. Use of this report is limited to address the purpose and scope previously defined in the report. The Hydrology Study & Drainage Devices Summary Table (see page 7) show all hydrology information and engineer's recommendations of this analysis. The opinions presented in this report have been derived in accordance with current standards of civil engineering practice. This report may not contain sufficient information for other parties or purposes.



VICINITY MAP

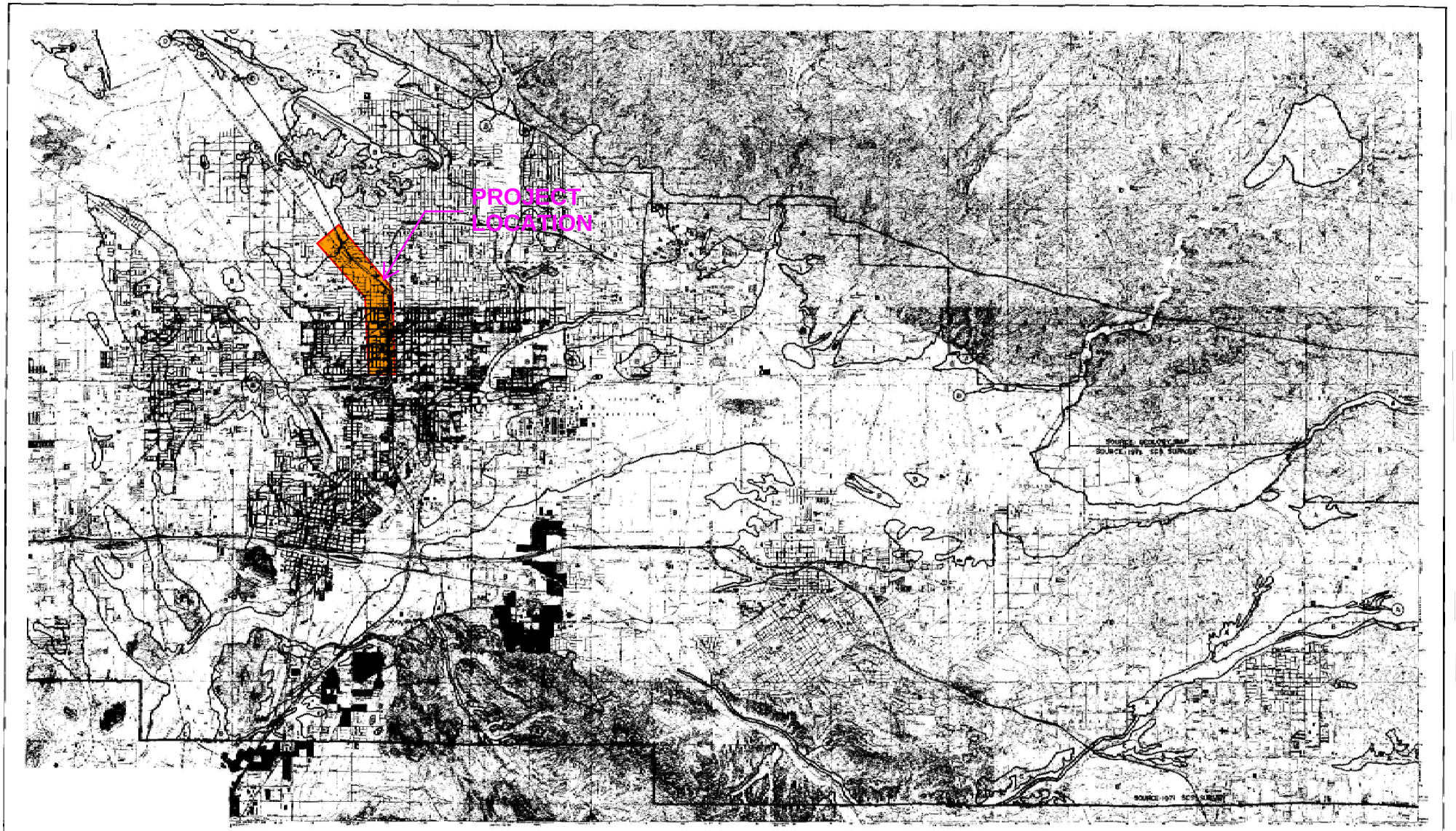
N.T.S.

HYDROLOGY INFORMATION

SITE AREA:	FROM OGDEN STREET. ~ W. 5TH STREET 5.5 MILES ALONG WEST SIDE OF RAILWAY	
SOIL GROUP:	B	(PER SBC SOIL GROUP MAP C–13)
IMPERVIOUS:	PER CALCULATION	
	60%	(8–10 DWELLINS/ACRE)
	90%	(COMMERCIAL OR INDUSTRIAL)
ISOHYETALS:	1.37"~1.8"	(100–YEAR 1 HOUR PER NOAA Atlas14 DATA)
CN NUMBER:	56 (AMC-II), 75 (AMC-III)	(SOIL GROUP B)
FREQUENCY:	100 YEAR	

ANTECEDENT MOISTURE CONDITION: AMC III (PER 100–YEAR)

METHOD: SAN BERNARDINO COUNTY HYDROLOGY MANUAL

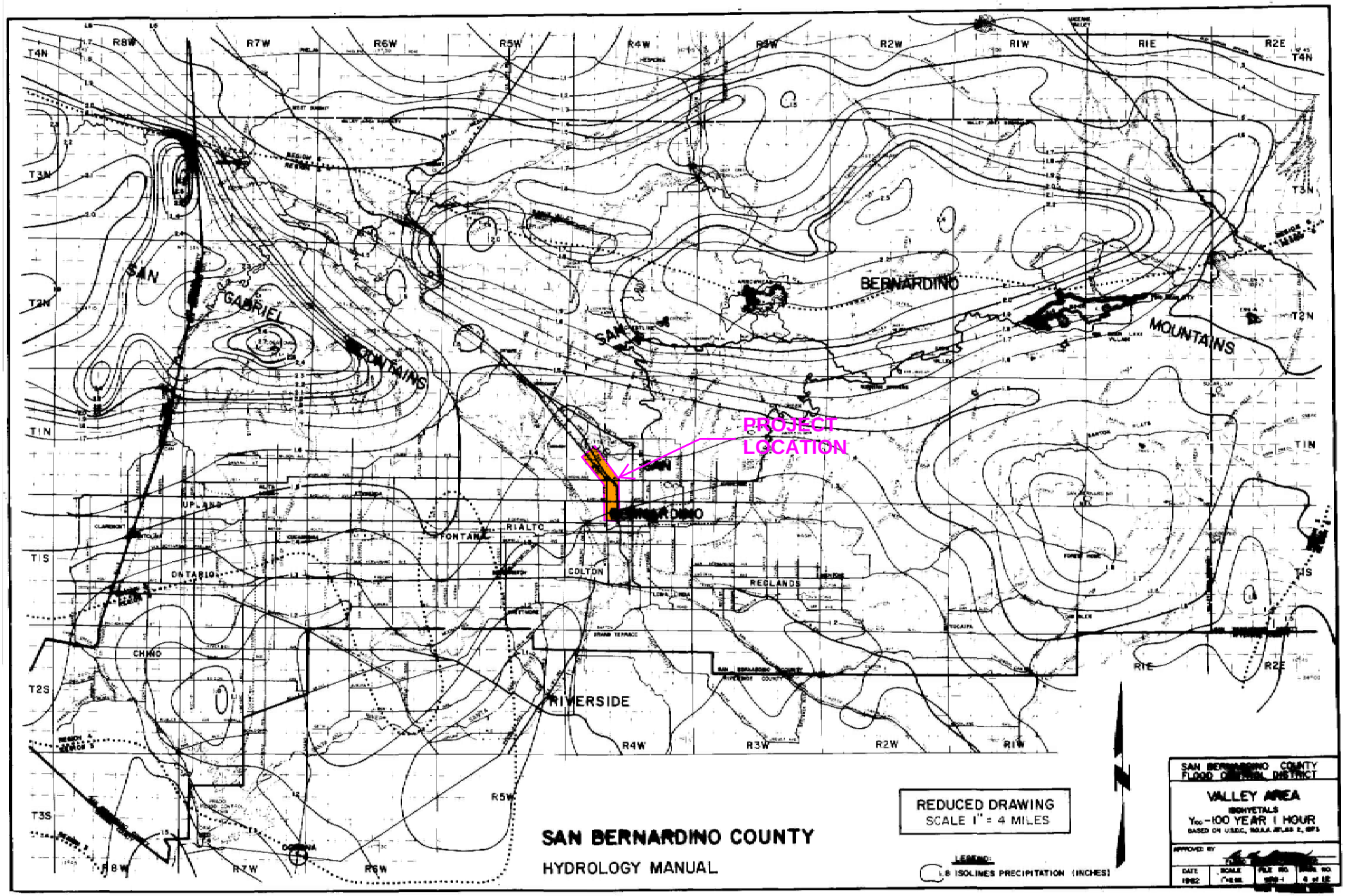


SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

SCALE REDUCED BY 1/2

HYDROLOGIC SOILS GROUP MAP
FOR
SOUTHWEST-D AREA

FIGURE C-16



B-12

FIGURE B-4

HYDROLOGY STUDY & DRAINAGE DEVICES SUMMARY TABLE:													
RAILWAY STATIONS	**SUB-AREA**	**AREA (ac)**	**SLOPE (%)**	**ISOHYETALS 100-Yr. 1-Hr.**	**SOILS GROUP**	**COVER TYPE**	**IMPERVIOUS NUMBER %**	**Q100 (cfs)**	**EXISTING INLETS OR CATCH BASINS**	**EXISTING INLETS OR CATCH BASINS CAPACITY (cfs)**	**Q100 OVER FLOW RATE (cfs)**	**CHANNEL FLOW Q100 (cfs)**	**ENGINNER RECOMMEND CHANNEL TYPE & SIZE**
104+00 -143+70	1A	5.24	2.1	1.8	B	Road & Rail Road	60	51.75	NO	0	51.75	51.75	Rectangular Concrete Channel: W=3', H=1.5'
143+70 - 176+10	2A	5.16	2.1	1.77	B	Road & Rail Road	60	21.74	NO	0	21.74	73.49	Rectangular Concrete Channel: W=3', H=2'
180+40 - 212+40	3A	4.1	1.7	1.7	B	Road & Rail Road	60	14.68	1-36"X36" INLET CATCH BASIN	11.74	2.94	14.68	Triangular Earth Channel: W=3' , H=1.5' with 2:1 Side Slope
215+00 - 234+00	4A	4.96	1.3	1.65	B	Industrial & Residential	70	19.79	NO	0	19.79	19.79	Triangular Earth Channel: W=3' , H=1.5' with 2:1 Side Slope
235+00 - 255+25	5A	20.17	1.2	1.6	B	Industrial & Residential	70	83.53	NO	0	83.53	83.53	Rectangular Concrete Channel: W=3', H=2.4'
256+00 - 280+00	6A	17.74	1.8	1.55	B	Residential	60	59.42	NO	0	59.42	59.42	Rectangular Concrete Channel: W=3', H=1.6'
282+00 - 288+50	7A	14.63	1.1	1.5	B	Residential	60	43.33	1-12" PIPE INLET	2.4	40.93	40.93	Rectangular Concrete Channel: W=3', H=1.5'
288+50 -295+30	8A	11.27	1.5	1.47	B	Industrial & Residential	70	33.47	1-12" PIPE & 2-24"X24' BOX INLET	18.4	15.07	15.07	Triangular Earth Channel: W=3' , H=1.5' with 2:1 Side Slope
295+30 -303+00	9A	11.67	1	1.44	B	Industrial	90	40.77	1-7'x8' & 1-5'x7' BULK INLET	0	0	0	No need
303+00 - 309+00	10A	27.32	1	1.4	B	Industrial & Open Space	50	71.34	2-24"X24" BOX INLETS	22	49.34	49.34	Rectangular Concrete Channel: W=3', H=1.5'
309+00 - 315+80	11A	27.51	0.7	1.37	B	Residential	60	68.16	2-24"X24" BOX INLETS	22	46.16	46.16	Rectangular Concrete Channel: W=3', H=1.5'
315+80 - 325+50	12A	19.9	0.5	1.35	B	Residential	60	55	1-12" PIPE INLET	4.5	50.5	50.5	Rectangular Concrete Channel: W=3', H=1.5'

Section-1

- ***100-Year Storm Runoff Calculations***

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 01/08/18

BNSF RAILWAY
ONO LEAD TRACK EXTENSION
100-YEAR STORM
SUB-AREA 1A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.800 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)
Initial subarea data:
Initial area flow distance = 712.000(Ft.)
Top (of initial area) elevation = 1413.810(Ft.)
Bottom (of initial area) elevation = 1365.450(Ft.)
Difference in elevation = 48.360(Ft.)
Slope = 0.06792 s(%)= 6.79
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.202 min.
Rainfall intensity = 6.422(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.894
Subarea runoff = 5.970(CFS)
Total initial stream area = 1.040(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.044(In/Hr)

++

Process from Point/Station 2.000 to Point/Station 3.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)
Time of concentration = 7.20 min.
Rainfall intensity = 6.422(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified rational method)(Q=KCIA) is C = 0.894
Subarea runoff = 38.805(CFS) for 6.760(Ac.)
Total runoff = 44.775(CFS)
Effective area this stream = 7.80(Ac.)
Total Study Area (Main Stream No. 1) = 7.80(Ac.)
Area averaged Fm value = 0.044(In/Hr)

++

Process from Point/Station 3.000 to Point/Station 4.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 0.000(CFS)

```
Depth of flow =   3.023(Ft.), Average velocity =   8.708(Ft/s)
!!Warning: Water is above left or right bank elevations
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              0.00
        2              1.00              0.00
Manning's 'N' friction factor =   0.023
------------------------------------------------------------------
Sub-Channel flow  =     30.424(CFS)
  '     '        flow top width =      1.000(Ft.)
  '     '    velocity=   10.065(Ft/s)
  '     '        area =      3.023(Sq.Ft)
  '     '        Froude number =     1.020

Information entered for subchannel number 2 :
Point number      'X' coordinate     'Y' coordinate
        1              1.00              0.00
        2              2.00              1.00
Manning's 'N' friction factor =   0.023
------------------------------------------------------------------
Sub-Channel flow  =     17.865(CFS)
  '     '        flow top width =      1.000(Ft.)
  '     '    velocity=    7.081(Ft/s)
  '     '        area =      2.523(Sq.Ft)
  '     '        Froude number =     0.786

Upstream point elevation =  1365.450(Ft.)
Downstream point elevation =  1350.000(Ft.)
Flow length =  2578.000(Ft.)
Travel time  =    4.93 min.
Time of concentration =   12.14 min.
Depth of flow =   3.023(Ft.)
Average velocity =   8.708(Ft/s)
Total irregular channel flow =    48.289(CFS)
Irregular channel normal depth above invert elev. =   3.023(Ft.)
Average velocity of channel(s) =   8.708(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.044(In/Hr)
Rainfall intensity =      4.696(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.892
Subarea runoff =      6.971(CFS) for    4.560(Ac.)
Total runoff =     51.746(CFS)
Effective area this stream =       12.36(Ac.)
Total Study Area (Main Stream No. 1) =       12.36(Ac.)
Area averaged Fm value =    0.044(In/Hr)
Depth of flow =   3.140(Ft.), Average velocity =   8.952(Ft/s)
!!Warning: Water is above left or right bank elevations
End of computations, Total Study Area =           12.36 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number =  56.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 01/04/18

BNSF RAILWAY
ONO LEAD TRACK EXTENSION
100-YEAR STORM
SUB-AREA 2A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.770 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 4.000 to Point/Station 5.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)
Initial subarea data:
Initial area flow distance = 400.000(Ft.)
Top (of initial area) elevation = 1346.430(Ft.)
Bottom (of initial area) elevation = 1331.260(Ft.)
Difference in elevation = 15.170(Ft.)
Slope = 0.03793 s(%)= 3.79
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.426 min.
Rainfall intensity = 6.763(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.894
Subarea runoff = 6.047(CFS)
Total initial stream area = 1.000(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.044(In/Hr)

++

Process from Point/Station 5.000 to Point/Station 6.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 0.000(CFS)
Depth of flow = 1.824(Ft.), Average velocity = 10.518(Ft/s)
!!Warning: Water is above left or right bank elevations
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.00
2	1.00	1.00

Manning's 'N' friction factor = 0.023

Sub-Channel flow = 13.925(CFS)
' ' flow top width = 1.000(Ft.)
' ' velocity= 10.518(Ft/s)
' ' area = 1.324(Sq.Ft)
' ' Froude number = 1.611

Upstream point elevation = 1365.450(Ft.)
Downstream point elevation = 1269.520(Ft.)
Flow length = 3315.000(Ft.)
Travel time = 5.25 min.
Time of concentration = 11.68 min.
Depth of flow = 1.824(Ft.)
Average velocity = 10.518(Ft/s)

```
Total irregular channel flow =    13.925(CFS)
Irregular channel normal depth above invert elev. =   1.824(Ft.)
Average velocity of channel(s) =  10.518(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.044(In/Hr)
Rainfall intensity =      4.725(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.892
Subarea runoff =     15.693(CFS) for    4.160(Ac.)
Total runoff =     21.740(CFS)
Effective area this stream =        5.16(Ac.)
Total Study Area (Main Stream No. 1) =        5.16(Ac.)
Area averaged Fm value =    0.044(In/Hr)
Depth of flow =   2.230(Ft.), Average velocity =  12.569(Ft/s)
!!Warning: Water is above left or right bank elevations
End of computations, Total Study Area =            5.16 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number =  56.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 01/04/18

BNSF RAILWAY
ONO LEAD TRACK EXTENSION
100-YEAR STORM
SUB-AREA 3A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.700 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 7.000 to Point/Station 8.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)
Initial subarea data:
Initial area flow distance = 700.000(Ft.)
Top (of initial area) elevation = 1271.400(Ft.)
Bottom (of initial area) elevation = 1245.220(Ft.)
Difference in elevation = 26.180(Ft.)
Slope = 0.03740 s(%)= 3.74
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.060 min.
Rainfall intensity = 5.669(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.893
Subarea runoff = 6.075(CFS)
Total initial stream area = 1.200(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.044(In/Hr)

++

Process from Point/Station 8.000 to Point/Station 9.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 0.000(CFS)
Depth of flow = 1.848(Ft.), Average velocity = 7.727(Ft/s)
!!Warning: Water is above left or right bank elevations
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.00
2	1.00	1.00

Manning's 'N' friction factor = 0.023

Sub-Channel flow = 10.413(CFS)
' ' flow top width = 1.000(Ft.)
' ' velocity= 7.727(Ft/s)
' ' area = 1.348(Sq.Ft)
' ' Froude number = 1.173

Upstream point elevation = 1245.220(Ft.)
Downstream point elevation = 1201.220(Ft.)
Flow length = 2885.000(Ft.)
Travel time = 6.22 min.
Time of concentration = 14.28 min.
Depth of flow = 1.848(Ft.)
Average velocity = 7.727(Ft/s)

```
Total irregular channel flow =    10.413(CFS)
Irregular channel normal depth above invert elev. =   1.848(Ft.)
Average velocity of channel(s) =   7.727(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.044(In/Hr)
Rainfall intensity =      4.022(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.890
Subarea runoff =      8.604(CFS) for    2.900(Ac.)
Total runoff =     14.679(CFS)
Effective area this stream =        4.10(Ac.)
Total Study Area (Main Stream No. 1) =        4.10(Ac.)
Area averaged Fm value =    0.044(In/Hr)
Depth of flow =   2.156(Ft.), Average velocity =   8.864(Ft/s)
!!Warning: Water is above left or right bank elevations
End of computations, Total Study Area =            4.10 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number =  56.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 01/04/18

BNSF RAILWAY
ONO LEAD TRACK EXTENSION
100-YEAR STORM
SUB-AREA 4A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.650 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 10.000 to Point/Station 11.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)
Initial subarea data:
Initial area flow distance = 550.000(Ft.)
Top (of initial area) elevation = 1193.670(Ft.)
Bottom (of initial area) elevation = 1184.930(Ft.)
Difference in elevation = 8.740(Ft.)
Slope = 0.01589 s(%)= 1.59
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.685 min.
Rainfall intensity = 5.261(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.892
Subarea runoff = 14.087(CFS)
Total initial stream area = 3.000(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.044(In/Hr)

++

Process from Point/Station 11.000 to Point/Station 12.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 0.000(CFS)
Depth of flow = 2.452(Ft.), Average velocity = 8.695(Ft/s)
!!Warning: Water is above left or right bank elevations
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.00
2	1.00	1.00

Manning's 'N' friction factor = 0.023

Sub-Channel flow = 16.972(CFS)
' ' flow top width = 1.000(Ft.)
' ' velocity= 8.695(Ft/s)
' ' area = 1.952(Sq.Ft)
' ' Froude number = 1.097

Upstream point elevation = 1184.930(Ft.)
Downstream point elevation = 1169.810(Ft.)
Flow length = 1283.000(Ft.)
Travel time = 2.46 min.
Time of concentration = 11.14 min.
Depth of flow = 2.452(Ft.)
Average velocity = 8.695(Ft/s)

```
Total irregular channel flow =    16.972(CFS)
Irregular channel normal depth above invert elev. =   2.452(Ft.)
Average velocity of channel(s) =   8.695(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.176(In/Hr)
Rainfall intensity =      4.530(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.881
Subarea runoff =       5.707(CFS) for    1.960(Ac.)
Total runoff =     19.794(CFS)
Effective area this stream =        4.96(Ac.)
Total Study Area (Main Stream No. 1) =        4.96(Ac.)
Area averaged Fm value =    0.096(In/Hr)
Depth of flow =   2.641(Ft.), Average velocity =   9.247(Ft/s)
!!Warning: Water is above left or right bank elevations
End of computations, Total Study Area =            4.96 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.219
Area averaged SCS curve number =  56.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 01/04/18

BNSF RAILWAY
ONO LEAD TRACK EXTENSION
100-YEAR STORM
SUB-AREA 5A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.600 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 13.000 to Point/Station 14.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)
Initial subarea data:
Initial area flow distance = 533.000(Ft.)
Top (of initial area) elevation = 1168.820(Ft.)
Bottom (of initial area) elevation = 1160.840(Ft.)
Difference in elevation = 7.980(Ft.)
Slope = 0.01497 s(%)= 1.50
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.680 min.
Rainfall intensity = 5.104(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.892
Subarea runoff = 17.305(CFS)
Total initial stream area = 3.800(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.044(In/Hr)

++

Process from Point/Station 14.000 to Point/Station 15.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 0.000(CFS)
Depth of flow = 3.919(Ft.), Average velocity = 14.755(Ft/s)
!!Warning: Water is above left or right bank elevations
******* Irregular Channel Data ***********

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.00
2	1.00	1.00

Manning's 'N' friction factor = 0.023

Sub-Channel flow = 50.455(CFS)
' ' flow top width = 1.000(Ft.)
' ' velocity= 14.755(Ft/s)
' ' area = 3.419(Sq.Ft)
' ' Froude number = 1.406

Upstream point elevation = 1160.840(Ft.)
Downstream point elevation = 1145.250(Ft.)
Flow length = 970.000(Ft.)
Travel time = 1.10 min.
Time of concentration = 9.78 min.
Depth of flow = 3.919(Ft.)
Average velocity = 14.755(Ft/s)

```
Total irregular channel flow =    50.455(CFS)
Irregular channel normal depth above invert elev. =   3.919(Ft.)
Average velocity of channel(s) =  14.755(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.176(In/Hr)
Rainfall intensity =      4.753(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.871
Subarea runoff =     66.225(CFS) for   16.370(Ac.)
Total runoff =     83.530(CFS)
Effective area this stream =       20.17(Ac.)
Total Study Area (Main Stream No. 1) =       20.17(Ac.)
Area averaged Fm value =    0.151(In/Hr)
Depth of flow =   5.127(Ft.), Average velocity =  18.052(Ft/s)
!!Warning: Water is above left or right bank elevations
End of computations, Total Study Area =           20.17 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.343
Area averaged SCS curve number =  56.0
```

```
                San Bernardino County Rational Hydrology Program

                    (Hydrology Manual Date - August 1986)

 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2014 Version 9.0
        Rational Hydrology Study        Date: 01/04/18
------------------------------------------------------------------------
BNSF RAILWAY
ONO LEAD TRACK EXTENSION
100-YEAR STORM
SUB-AREA 6A
------------------------------------------------------------------------


Program License Serial Number 6277

------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
Computed rainfall intensity:
Storm year =   100.00   1 hour rainfall =     1.550 (In.)
Slope used for rainfall intensity curve b =  0.6000
Soil antecedent moisture condition (AMC) = 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.176(In/Hr)
Initial subarea data:
Initial area flow distance =   427.000(Ft.)
Top (of initial area) elevation =  1147.360(Ft.)
Bottom (of initial area) elevation =  1140.330(Ft.)
Difference in elevation =     7.030(Ft.)
Slope =    0.01646  s(%)=       1.65
TC = k(0.374)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.588 min.
Rainfall intensity =      4.658(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.866
Subarea runoff =      7.785(CFS)
Total initial stream area =        1.930(Ac.)
Pervious area fraction = 0.400
Initial area Fm value =    0.176(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station       18.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   3.976(Ft.), Average velocity =   9.677(Ft/s)
!!Warning: Water is above left or right bank elevations
        ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1              0.00              0.00
        2              1.00              1.00
Manning's 'N' friction factor =   0.023
------------------------------------------------------------------
Sub-Channel flow  =     33.637(CFS)
  '     '        flow top width =      1.000(Ft.)
  '     '    velocity=    9.677(Ft/s)
  '     '        area =      3.476(Sq.Ft)
  '     '        Froude number =     0.915

Upstream point elevation =  1140.330(Ft.)
Downstream point elevation =  1127.310(Ft.)
Flow length =  1925.000(Ft.)
Travel time  =    3.32 min.
Time of concentration =   12.90 min.
Depth of flow =   3.976(Ft.)
Average velocity =   9.677(Ft/s)
```

```
Total irregular channel flow =    33.637(CFS)
Irregular channel normal depth above invert elev. =   3.976(Ft.)
Average velocity of channel(s) =   9.677(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.176(In/Hr)
Rainfall intensity =      3.898(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.859
Subarea runoff =     51.634(CFS) for   15.810(Ac.)
Total runoff =     59.419(CFS)
Effective area this stream =       17.74(Ac.)
Total Study Area (Main Stream No. 1) =       17.74(Ac.)
Area averaged Fm value =    0.176(In/Hr)
Depth of flow =   5.390(Ft.), Average velocity =  12.150(Ft/s)
!!Warning: Water is above left or right bank elevations
End of computations, Total Study Area =           17.74 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.400
Area averaged SCS curve number =  56.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 01/04/18

BNSF RAILWAY
ONO LEAD TRACK EXTENSION
100-YEAR STORM
SUB-AREA 7A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.500 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 19.000 to Point/Station 20.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)
Initial subarea data:
Initial area flow distance = 800.000(Ft.)
Top (of initial area) elevation = 1127.060(Ft.)
Bottom (of initial area) elevation = 1125.400(Ft.)
Difference in elevation = 1.660(Ft.)
Slope = 0.00207 s(%)= 0.21
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 15.160 min.
Rainfall intensity = 3.424(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.888
Subarea runoff = 14.511(CFS)
Total initial stream area = 4.770(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.044(In/Hr)

++

Process from Point/Station 20.000 to Point/Station 21.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 1125.400(Ft.)
End of street segment elevation = 1119.510(Ft.)
Length of street segment = 9.860(Ft.)
Height of curb above gutter flowline = 6.0(In.)
Width of half street (curb to crown) = 30.000(Ft.)
Distance from crown to crossfall grade break = 28.500(Ft.)
Slope from gutter to grade break (v/hz) = 1.000
Slope from grade break to crown (v/hz) = 1.000
Street flow is on [2] side(s) of the street
Distance from curb to property line = 10.000(Ft.)
Slope from curb to property line (v/hz) = 2.000
Gutter width = 1.500(Ft.)
Gutter hike from flowline = 0.500(In.)
Manning's N in gutter = 0.0130
Manning's N from gutter to grade break = 0.0140
Manning's N from grade break to crown = 0.0140
Estimated mean flow rate at midpoint of street = 28.993(CFS)
Depth of flow = 0.308(Ft.), Average velocity = 31.110(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 1.766(Ft.)
Flow velocity = 31.11(Ft/s)
Travel time = 0.01 min. TC = 15.17 min.
Adding area flow to street
RESIDENTIAL(8 - 10 dwl/acre)

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.176(In/Hr)
Rainfall intensity =      3.423(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.865
Subarea runoff =     28.815(CFS) for    9.860(Ac.)
Total runoff =     43.327(CFS)
Effective area this stream =       14.63(Ac.)
Total Study Area (Main Stream No. 1) =       14.63(Ac.)
Area averaged Fm value =    0.133(In/Hr)
Street flow at end of street =     43.327(CFS)
Half street flow at end of street =     21.663(CFS)
Depth of flow =   0.390(Ft.), Average velocity =  35.225(Ft/s)
Flow width (from curb towards crown)=   1.849(Ft.)
End of computations, Total Study Area =           14.63 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.302
Area averaged SCS curve number =  56.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 01/04/18

BNSF RAILWAY
ONO LEAD TRACK EXTENSION
100-YEAR STORM
SUB-AREA 8A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.470 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 22.000 to Point/Station 23.000
**** INITIAL AREA EVALUATION ****

RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.4000 Max loss rate(Fm)= 0.176(In/Hr)
Initial subarea data:
Initial area flow distance = 784.000(Ft.)
Top (of initial area) elevation = 1120.630(Ft.)
Bottom (of initial area) elevation = 1113.580(Ft.)
Difference in elevation = 7.050(Ft.)
Slope = 0.00899 s(%)= 0.90
TC = k(0.374)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.798 min.
Rainfall intensity = 3.551(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.855
Subarea runoff = 16.796(CFS)
Total initial stream area = 5.530(Ac.)
Pervious area fraction = 0.400
Initial area Fm value = 0.176(In/Hr)

++

Process from Point/Station 24.000 to Point/Station 24.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 1113.580(Ft.)
End of street segment elevation = 1108.180(Ft.)
Length of street segment = 275.000(Ft.)
Height of curb above gutter flowline = 6.0(In.)
Width of half street (curb to crown) = 30.000(Ft.)
Distance from crown to crossfall grade break = 28.500(Ft.)
Slope from gutter to grade break (v/hz) = 1.000
Slope from grade break to crown (v/hz) = 1.000
Street flow is on [2] side(s) of the street
Distance from curb to property line = 10.000(Ft.)
Slope from curb to property line (v/hz) = 2.000
Gutter width = 1.500(Ft.)
Gutter hike from flowline = 0.500(In.)
Manning's N in gutter = 0.0130
Manning's N from gutter to grade break = 0.0140
Manning's N from grade break to crown = 0.0140
Estimated mean flow rate at midpoint of street = 25.233(CFS)
Depth of flow = 0.778(Ft.), Average velocity = 8.844(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property = 0.14(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 2.237(Ft.)
Flow velocity = 8.84(Ft/s)
Travel time = 0.52 min. TC = 14.32 min.

```
 Adding area flow to street
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.176(In/Hr)
Rainfall intensity =      3.473(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.854
Subarea runoff =     16.676(CFS) for    5.750(Ac.)
Total runoff =     33.472(CFS)
Effective area this stream =       11.28(Ac.)
Total Study Area (Main Stream No. 1) =       11.28(Ac.)
Area averaged Fm value =    0.176(In/Hr)
Street flow at end of street =     33.472(CFS)
Half street flow at end of street =     16.736(CFS)
Depth of flow =   0.912(Ft.), Average velocity =   9.518(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    0.21(Ft.)
Flow width (from curb towards crown)=   2.371(Ft.)
End of computations, Total Study Area =           11.28 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.400
Area averaged SCS curve number =  56.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 01/04/18

BNSF RAILWAY
ONO LEAD TRACK EXTENSION
100-YEAR STORM
SUB-AREA 9A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.440 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++
Process from Point/Station 25.000 to Point/Station 26.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)
Initial subarea data:
Initial area flow distance = 926.000(Ft.)
Top (of initial area) elevation = 1114.000(Ft.)
Bottom (of initial area) elevation = 1102.700(Ft.)
Difference in elevation = 11.300(Ft.)
Slope = 0.01220 s(%)= 1.22
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.278 min.
Rainfall intensity = 3.926(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.890
Subarea runoff = 40.770(CFS)
Total initial stream area = 11.670(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.044(In/Hr)
End of computations, Total Study Area = 11.67 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 56.0

San Bernardino County Rational Hydrology Program

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CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 01/04/18

BNSF RAILWAY
ONO LEAD TRACK EXTENSION
100-YEAR STORM
SUB-AREA 10A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.400 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 27.000 to Point/Station 28.000
**** INITIAL AREA EVALUATION ****

RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.4000 Max loss rate(Fm)= 0.176(In/Hr)
Initial subarea data:
Initial area flow distance = 663.000(Ft.)
Top (of initial area) elevation = 1116.000(Ft.)
Bottom (of initial area) elevation = 1111.000(Ft.)
Difference in elevation = 5.000(Ft.)
Slope = 0.00754 s(%)= 0.75
TC = k(0.374)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.366 min.
Rainfall intensity = 3.447(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.854
Subarea runoff = 14.425(CFS)
Total initial stream area = 4.900(Ac.)
Pervious area fraction = 0.400
Initial area Fm value = 0.176(In/Hr)

++

Process from Point/Station 28.000 to Point/Station 29.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 1111.000(Ft.)
End of street segment elevation = 1096.000(Ft.)
Length of street segment = 1363.000(Ft.)
Height of curb above gutter flowline = 6.0(In.)
Width of half street (curb to crown) = 30.000(Ft.)
Distance from crown to crossfall grade break = 28.500(Ft.)
Slope from gutter to grade break (v/hz) = 1.000
Slope from grade break to crown (v/hz) = 1.000
Street flow is on [2] side(s) of the street
Distance from curb to property line = 10.000(Ft.)
Slope from curb to property line (v/hz) = 2.000
Gutter width = 1.500(Ft.)
Gutter hike from flowline = 0.500(In.)
Manning's N in gutter = 0.0130
Manning's N from gutter to grade break = 0.0140
Manning's N from grade break to crown = 0.0140
Estimated mean flow rate at midpoint of street = 42.961(CFS)
Depth of flow = 1.222(Ft.), Average velocity = 8.169(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property = 0.36(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 2.681(Ft.)
Flow velocity = 8.17(Ft/s)
Travel time = 2.78 min. TC = 16.15 min.

```
 Adding area flow to street
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.176(In/Hr)
Rainfall intensity =      3.077(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.849
Subarea runoff =     56.914(CFS) for   22.420(Ac.)
Total runoff =     71.339(CFS)
Effective area this stream =       27.32(Ac.)
Total Study Area (Main Stream No. 1) =       27.32(Ac.)
Area averaged Fm value =    0.176(In/Hr)
Street flow at end of street =     71.339(CFS)
Half street flow at end of street =     35.669(CFS)
Depth of flow =   1.590(Ft.), Average velocity =   9.264(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    0.55(Ft.)
Flow width (from curb towards crown)=   3.049(Ft.)
End of computations, Total Study Area =           27.32 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.400
Area averaged SCS curve number =  56.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 01/04/18

BNSF RAILWAY
ONO LEAD TRACK EXTENSION
100-YEAR STORM
SUB-AREA 11A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.370 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++

Process from Point/Station 30.000 to Point/Station 31.000
**** INITIAL AREA EVALUATION ****

RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.4000 Max loss rate(Fm)= 0.176(In/Hr)
Initial subarea data:
Initial area flow distance = 728.000(Ft.)
Top (of initial area) elevation = 1113.720(Ft.)
Bottom (of initial area) elevation = 1108.700(Ft.)
Difference in elevation = 5.020(Ft.)
Slope = 0.00690 s(%)= 0.69
TC = k(0.374)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 14.126 min.
Rainfall intensity = 3.263(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.851
Subarea runoff = 13.891(CFS)
Total initial stream area = 5.000(Ac.)
Pervious area fraction = 0.400
Initial area Fm value = 0.176(In/Hr)

++

Process from Point/Station 31.000 to Point/Station 32.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 1108.700(Ft.)
End of street segment elevation = 1091.710(Ft.)
Length of street segment = 1400.000(Ft.)
Height of curb above gutter flowline = 6.0(In.)
Width of half street (curb to crown) = 30.000(Ft.)
Distance from crown to crossfall grade break = 28.500(Ft.)
Slope from gutter to grade break (v/hz) = 1.000
Slope from grade break to crown (v/hz) = 1.000
Street flow is on [2] side(s) of the street
Distance from curb to property line = 10.000(Ft.)
Slope from curb to property line (v/hz) = 2.000
Gutter width = 1.500(Ft.)
Gutter hike from flowline = 0.500(In.)
Manning's N in gutter = 0.0130
Manning's N from gutter to grade break = 0.0140
Manning's N from grade break to crown = 0.0140
Estimated mean flow rate at midpoint of street = 41.099(CFS)
Depth of flow = 1.163(Ft.), Average velocity = 8.380(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property = 0.33(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 2.621(Ft.)
Flow velocity = 8.38(Ft/s)
Travel time = 2.78 min. TC = 16.91 min.

```
 Adding area flow to street
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.176(In/Hr)
Rainfall intensity =      2.929(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.846
Subarea runoff =     54.272(CFS) for   22.510(Ac.)
Total runoff =     68.163(CFS)
Effective area this stream =       27.51(Ac.)
Total Study Area (Main Stream No. 1) =       27.51(Ac.)
Area averaged Fm value =    0.176(In/Hr)
Street flow at end of street =     68.163(CFS)
Half street flow at end of street =     34.082(CFS)
Depth of flow =   1.515(Ft.), Average velocity =   9.505(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    0.51(Ft.)
Flow width (from curb towards crown)=   2.974(Ft.)
End of computations, Total Study Area =           27.51 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.400
Area averaged SCS curve number =  56.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2014 Version 9.0
Rational Hydrology Study Date: 01/04/18

BNSF RAILWAY
ONO LEAD TRACK EXTENSION
100-YEAR STORM
SUB-AREA 12A

Program License Serial Number 6277

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.350 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++
Process from Point/Station 33.000 to Point/Station 34.000
**** INITIAL AREA EVALUATION ****

RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.4000 Max loss rate(Fm)= 0.176(In/Hr)
Initial subarea data:
Initial area flow distance = 688.000(Ft.)
Top (of initial area) elevation = 1099.000(Ft.)
Bottom (of initial area) elevation = 1090.440(Ft.)
Difference in elevation = 8.560(Ft.)
Slope = 0.01244 s(%)= 1.24
TC = k(0.374)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.272 min.
Rainfall intensity = 3.498(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.855
Subarea runoff = 17.283(CFS)
Total initial stream area = 5.780(Ac.)
Pervious area fraction = 0.400
Initial area Fm value = 0.176(In/Hr)

++
Process from Point/Station 34.000 to Point/Station 35.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 1090.440(Ft.)
End of street segment elevation = 1086.510(Ft.)
Length of street segment = 620.000(Ft.)
Height of curb above gutter flowline = 6.0(In.)
Width of half street (curb to crown) = 30.000(Ft.)
Distance from crown to crossfall grade break = 28.500(Ft.)
Slope from gutter to grade break (v/hz) = 1.000
Slope from grade break to crown (v/hz) = 1.000
Street flow is on [2] side(s) of the street
Distance from curb to property line = 10.000(Ft.)
Slope from curb to property line (v/hz) = 2.000
Gutter width = 1.500(Ft.)
Gutter hike from flowline = 0.500(In.)
Manning's N in gutter = 0.0130
Manning's N from gutter to grade break = 0.0140
Manning's N from grade break to crown = 0.0140
Estimated mean flow rate at midpoint of street = 36.218(CFS)
Depth of flow = 1.292(Ft.), Average velocity = 6.365(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property = 0.40(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 2.750(Ft.)
Flow velocity = 6.36(Ft/s)
Travel time = 1.62 min. TC = 13.90 min.

```
 Adding area flow to street
RESIDENTIAL(8 - 10 dwl/acre)
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.4000     Max loss rate(Fm)=     0.176(In/Hr)
Rainfall intensity =      3.247(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.851
Subarea runoff =     37.720(CFS) for   14.120(Ac.)
Total runoff =     55.003(CFS)
Effective area this stream =       19.90(Ac.)
Total Study Area (Main Stream No. 1) =       19.90(Ac.)
Area averaged Fm value =    0.176(In/Hr)
Street flow at end of street =     55.003(CFS)
Half street flow at end of street =     27.502(CFS)
Depth of flow =   1.603(Ft.), Average velocity =   7.058(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    0.55(Ft.)
Flow width (from curb towards crown)=   3.061(Ft.)
End of computations, Total Study Area =           19.90 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.400
Area averaged SCS curve number =  56.0
```

WestLAND Group, Inc.

Section-2

- ***Sub-Area Drainage Channel Size Calculatons***

Not Recommend

1-A Tranglar Earth Channel

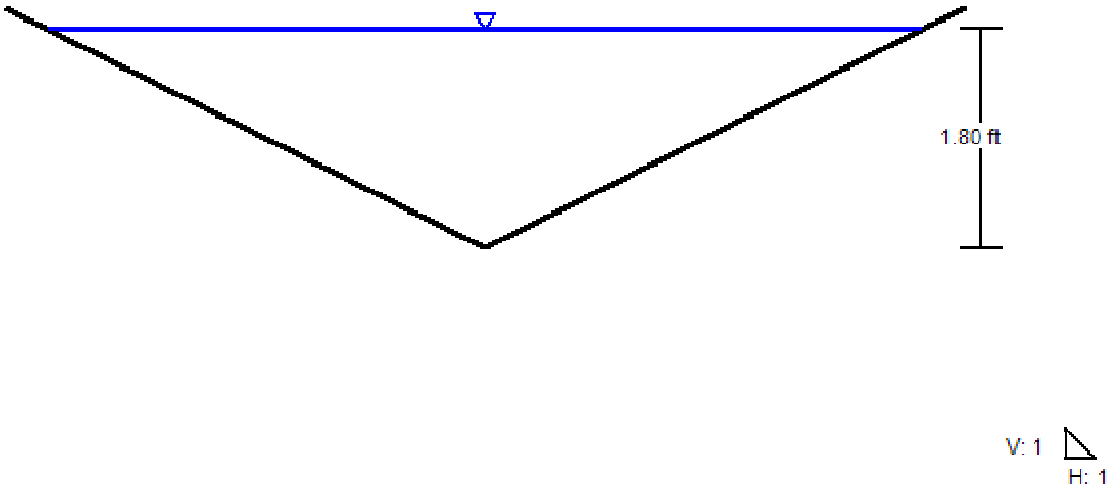
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.023	
Channel Slope	0.02100	ft/ft
Normal Depth	1.80	ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Discharge	52.50	ft³/s

Cross Section Image



Not Recommend

1A - Triangular Channel

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.023	
Channel Slope	0.02100	ft/ft
Normal Depth	1.80	ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)

Results

Discharge	52.50	ft³/s	
Flow Area	6.48	ft²	
Wetted Perimeter	8.05	ft	
Hydraulic Radius	0.80	ft	
Top Width	7.20	ft	
Critical Depth	2.12	ft	
Critical Slope	0.00877	ft/ft	
Velocity	8.10	ft/s	> 5 ft/s (Erosible Velocity)
Velocity Head	1.02	ft	
Specific Energy	2.82	ft	
Froude Number	1.51		
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.80	ft
Critical Depth	2.12	ft
Channel Slope	0.02100	ft/ft
Critical Slope	0.00877	ft/ft

Recommend Channel

1A Cross Section for Rectangular Channel - 1

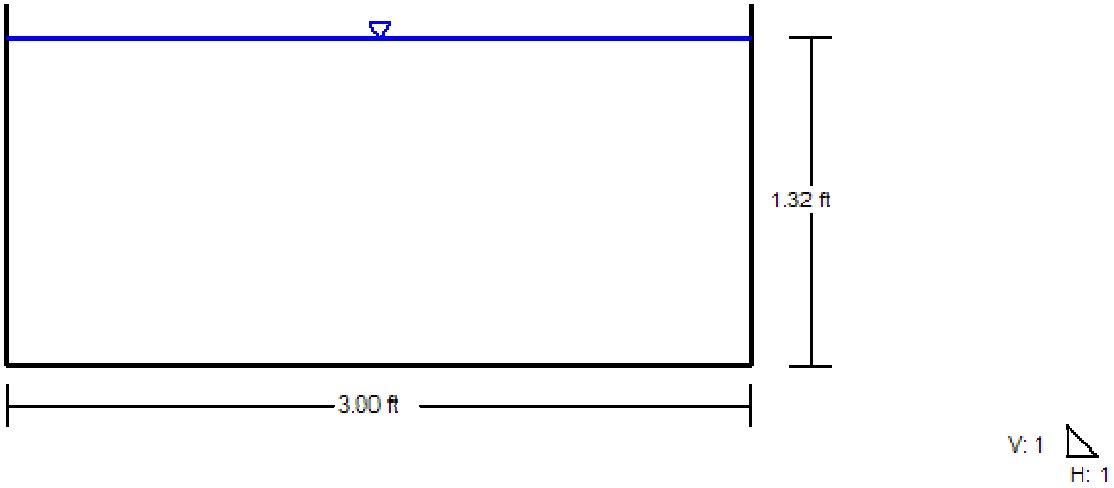
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.02100	ft/ft
Normal Depth	1.32	ft
Bottom Width	3.00	ft
Discharge	51.75	ft³/s

Cross Section Image



1A Rectangular Channel - 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.02100	ft/ft
Bottom Width	3.00	ft
Discharge	51.75	ft^3/s

Results

Normal Depth	1.32	ft
Flow Area	3.96	ft^2
Wetted Perimeter	5.64	ft
Hydraulic Radius	0.70	ft
Top Width	3.00	ft
Critical Depth	2.10	ft
Critical Slope	0.00618	ft/ft
Velocity	13.08	ft/s
Velocity Head	2.66	ft
Specific Energy	3.98	ft
Froude Number	2.01	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.32	ft
Critical Depth	2.10	ft
Channel Slope	0.02100	ft/ft
Critical Slope	0.00618	ft/ft

Recommend Channel

Cross Section for 2A Rectangular Channel - 1

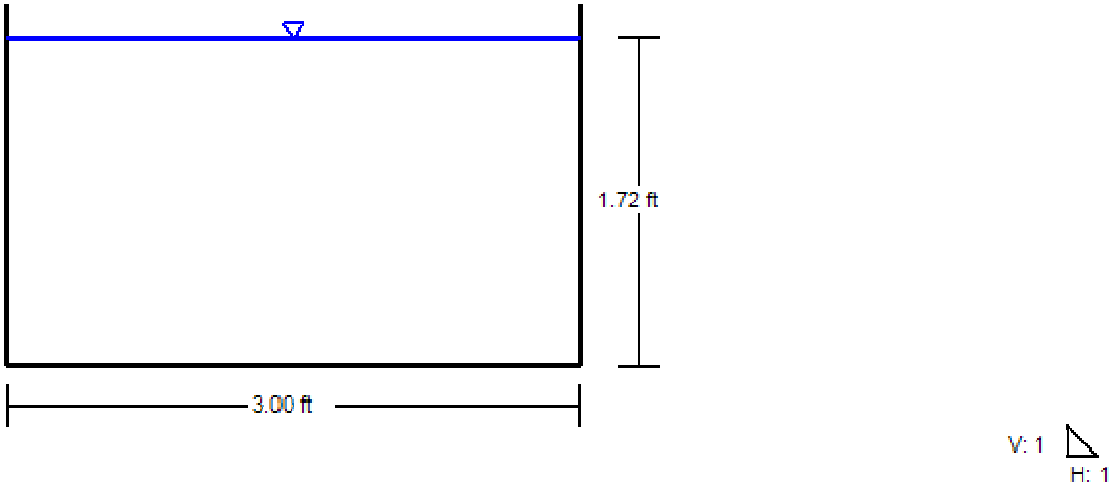
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.02100	ft/ft
Normal Depth	1.72	ft
Bottom Width	3.00	ft
Discharge	73.49	ft³/s

Cross Section Image



Recommend Channel

2A Rectangular Channel

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.02100	ft/ft
Bottom Width	3.00	ft
Discharge	73.49	ft^3/s

Results

Normal Depth	1.72	ft
Flow Area	5.15	ft^2
Wetted Perimeter	6.43	ft
Hydraulic Radius	0.80	ft
Top Width	3.00	ft
Critical Depth	2.65	ft
Critical Slope	0.00691	ft/ft
Velocity	14.28	ft/s
Velocity Head	3.17	ft
Specific Energy	4.88	ft
Froude Number	1.92	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.72	ft
Critical Depth	2.65	ft
Channel Slope	0.02100	ft/ft
Critical Slope	0.00691	ft/ft

Recommend Channel

Worksheet for 3A Triangular Channel - 1

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.023	
Channel Slope	0.01700	ft/ft
Normal Depth	1.20	ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)

Results

Discharge	16.02	ft³/s
Flow Area	2.88	ft²
Wetted Perimeter	5.37	ft
Hydraulic Radius	0.54	ft
Top Width	4.80	ft
Critical Depth	1.32	ft
Critical Slope	0.01028	ft/ft
Velocity	5.56	ft/s
Velocity Head	0.48	ft
Specific Energy	1.68	ft
Froude Number	1.27	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.20	ft
Critical Depth	1.32	ft
Channel Slope	0.01700	ft/ft
Critical Slope	0.01028	ft/ft

Recommend Channel

Cross Section for 3A Triangular Channel - 1

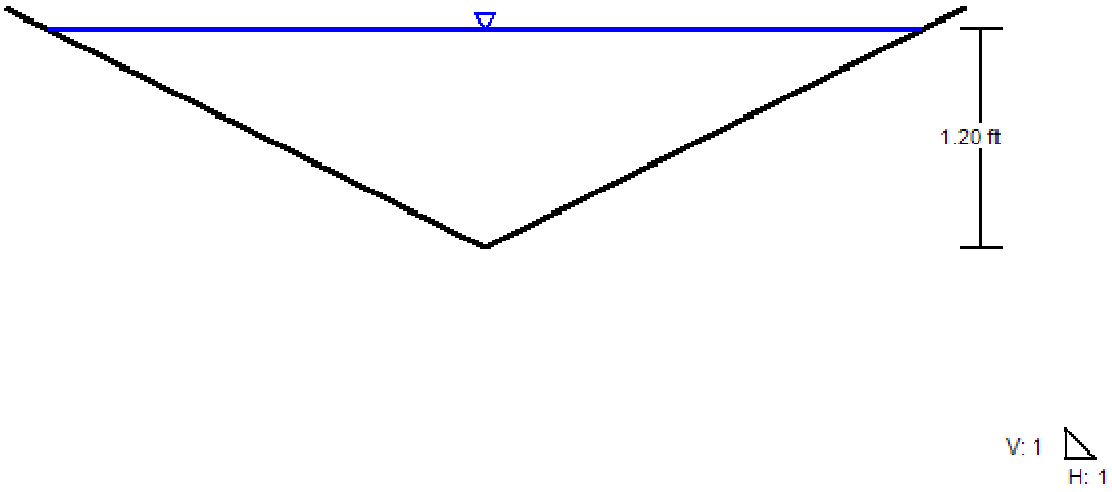
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.023	
Channel Slope	0.01700	ft/ft
Normal Depth	1.20	ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Discharge	16.02	ft³/s

Cross Section Image



Recommend Channel

Worksheet for 4A Triangular Channel - 1

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.023	
Channel Slope	0.01300	ft/ft
Normal Depth	1.50	ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)

Results

Discharge	25.40	ft^3/s
Flow Area	4.50	ft^2
Wetted Perimeter	6.71	ft
Hydraulic Radius	0.67	ft
Top Width	6.00	ft
Critical Depth	1.59	ft
Critical Slope	0.00966	ft/ft
Velocity	5.64	ft/s
Velocity Head	0.50	ft
Specific Energy	2.00	ft
Froude Number	1.15	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.50	ft
Critical Depth	1.59	ft
Channel Slope	0.01300	ft/ft
Critical Slope	0.00966	ft/ft

Recommend Channel

Cross Section for 4A Triangular Channel - 1

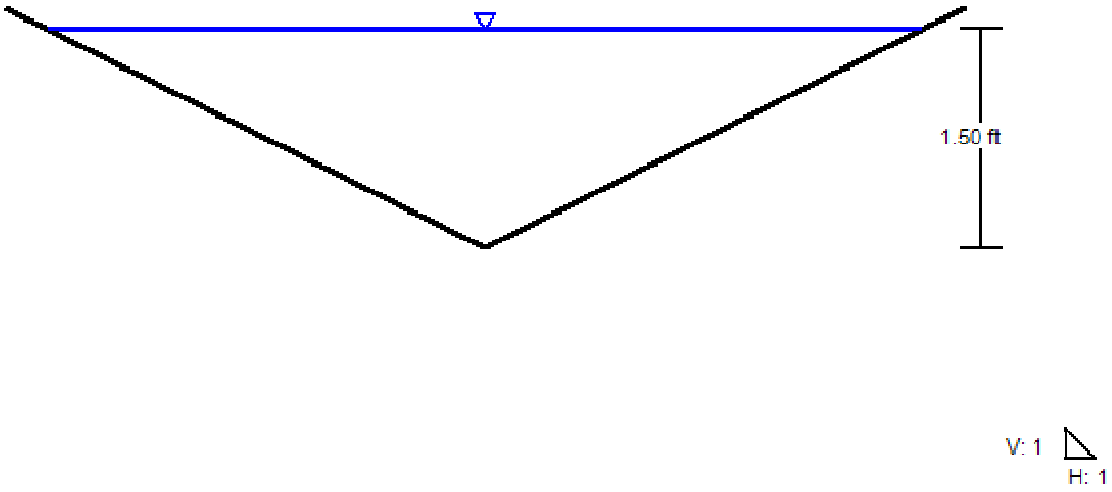
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.023	
Channel Slope	0.01300	ft/ft
Normal Depth	1.50	ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Discharge	25.40	ft³/s

Cross Section Image



Recommend Channel

Cross Section for 5A Rectangular Channel - 1

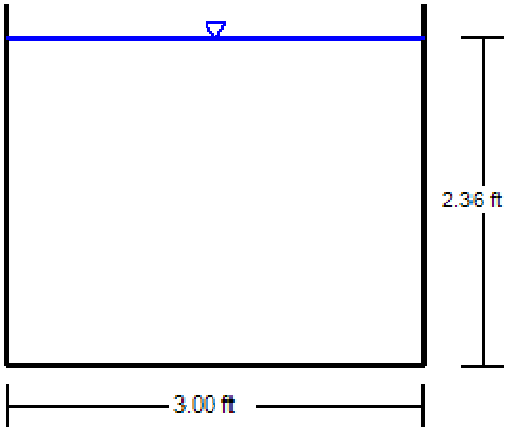
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01200	ft/ft
Normal Depth	2.36	ft
Bottom Width	3.00	ft
Discharge	83.53	ft³/s

Cross Section Image



V: 1
H: 1

Recommend Channel

Worksheet for 5A Rectangular Channel - 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01200	ft/ft
Bottom Width	3.00	ft
Discharge	83.53	ft^3/s

Results

Normal Depth	2.36	ft
Flow Area	7.07	ft^2
Wetted Perimeter	7.71	ft
Hydraulic Radius	0.92	ft
Top Width	3.00	ft
Critical Depth	2.89	ft
Critical Slope	0.00724	ft/ft
Velocity	11.81	ft/s
Velocity Head	2.17	ft
Specific Energy	4.53	ft
Froude Number	1.36	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	2.00	ft
Length	1500.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.36	ft
Critical Depth	2.89	ft
Channel Slope	0.01200	ft/ft
Critical Slope	0.00724	ft/ft

Recommend Channel

Cross Section for 6A Rectangular Channel - 1

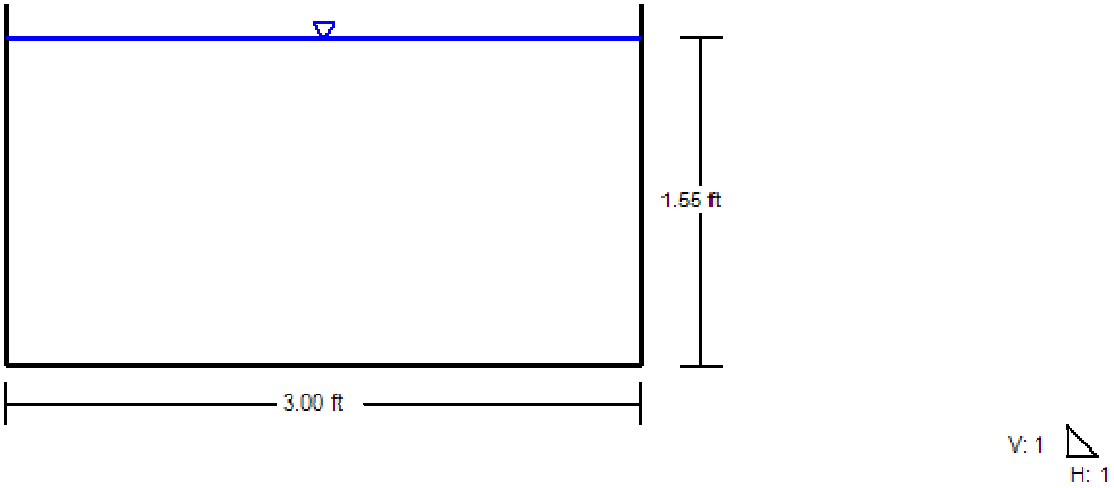
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01800	ft/ft
Normal Depth	1.55	ft
Bottom Width	3.00	ft
Discharge	59.42	ft³/s

Cross Section Image



Recommend Channel

Worksheet for 6A Rectangular Channel - 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01800	ft/ft
Bottom Width	3.00	ft
Discharge	59.42	ft^3/s

Results

Normal Depth	1.55	ft
Flow Area	4.64	ft^2
Wetted Perimeter	6.10	ft
Hydraulic Radius	0.76	ft
Top Width	3.00	ft
Critical Depth	2.30	ft
Critical Slope	0.00645	ft/ft
Velocity	12.79	ft/s
Velocity Head	2.54	ft
Specific Energy	4.09	ft
Froude Number	1.81	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	2.00	ft
Length	1500.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.55	ft
Critical Depth	2.30	ft
Channel Slope	0.01800	ft/ft
Critical Slope	0.00645	ft/ft

Recommend Channel

Cross Section for 7A Rectangular Channel - 1

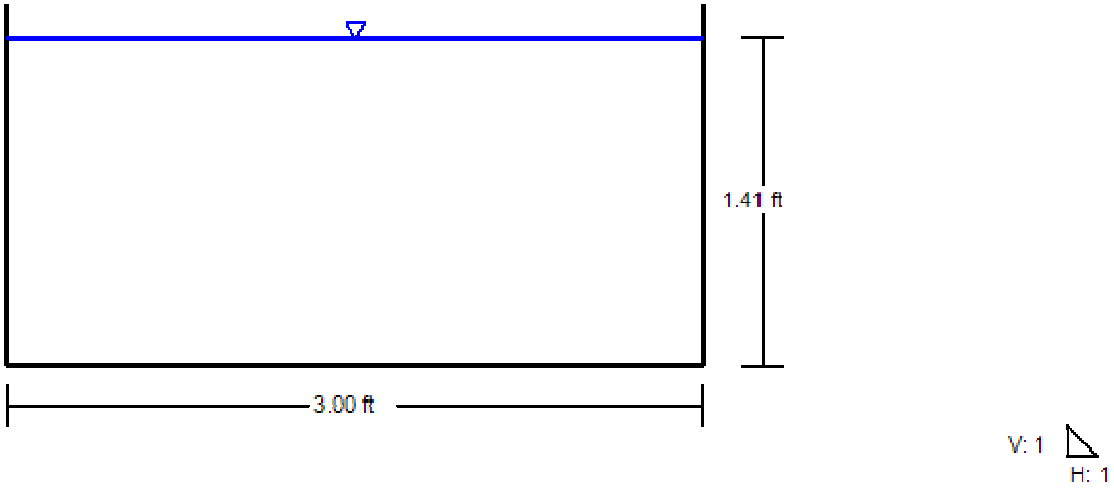
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01100	ft/ft
Normal Depth	1.41	ft
Bottom Width	3.00	ft
Discharge	40.93	ft³/s

Cross Section Image



Recommend Channel

Worksheet for 7A Rectangular Channel - 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01100	ft/ft
Bottom Width	3.00	ft
Discharge	40.93	ft³/s

Results

Normal Depth	1.41	ft
Flow Area	4.23	ft²
Wetted Perimeter	5.82	ft
Hydraulic Radius	0.73	ft
Top Width	3.00	ft
Critical Depth	1.80	ft
Critical Slope	0.00579	ft/ft
Velocity	9.69	ft/s
Velocity Head	1.46	ft
Specific Energy	2.87	ft
Froude Number	1.44	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	2.00	ft
Length	1500.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.41	ft
Critical Depth	1.80	ft
Channel Slope	0.01100	ft/ft
Critical Slope	0.00579	ft/ft

Recommend Channel

Worksheet for 8A Triangular Channel - 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.023	
Channel Slope	0.01500	ft/ft
Left Side Slope	2.00	ft/ft (H:V)
Right Side Slope	2.00	ft/ft (H:V)
Discharge	15.07	ft³/s

Results

Normal Depth	1.20	ft
Flow Area	2.88	ft²
Wetted Perimeter	5.37	ft
Hydraulic Radius	0.54	ft
Top Width	4.80	ft
Critical Depth	1.29	ft
Critical Slope	0.01036	ft/ft
Velocity	5.23	ft/s
Velocity Head	0.42	ft
Specific Energy	1.63	ft
Froude Number	1.19	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.20	ft
Critical Depth	1.29	ft
Channel Slope	0.01500	ft/ft
Critical Slope	0.01036	ft/ft

Recommend Channel

Cross Section for 10A Rectangular Channel - 1

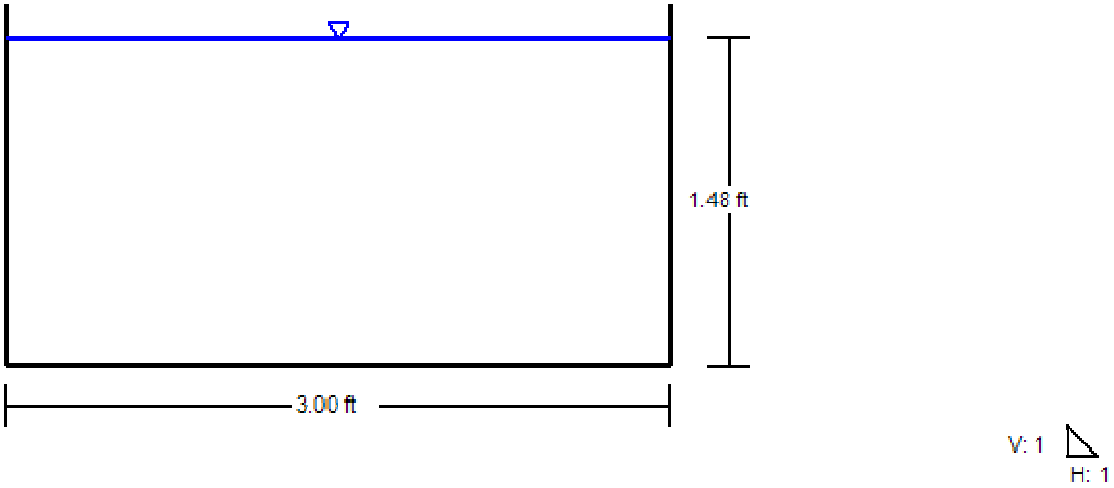
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01400	ft/ft
Normal Depth	1.48	ft
Bottom Width	3.00	ft
Discharge	49.34	ft³/s

Cross Section Image



Worksheet for 10A Rectangular Channel - 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01400	ft/ft
Bottom Width	3.00	ft
Discharge	49.34	ft^3/s

Results

Normal Depth	1.48	ft
Flow Area	4.44	ft^2
Wetted Perimeter	5.96	ft
Hydraulic Radius	0.74	ft
Top Width	3.00	ft
Critical Depth	2.03	ft
Critical Slope	0.00609	ft/ft
Velocity	11.11	ft/s
Velocity Head	1.92	ft
Specific Energy	3.40	ft
Froude Number	1.61	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	2.00	ft
Length	1500.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.48	ft
Critical Depth	2.03	ft
Channel Slope	0.01400	ft/ft
Critical Slope	0.00609	ft/ft

Recommend Channel

Cross Section for 11A Rectangular Channel - 1

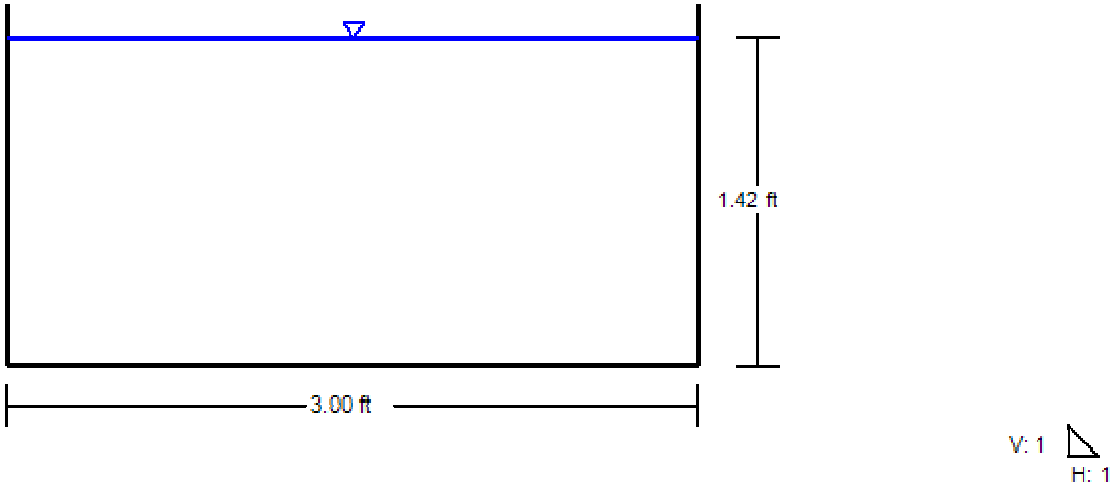
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01370	ft/ft
Normal Depth	1.42	ft
Bottom Width	3.00	ft
Discharge	46.16	ft³/s

Cross Section Image



Recommend Channel

Worksheet for 11A Rectangular Channel - 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01370	ft/ft
Bottom Width	3.00	ft
Discharge	46.16	ft^3/s

Results

Normal Depth	1.42	ft
Flow Area	4.26	ft^2
Wetted Perimeter	5.84	ft
Hydraulic Radius	0.73	ft
Top Width	3.00	ft
Critical Depth	1.95	ft
Critical Slope	0.00598	ft/ft
Velocity	10.84	ft/s
Velocity Head	1.83	ft
Specific Energy	3.25	ft
Froude Number	1.60	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	2.00	ft
Length	1500.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.42	ft
Critical Depth	1.95	ft
Channel Slope	0.01370	ft/ft
Critical Slope	0.00598	ft/ft

Recommend Channel

Cross Section for 12A Rectangular Channel - 1

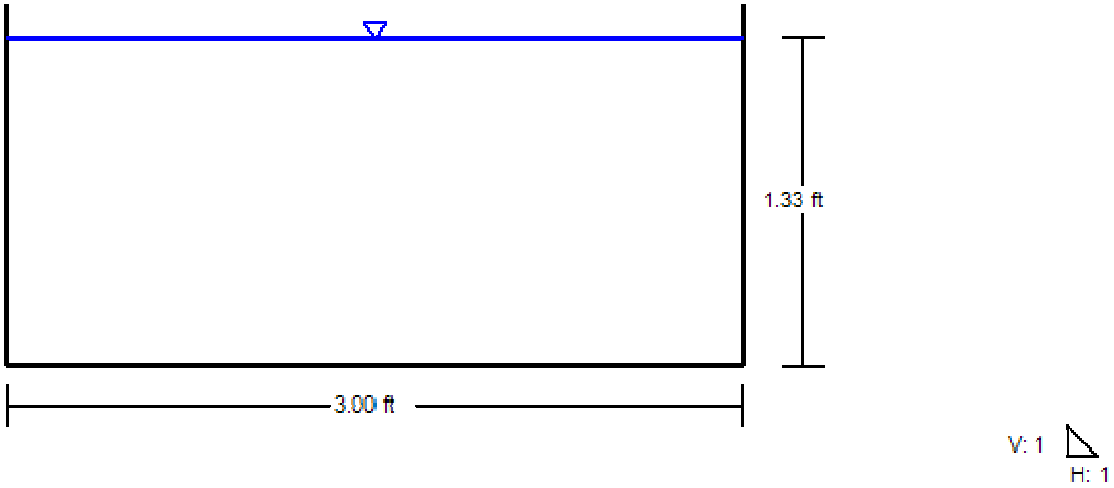
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01940	ft/ft
Normal Depth	1.33	ft
Bottom Width	3.00	ft
Discharge	50.50	ft³/s

Cross Section Image



Recommend Channel

Worksheet for 12A Rectangular Channel - 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01940	ft/ft
Bottom Width	3.00	ft
Discharge	50.50	ft^3/s

Results

Normal Depth	1.33	ft
Flow Area	4.00	ft^2
Wetted Perimeter	5.67	ft
Hydraulic Radius	0.71	ft
Top Width	3.00	ft
Critical Depth	2.07	ft
Critical Slope	0.00613	ft/ft
Velocity	12.62	ft/s
Velocity Head	2.48	ft
Specific Energy	3.81	ft
Froude Number	1.93	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	2.00	ft
Length	1500.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.33	ft
Critical Depth	2.07	ft
Channel Slope	0.01940	ft/ft
Critical Slope	0.00613	ft/ft

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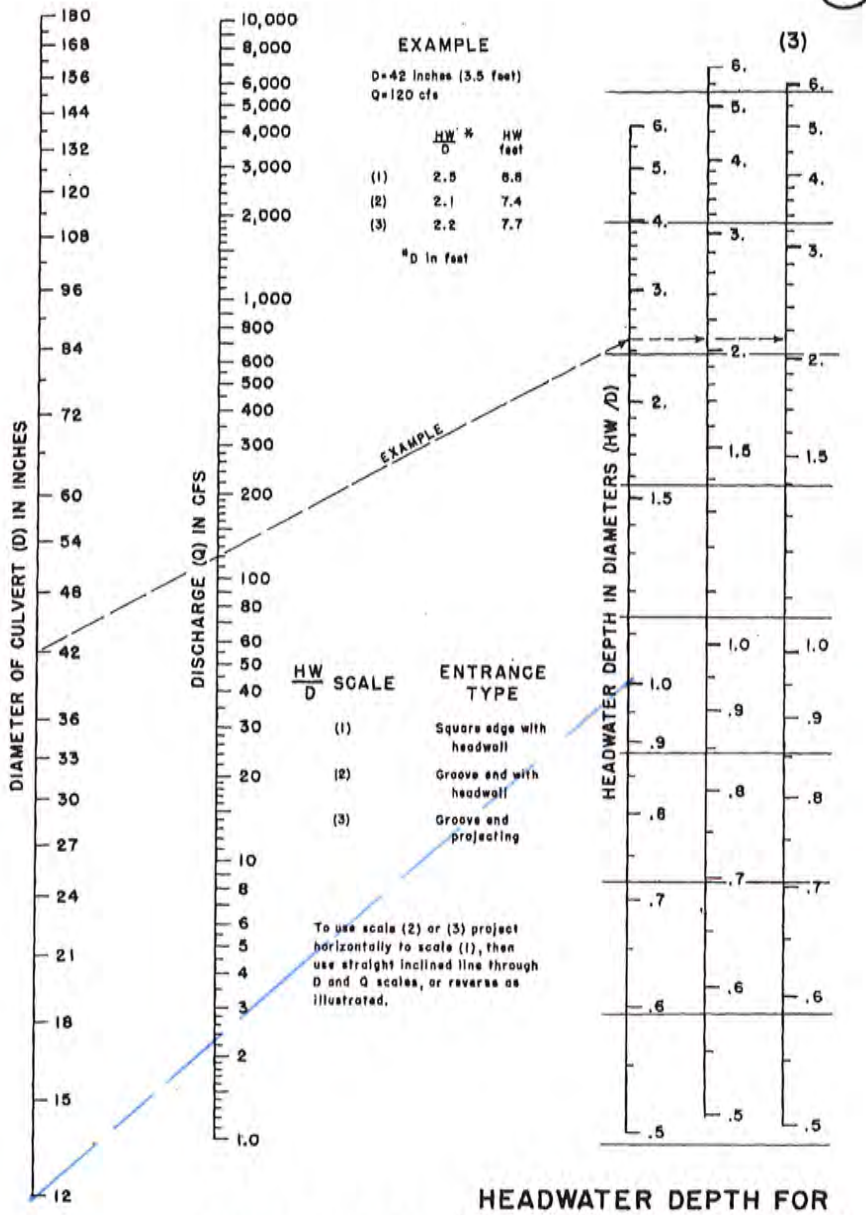
Section-3

- ***Existing Drainage Devices Inflow Capacity Calculations***

7A; 8A.

Existing 12" Pipe Inlet

CHART 1B



HEADWATER SCALES 2&3
REVISED MAY 1964

BUREAU OF PUBLIC ROADS JAN. 1963

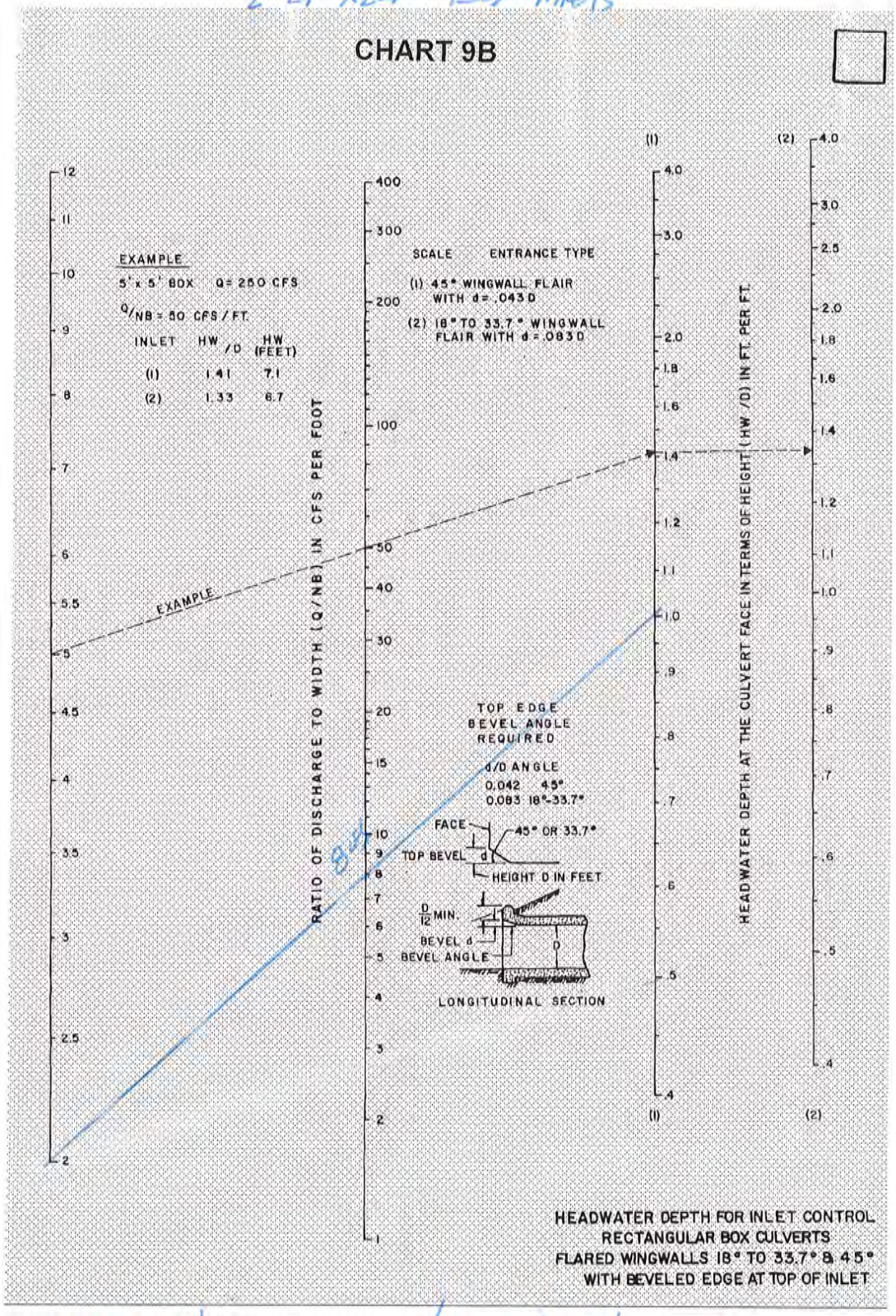
HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

HW = 12"
D = 12"

$\frac{HW}{D} = 1$

$Q_{in} = 2.4\ cfs$

8A.
1-12" Pipe Inlet $Q_{in} = 2.4$ cfs
2-24" X24" Box Inlets



HW = 2'
D = 24"
HW/D = 1

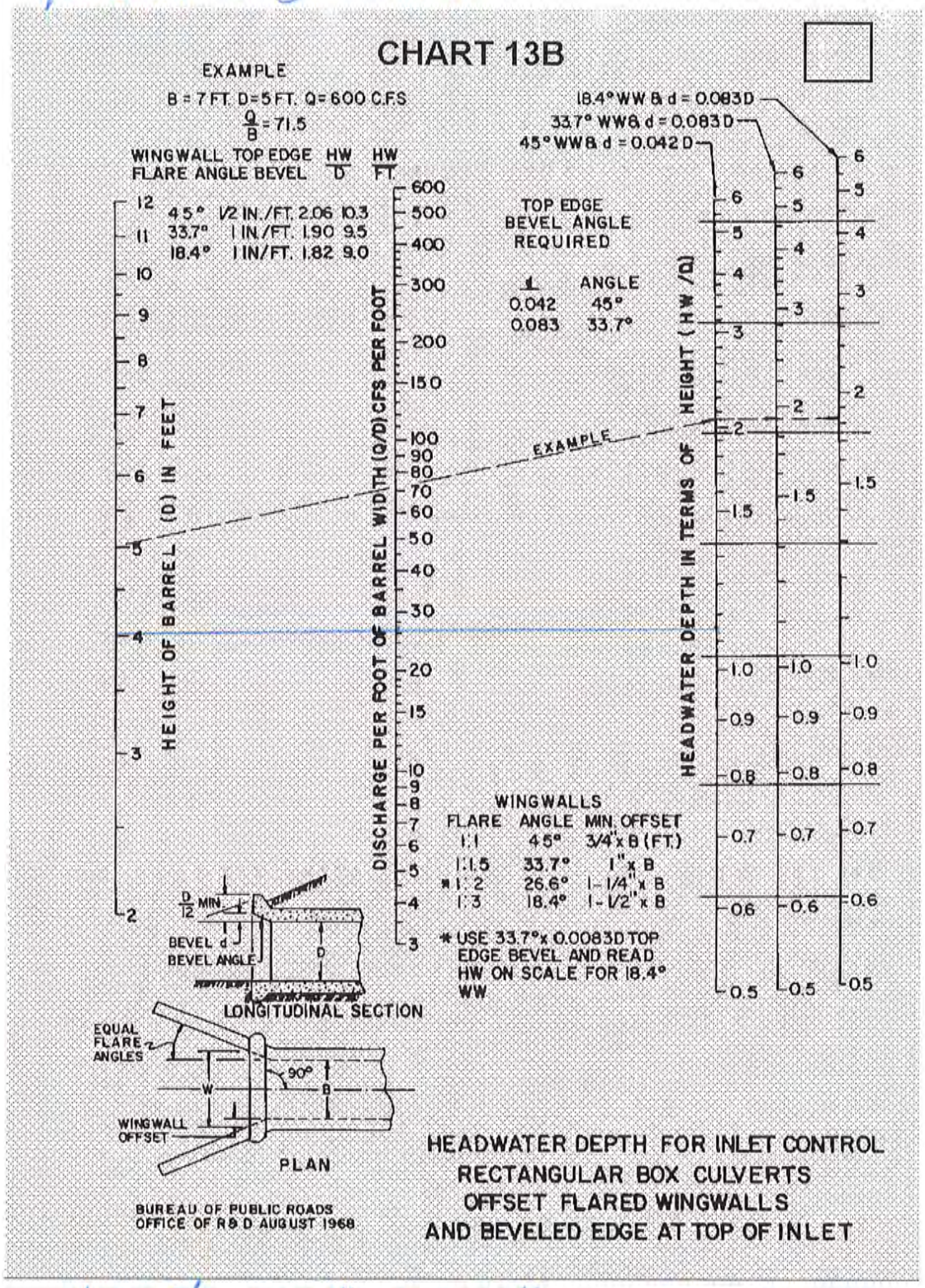
Box. 2'x2' $Q_{in} = 8.0$ cfs

2 - 2'x2' $\Sigma Q_{in} = 16$ cfs
1 - 12" Pipe $Q_{in} = 2.4$ cfs

9A'

1 - 7'x8' Wingwall Inlet

1 - 5'x7' Wingwall Inlet.



HW = 4', B = 42", D = 42"

Q_{in} = 26 cfs

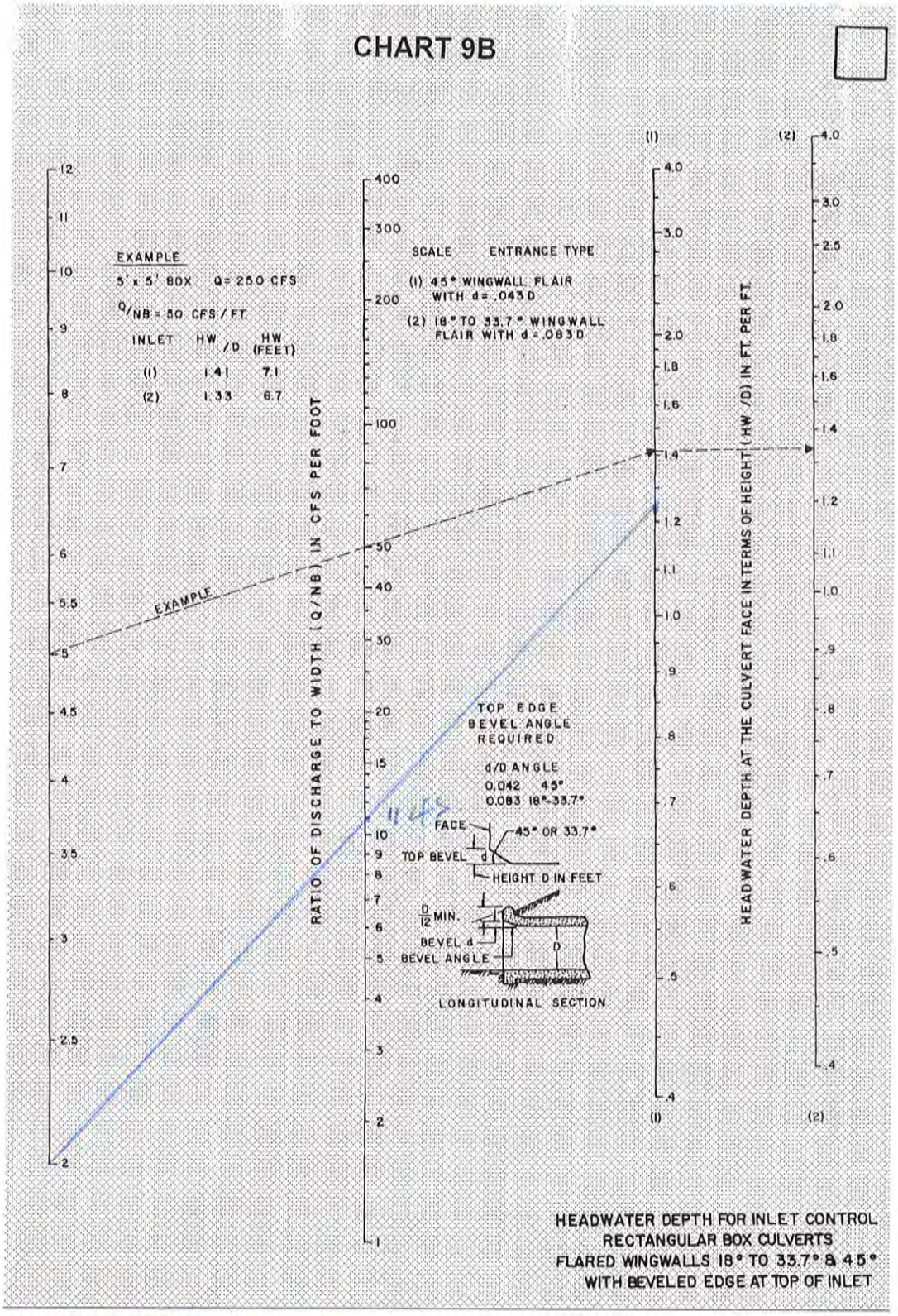
$\frac{HW}{D}$ = 1.14

ΣQ_{in} = 2x26

= 52 cfs

10-A

2- Existing 2'x2' Box Inlet



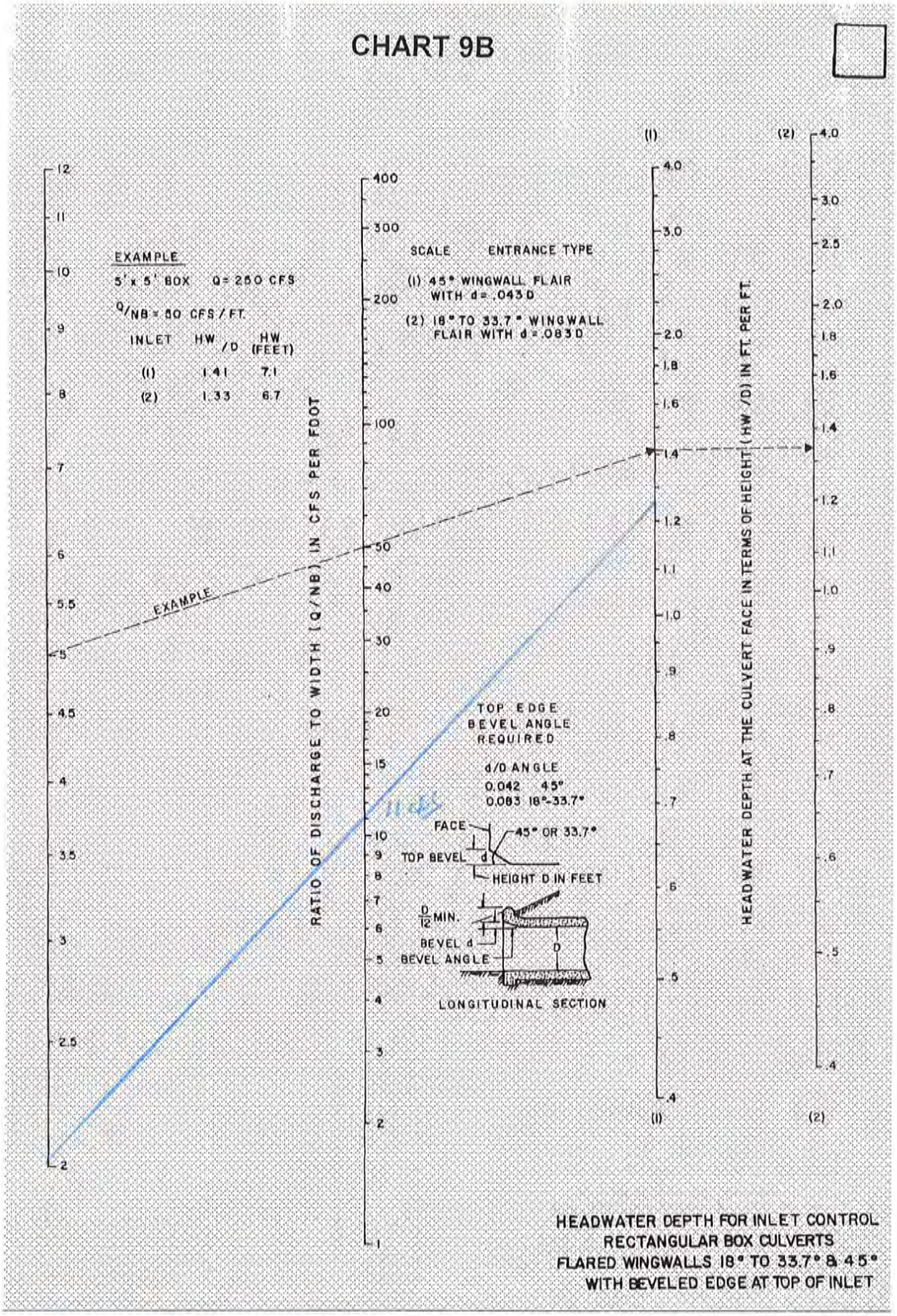
$HW = 2.5'$; $D = 2'$

$HW/D = \frac{2.5'}{2'} = 1.25$

$Q_{in} = 11$ cfs $\quad \Sigma Q_{in} = 2 \times 11 = 22$ cfs

11 A

Ex. 2-24" x 24" Box Inlet



HW = 2.5', D = 2.0

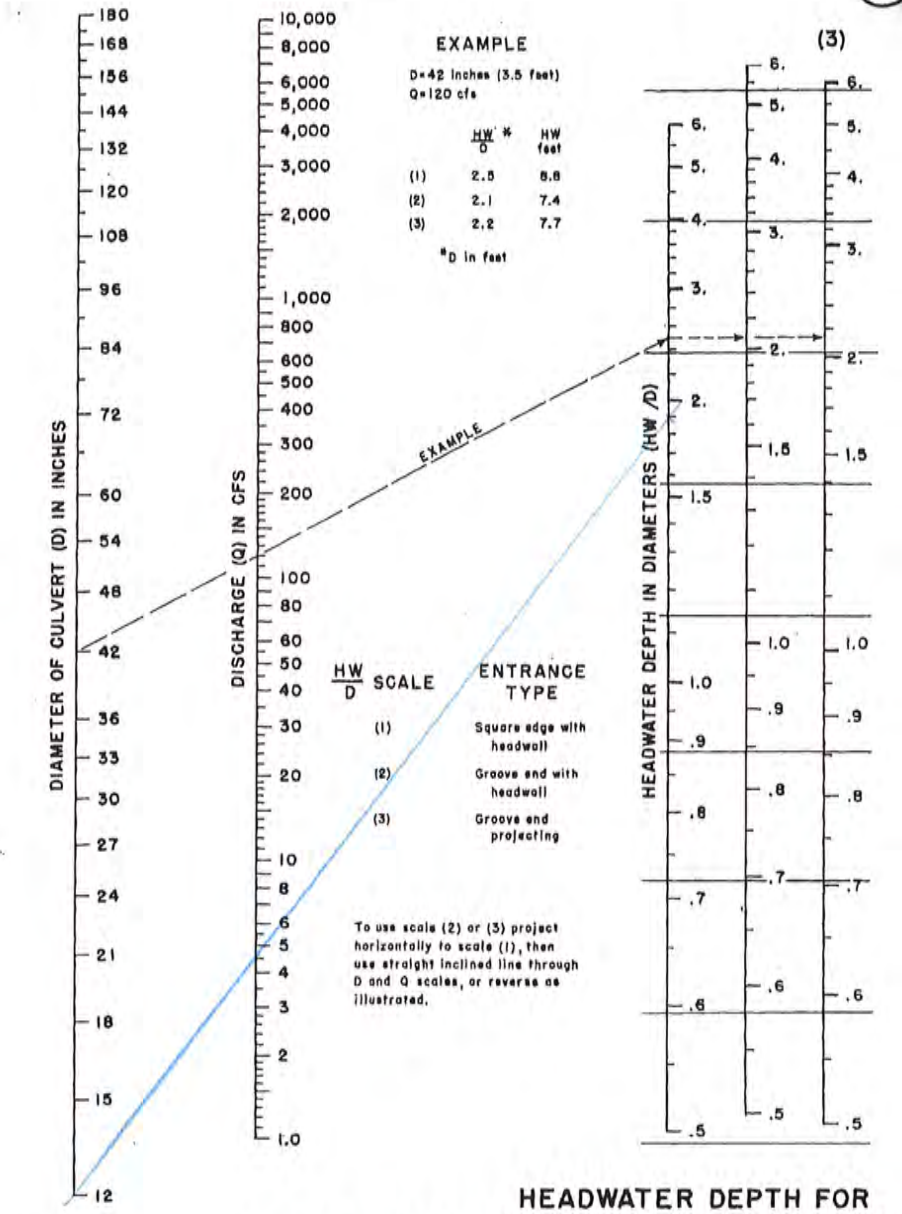
$\frac{HW}{D} = \frac{2.5}{2} = 1.25$

$Q_{in} = 11$ cfs $\quad \Sigma Q_{in} = 2 \times 11 = 22$ cfs

12A

Existing 1-12" pipe Inlet

CHART 1B



HEADWATER SCALES 2&3
REVISED MAY 1964

BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

HW = 1.9'

D = 12" = 1'

$\frac{HW}{D} = \frac{1.9}{1} = 1.9$

$Q_{in} = 4.5$ cfs

60' Wide Street Capacity

Project Description

Friction Method	Manning Formula
Solve For	<None>

Input Data

Channel Slope	0.01000	ft/ft
Normal Depth	0.60	ft
Discharge	84.48	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	0.50
0+00	0.00
0+30	0.60
0+60	0.00
0+60	0.50

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.50)	(0+60, 0.00)	0.014
(0+60, 0.00)	(0+60, 0.50)	0.014

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Elevation Range	0.00 to 0.60 ft	
Flow Area	18.00	ft²
Wetted Perimeter	61.21	ft
Hydraulic Radius	0.29	ft
Top Width	60.00	ft
Normal Depth	0.60	ft

60' Wide Street Capacity

Results

Critical Depth		0.70	ft
Critical Slope		0.00401	ft/ft
Velocity		4.69	ft/s
Velocity Head		0.34	ft
Specific Energy		0.94	ft
Froude Number		1.51	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth		0.60	ft
Length		0.00	ft
Number Of Steps		0	

GVF Output Data

Upstream Depth		0.00	ft
Profile Description	N/A		
Profile Headloss		0.00	ft
Downstream Velocity		0.00	ft/s
Upstream Velocity		0.00	ft/s
Normal Depth		0.60	ft
Critical Depth		0.70	ft
Channel Slope		0.01000	ft/ft
Critical Slope		0.00401	ft/ft

Messages

Messages	Water Surface Elevation exceeds lowest end station by 0.1ft. Flow is divided.

Worksheet for Grate Inlet On Grade - 2

Project Description	SUB-AREA 3A CATCH BASIN CAPACITY
Solve For	Grate Length

Input Data

Discharge		14.68	ft^3/s
Slope		0.01700	ft/ft
Gutter Width		3.00	ft
Gutter Cross Slope		3.00	ft/ft
Road Cross Slope		0.02	ft/ft
Roughness Coefficient		0.023	
Efficiency		80.00	%
Grate Width		3.00	ft
Grate Type	Curved Vaned		
Clogging		10.00	%

Options

Grate Flow Option	Exclude None

Results

Grate Length	5.29	ft
Intercepted Flow	11.74	ft^3/s
Bypass Flow	2.94	ft^3/s
Spread	0.89	ft
Depth	2.68	ft
Flow Area	1.20	ft^2
Gutter Depression	8.95	ft
Total Depression	8.95	ft
Velocity	12.28	ft/s
Splash Over Velocity	10.06	ft/s
Frontal Flow Factor	0.80	
Side Flow Factor	0.04	
Grate Flow Ratio	1.00	
Active Grate Length	4.76	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

Worksheet for Grate Inlet On Grade - 2

Project Description

Solve For	Grate Length

Input Data

Discharge		14.68	ft³/s
Slope		0.01700	ft/ft
Gutter Width		3.00	ft
Gutter Cross Slope		3.00	ft/ft
Road Cross Slope		0.02	ft/ft
Roughness Coefficient		0.023	
Efficiency		80.00	%
Grate Width		3.00	ft
Grate Type	Curved Vaned		
Clogging		10.00	%

Options

Grate Flow Option	Exclude None

Results

Grate Length	5.29	ft
Intercepted Flow	11.74	ft³/s
Bypass Flow	2.94	ft³/s
Spread	0.89	ft
Depth	2.68	ft
Flow Area	1.20	ft²
Gutter Depression	8.95	ft
Total Depression	8.95	ft
Velocity	12.28	ft/s
Splash Over Velocity	10.06	ft/s
Frontal Flow Factor	0.80	
Side Flow Factor	0.04	
Grate Flow Ratio	1.00	
Active Grate Length	4.76	ft

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

WestLAND Group, Inc.

Reference-1

- ***NOAA Altas14 Precipitation***

NOAA Atlas 14, Volume 6, Version 2
Location name: San Bernardino, California, USA*
Latitude: 34.1117°, Longitude: -117.3057°
Elevation: 1089.45 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES @ 7th street

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_&_aerials

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	**0.116** (0.096-0.141)	**0.151** (0.125-0.183)	**0.197** (0.164-0.240)	**0.236** (0.194-0.290)	**0.289** (0.229-0.367)	**0.330** (0.256-0.429)	**0.373** (0.282-0.497)	**0.417** (0.307-0.572)	**0.479** (0.338-0.686)	**0.528** (0.360-0.783)
10-min	**0.166** (0.138-0.202)	**0.216** (0.180-0.263)	**0.283** (0.234-0.345)	**0.338** (0.278-0.415)	**0.414** (0.328-0.526)	**0.473** (0.368-0.615)	**0.534** (0.405-0.712)	**0.598** (0.440-0.820)	**0.687** (0.485-0.983)	**0.757** (0.516-1.12)
15-min	**0.201** (0.167-0.244)	**0.262** (0.217-0.318)	**0.342** (0.283-0.417)	**0.408** (0.336-0.502)	**0.500** (0.397-0.636)	**0.572** (0.444-0.743)	**0.646** (0.490-0.861)	**0.723** (0.533-0.992)	**0.830** (0.586-1.19)	**0.915** (0.623-1.36)
30-min	**0.297** (0.247-0.361)	**0.387** (0.321-0.470)	**0.506** (0.419-0.616)	**0.604** (0.496-0.742)	**0.739** (0.587-0.941)	**0.845** (0.657-1.10)	**0.955** (0.724-1.27)	**1.07** (0.788-1.47)	**1.23** (0.866-1.76)	**1.35** (0.922-2.01)
60-min	**0.426** (0.354-0.517)	**0.554** (0.460-0.673)	**0.724** (0.600-0.883)	**0.865** (0.711-1.06)	**1.06** (0.841-1.35)	**1.21** (0.941-1.57)	**1.37** (1.04-1.82)	**1.53** (1.13-2.10)	**1.76** (1.24-2.52)	**1.94** (1.32-2.87)
2-hr	**0.610** (0.508-0.740)	**0.785** (0.652-0.954)	**1.01** (0.842-1.24)	**1.21** (0.990-1.48)	**1.46** (1.16-1.86)	**1.67** (1.29-2.16)	**1.87** (1.42-2.49)	**2.09** (1.54-2.86)	**2.38** (1.68-3.40)	**2.61** (1.78-3.86)
3-hr	**0.751** (0.625-0.911)	**0.962** (0.799-1.17)	**1.24** (1.03-1.51)	**1.47** (1.21-1.80)	**1.78** (1.41-2.26)	**2.02** (1.57-2.62)	**2.26** (1.72-3.02)	**2.52** (1.85-3.45)	**2.86** (2.02-4.10)	**3.13** (2.13-4.65)
6-hr	**1.05** (0.870-1.27)	**1.34** (1.11-1.62)	**1.72** (1.42-2.09)	**2.03** (1.67-2.49)	**2.45** (1.94-3.11)	**2.77** (2.15-3.60)	**3.10** (2.35-4.13)	**3.44** (2.53-4.72)	**3.90** (2.75-5.58)	**4.25** (2.90-6.31)
12-hr	**1.39** (1.16-1.69)	**1.79** (1.49-2.17)	**2.30** (1.91-2.81)	**2.72** (2.24-3.34)	**3.28** (2.61-4.18)	**3.71** (2.89-4.83)	**4.15** (3.15-5.53)	**4.60** (3.39-6.30)	**5.20** (3.67-7.44)	**5.66** (3.86-8.40)
24-hr	**1.86** (1.65-2.14)	**2.41** (2.13-2.78)	**3.12** (2.75-3.61)	**3.70** (3.24-4.31)	**4.47** (3.79-5.39)	**5.07** (4.20-6.23)	**5.66** (4.59-7.13)	**6.27** (4.94-8.12)	**7.09** (5.36-9.56)	**7.72** (5.64-10.8)
2-day	**2.26** (2.00-2.61)	**2.98** (2.63-3.43)	**3.91** (3.45-4.53)	**4.68** (4.09-5.45)	**5.71** (4.84-6.88)	**6.51** (5.40-8.00)	**7.31** (5.93-9.21)	**8.15** (6.42-10.5)	**9.27** (7.01-12.5)	**10.1** (7.42-14.1)
3-day	**2.40** (2.13-2.77)	**3.22** (2.85-3.71)	**4.30** (3.79-4.97)	**5.19** (4.54-6.05)	**6.41** (5.43-7.73)	**7.37** (6.11-9.06)	**8.35** (6.76-10.5)	**9.37** (7.38-12.1)	**10.8** (8.14-14.5)	**11.9** (8.68-16.5)
4-day	**2.56** (2.27-2.95)	**3.46** (3.06-3.99)	**4.67** (4.12-5.40)	**5.67** (4.96-6.61)	**7.06** (5.98-8.50)	**8.15** (6.76-10.0)	**9.27** (7.51-11.7)	**10.5** (8.24-13.5)	**12.1** (9.14-16.3)	**13.4** (9.78-18.7)
7-day	**2.91** (2.57-3.35)	**3.97** (3.51-4.58)	**5.39** (4.76-6.24)	**6.58** (5.76-7.68)	**8.24** (6.98-9.92)	**9.54** (7.92-11.7)	**10.9** (8.82-13.7)	**12.3** (9.71-15.9)	**14.3** (10.8-19.3)	**15.9** (11.6-22.1)
10-day	**3.16** (2.79-3.64)	**4.33** (3.83-5.00)	**5.92** (5.23-6.85)	**7.25** (6.35-8.46)	**9.11** (7.71-11.0)	**10.6** (8.77-13.0)	**12.1** (9.80-15.2)	**13.7** (10.8-17.7)	**15.9** (12.1-21.5)	**17.7** (13.0-24.7)
20-day	**3.86** (3.42-4.45)	**5.36** (4.74-6.18)	**7.39** (6.52-8.55)	**9.10** (7.97-10.6)	**11.5** (9.74-13.9)	**13.4** (11.1-16.5)	**15.4** (12.5-19.4)	**17.5** (13.8-22.7)	**20.5** (15.5-27.6)	**22.8** (16.7-31.9)
30-day	**4.56** (4.04-5.25)	**6.35** (5.61-7.32)	**8.78** (7.74-10.2)	**10.8** (9.48-12.6)	**13.7** (11.6-16.5)	**16.0** (13.3-19.7)	**18.4** (14.9-23.2)	**21.0** (16.5-27.2)	**24.6** (18.6-33.2)	**27.5** (20.1-38.3)
45-day	**5.42** (4.80-6.25)	**7.53** (6.66-8.68)	**10.4** (9.18-12.0)	**12.8** (11.2-15.0)	**16.3** (13.8-19.6)	**19.0** (15.8-23.4)	**21.9** (17.7-27.6)	**25.0** (19.7-32.3)	**29.3** (22.1-39.5)	**32.7** (23.9-45.7)
60-day	**6.31** (5.59-7.28)	**8.72** (7.71-10.1)	**12.0** (10.6-13.9)	**14.8** (12.9-17.2)	**18.7** (15.9-22.5)	**21.9** (18.1-26.9)	**25.2** (20.4-31.7)	**28.7** (22.6-37.1)	**33.6** (25.4-45.3)	**37.6** (27.5-52.4)

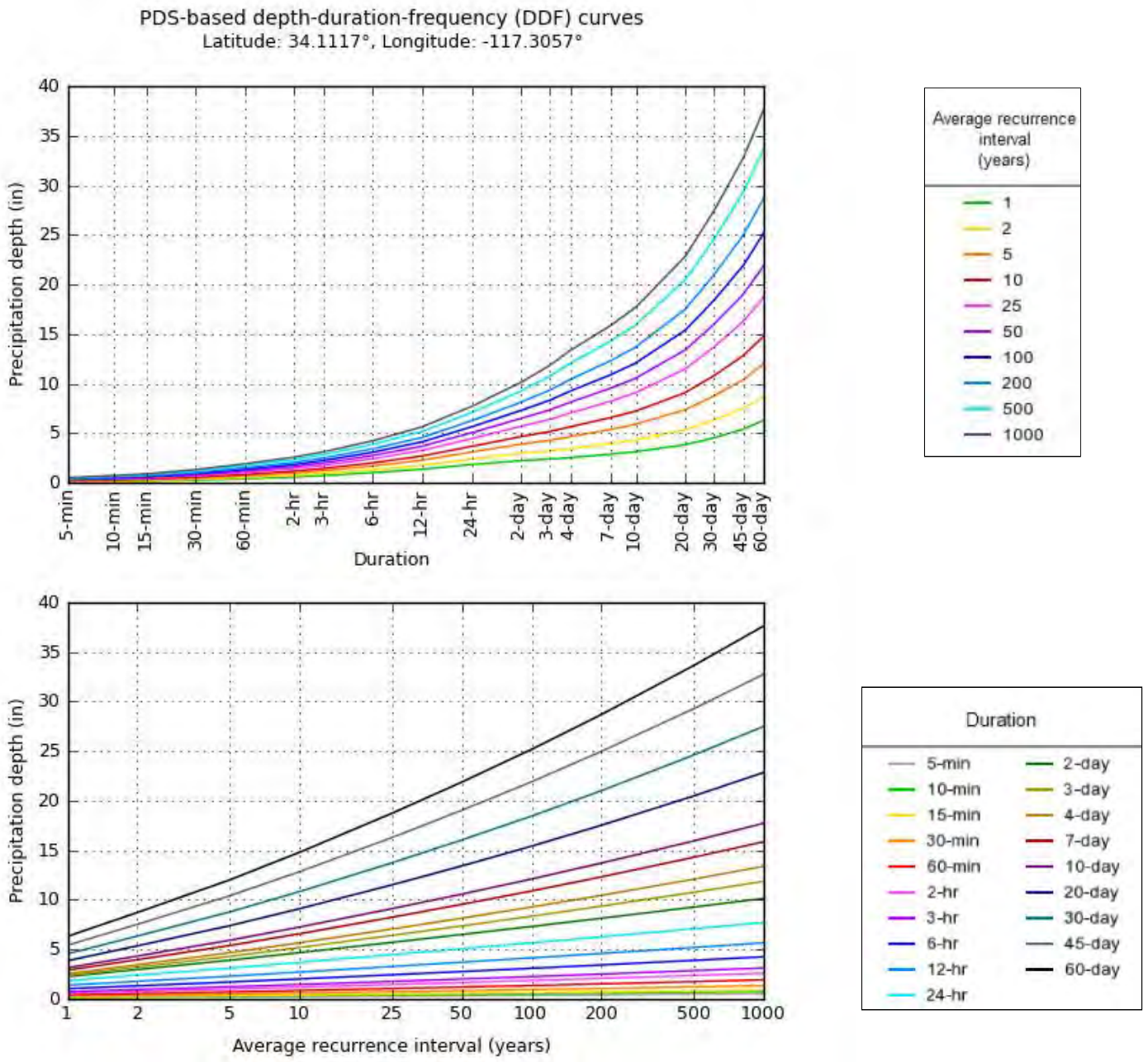
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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.

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NOAA Atlas 14, Volume 6, Version 2
Location name: San Bernardino, California, USA*
Latitude: 34.121°, Longitude: -117.3116°
Elevation: 1141.55 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES @ Base Line

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_&_aerials

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	**0.118** (0.098-0.143)	**0.155** (0.128-0.188)	**0.204** (0.169-0.249)	**0.245** (0.202-0.302)	**0.303** (0.241-0.386)	**0.349** (0.272-0.454)	**0.398** (0.301-0.530)	**0.449** (0.331-0.616)	**0.522** (0.368-0.747)	**0.580** (0.395-0.861)
10-min	**0.169** (0.141-0.205)	**0.222** (0.184-0.269)	**0.292** (0.242-0.356)	**0.352** (0.289-0.432)	**0.435** (0.345-0.553)	**0.501** (0.389-0.651)	**0.570** (0.432-0.760)	**0.644** (0.474-0.883)	**0.748** (0.528-1.07)	**0.832** (0.567-1.23)
15-min	**0.204** (0.170-0.248)	**0.268** (0.223-0.326)	**0.354** (0.293-0.431)	**0.425** (0.349-0.523)	**0.526** (0.417-0.669)	**0.606** (0.471-0.787)	**0.690** (0.522-0.919)	**0.779** (0.573-1.07)	**0.904** (0.638-1.30)	**1.01** (0.685-1.49)
30-min	**0.304** (0.253-0.370)	**0.399** (0.331-0.485)	**0.526** (0.436-0.642)	**0.633** (0.520-0.778)	**0.783** (0.622-0.996)	**0.902** (0.701-1.17)	**1.03** (0.778-1.37)	**1.16** (0.854-1.59)	**1.35** (0.950-1.93)	**1.50** (1.02-2.22)
60-min	**0.443** (0.369-0.538)	**0.581** (0.483-0.706)	**0.767** (0.635-0.935)	**0.922** (0.758-1.13)	**1.14** (0.905-1.45)	**1.31** (1.02-1.71)	**1.50** (1.13-1.99)	**1.69** (1.24-2.32)	**1.96** (1.38-2.81)	**2.18** (1.49-3.24)
2-hr	**0.641** (0.533-0.778)	**0.825** (0.685-1.00)	**1.07** (0.886-1.30)	**1.27** (1.04-1.56)	**1.55** (1.23-1.97)	**1.77** (1.38-2.30)	**2.00** (1.51-2.66)	**2.23** (1.65-3.07)	**2.56** (1.81-3.67)	**2.83** (1.92-4.19)
3-hr	**0.788** (0.656-0.957)	**1.01** (0.837-1.22)	**1.30** (1.07-1.58)	**1.54** (1.26-1.89)	**1.86** (1.48-2.37)	**2.12** (1.65-2.76)	**2.38** (1.81-3.18)	**2.66** (1.96-3.64)	**3.03** (2.14-4.34)	**3.33** (2.27-4.94)
6-hr	**1.11** (0.921-1.34)	**1.41** (1.17-1.71)	**1.80** (1.49-2.20)	**2.13** (1.75-2.61)	**2.57** (2.04-3.26)	**2.91** (2.26-3.78)	**3.25** (2.46-4.33)	**3.61** (2.66-4.95)	**4.10** (2.89-5.87)	**4.48** (3.05-6.64)
12-hr	**1.47** (1.22-1.78)	**1.88** (1.56-2.29)	**2.42** (2.00-2.95)	**2.85** (2.34-3.51)	**3.44** (2.73-4.38)	**3.89** (3.02-5.06)	**4.35** (3.29-5.79)	**4.81** (3.55-6.60)	**5.45** (3.84-7.80)	**5.94** (4.04-8.80)
24-hr	**1.96** (1.74-2.26)	**2.55** (2.25-2.94)	**3.30** (2.91-3.82)	**3.91** (3.42-4.56)	**4.74** (4.01-5.71)	**5.37** (4.45-6.60)	**6.00** (4.86-7.56)	**6.65** (5.24-8.61)	**7.53** (5.70-10.2)	**8.20** (6.00-11.4)
2-day	**2.40** (2.12-2.76)	**3.16** (2.79-3.64)	**4.15** (3.66-4.80)	**4.96** (4.34-5.79)	**6.06** (5.14-7.31)	**6.91** (5.74-8.50)	**7.77** (6.30-9.79)	**8.66** (6.83-11.2)	**9.86** (7.46-13.3)	**10.8** (7.90-15.1)
3-day	**2.57** (2.27-2.96)	**3.43** (3.03-3.96)	**4.57** (4.03-5.29)	**5.51** (4.83-6.43)	**6.80** (5.76-8.20)	**7.81** (6.48-9.60)	**8.84** (7.16-11.1)	**9.90** (7.81-12.8)	**11.4** (8.60-15.3)	**12.5** (9.15-17.5)
4-day	**2.73** (2.42-3.15)	**3.69** (3.26-4.25)	**4.96** (4.37-5.74)	**6.01** (5.26-7.01)	**7.46** (6.32-8.99)	**8.60** (7.14-10.6)	**9.77** (7.92-12.3)	**11.0** (8.66-14.2)	**12.7** (9.60-17.1)	**14.0** (10.3-19.6)
7-day	**3.10** (2.74-3.57)	**4.22** (3.74-4.87)	**5.74** (5.06-6.63)	**6.99** (6.12-8.15)	**8.74** (7.40-10.5)	**10.1** (8.40-12.4)	**11.5** (9.35-14.5)	**13.0** (10.3-16.9)	**15.1** (11.4-20.4)	**16.8** (12.3-23.4)
10-day	**3.37** (2.98-3.88)	**4.63** (4.09-5.34)	**6.32** (5.58-7.32)	**7.74** (6.77-9.02)	**9.71** (8.23-11.7)	**11.3** (9.36-13.9)	**12.9** (10.4-16.2)	**14.6** (11.5-18.9)	**17.0** (12.9-22.9)	**18.9** (13.8-26.4)
20-day	**4.14** (3.67-4.78)	**5.76** (5.09-6.64)	**7.94** (7.01-9.19)	**9.78** (8.55-11.4)	**12.4** (10.5-14.9)	**14.4** (11.9-17.7)	**16.5** (13.4-20.8)	**18.8** (14.8-24.4)	**22.0** (16.6-29.7)	**24.6** (18.0-34.3)
30-day	**4.89** (4.33-5.63)	**6.80** (6.02-7.85)	**9.40** (8.29-10.9)	**11.6** (10.1-13.5)	**14.7** (12.4-17.7)	**17.1** (14.2-21.1)	**19.7** (16.0-24.8)	**22.4** (17.7-29.1)	**26.3** (19.9-35.5)	**29.4** (21.5-41.0)
45-day	**5.85** (5.18-6.74)	**8.10** (7.17-9.35)	**11.2** (9.85-12.9)	**13.7** (12.0-16.0)	**17.4** (14.7-21.0)	**20.3** (16.8-25.0)	**23.4** (18.9-29.4)	**26.6** (21.0-34.4)	**31.2** (23.6-42.1)	**34.9** (25.5-48.7)
60-day	**6.83** (6.05-7.87)	**9.38** (8.29-10.8)	**12.8** (11.3-14.9)	**15.8** (13.8-18.4)	**19.9** (16.9-24.0)	**23.2** (19.2-28.5)	**26.7** (21.6-33.6)	**30.3** (23.9-39.3)	**35.5** (26.9-47.9)	**39.7** (29.1-55.4)

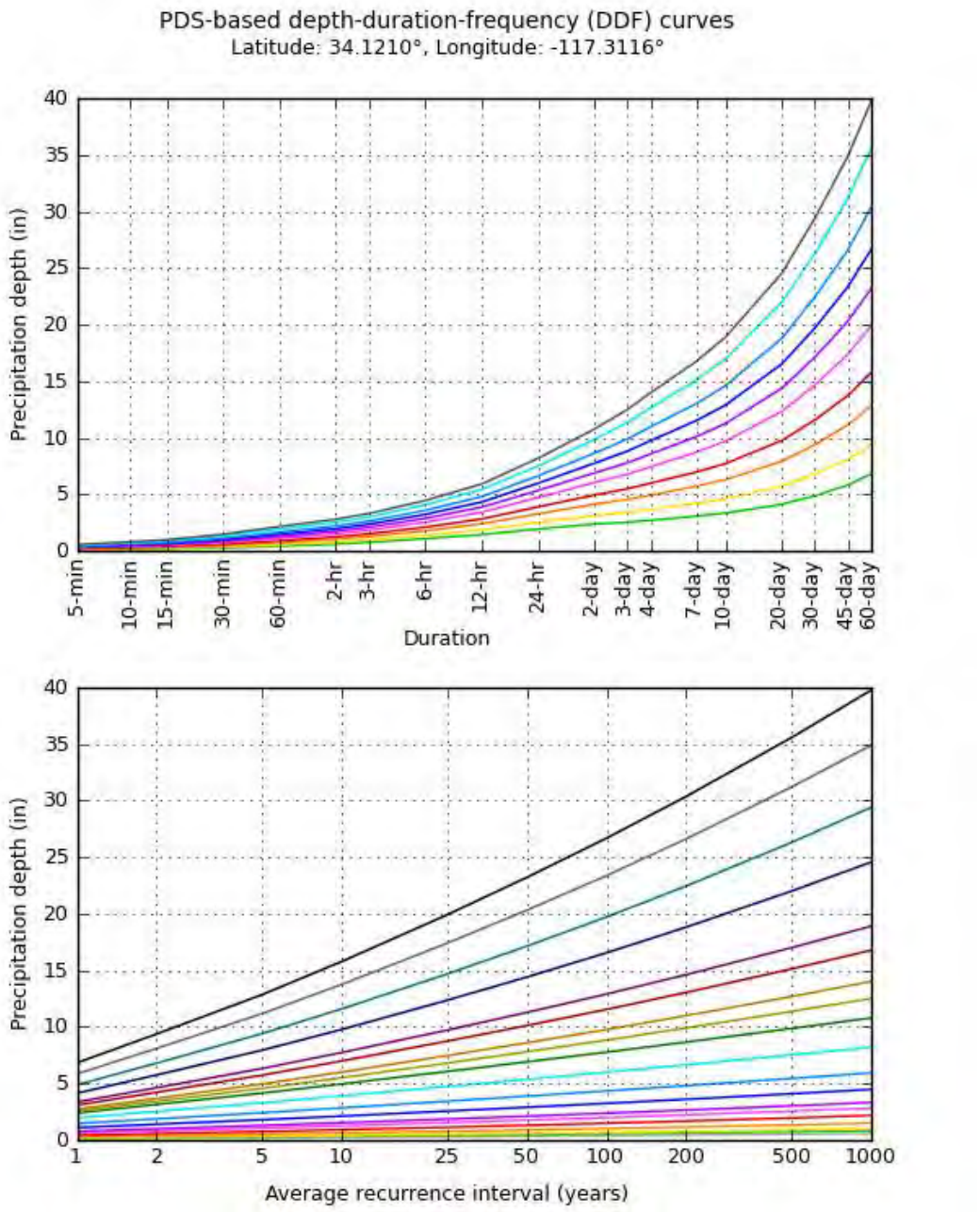
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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NOAA Atlas 14, Volume 6, Version 2
Location name: San Bernardino, California, USA*
Latitude: 34.1358°, Longitude: -117.319°
Elevation: 1212.37 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES @ "N" Street

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

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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	**0.122** (0.102-0.148)	**0.160** (0.133-0.195)	**0.212** (0.176-0.258)	**0.255** (0.210-0.314)	**0.317** (0.251-0.403)	**0.366** (0.284-0.476)	**0.418** (0.317-0.557)	**0.473** (0.348-0.649)	**0.552** (0.390-0.790)	**0.616** (0.420-0.914)
10-min	**0.175** (0.146-0.213)	**0.230** (0.191-0.279)	**0.304** (0.252-0.370)	**0.366** (0.301-0.450)	**0.454** (0.360-0.578)	**0.525** (0.408-0.682)	**0.599** (0.454-0.798)	**0.678** (0.499-0.931)	**0.791** (0.558-1.13)	**0.883** (0.602-1.31)
15-min	**0.212** (0.176-0.257)	**0.278** (0.231-0.338)	**0.367** (0.304-0.448)	**0.443** (0.364-0.544)	**0.549** (0.436-0.699)	**0.634** (0.493-0.825)	**0.724** (0.549-0.965)	**0.820** (0.604-1.13)	**0.957** (0.675-1.37)	**1.07** (0.728-1.58)
30-min	**0.315** (0.262-0.383)	**0.414** (0.344-0.503)	**0.547** (0.453-0.667)	**0.659** (0.542-0.811)	**0.818** (0.649-1.04)	**0.945** (0.734-1.23)	**1.08** (0.817-1.44)	**1.22** (0.899-1.68)	**1.43** (1.00-2.04)	**1.59** (1.08-2.36)
60-min	**0.462** (0.384-0.561)	**0.606** (0.503-0.737)	**0.801** (0.664-0.977)	**0.966** (0.793-1.19)	**1.20** (0.951-1.52)	**1.38** (1.08-1.80)	**1.58** (1.20-2.11)	**1.79** (1.32-2.46)	**2.09** (1.47-2.99)	**2.33** (1.59-3.46)
2-hr	**0.671** (0.558-0.814)	**0.862** (0.716-1.05)	**1.12** (0.926-1.36)	**1.33** (1.09-1.64)	**1.63** (1.29-2.07)	**1.86** (1.44-2.42)	**2.10** (1.59-2.80)	**2.35** (1.73-3.23)	**2.71** (1.91-3.87)	**2.99** (2.04-4.43)
3-hr	**0.826** (0.687-1.00)	**1.05** (0.876-1.28)	**1.36** (1.12-1.65)	**1.61** (1.32-1.98)	**1.95** (1.55-2.48)	**2.22** (1.73-2.89)	**2.50** (1.89-3.33)	**2.79** (2.05-3.83)	**3.19** (2.25-4.57)	**3.51** (2.39-5.20)
6-hr	**1.17** (0.972-1.42)	**1.48** (1.23-1.80)	**1.90** (1.57-2.31)	**2.24** (1.84-2.75)	**2.70** (2.14-3.43)	**3.05** (2.37-3.97)	**3.42** (2.59-4.56)	**3.80** (2.80-5.21)	**4.31** (3.04-6.17)	**4.72** (3.21-6.99)
12-hr	**1.55** (1.29-1.88)	**1.98** (1.65-2.41)	**2.54** (2.10-3.10)	**3.00** (2.46-3.68)	**3.61** (2.87-4.59)	**4.08** (3.17-5.30)	**4.56** (3.45-6.07)	**5.05** (3.72-6.92)	**5.71** (4.03-8.17)	**6.22** (4.24-9.22)
24-hr	**2.07** (1.83-2.38)	**2.68** (2.37-3.09)	**3.47** (3.06-4.01)	**4.11** (3.60-4.79)	**4.97** (4.21-5.99)	**5.63** (4.67-6.92)	**6.29** (5.09-7.92)	**6.96** (5.49-9.02)	**7.87** (5.96-10.6)	**8.57** (6.27-12.0)
2-day	**2.52** (2.23-2.91)	**3.32** (2.94-3.83)	**4.37** (3.86-5.06)	**5.22** (4.57-6.09)	**6.38** (5.40-7.68)	**7.26** (6.02-8.93)	**8.16** (6.61-10.3)	**9.08** (7.16-11.8)	**10.3** (7.82-13.9)	**11.3** (8.26-15.8)
3-day	**2.70** (2.39-3.11)	**3.61** (3.19-4.17)	**4.81** (4.25-5.57)	**5.80** (5.08-6.76)	**7.15** (6.06-8.62)	**8.20** (6.81-10.1)	**9.28** (7.51-11.7)	**10.4** (8.19-13.5)	**11.9** (9.01-16.1)	**13.1** (9.59-18.3)
4-day	**2.87** (2.54-3.31)	**3.88** (3.43-4.47)	**5.21** (4.60-6.03)	**6.32** (5.53-7.37)	**7.84** (6.64-9.45)	**9.03** (7.49-11.1)	**10.3** (8.31-12.9)	**11.5** (9.09-14.9)	**13.3** (10.1-17.9)	**14.7** (10.7-20.5)
7-day	**3.25** (2.87-3.74)	**4.43** (3.92-5.11)	**6.01** (5.30-6.96)	**7.33** (6.42-8.55)	**9.16** (7.76-11.0)	**10.6** (8.79-13.0)	**12.1** (9.79-15.2)	**13.7** (10.8-17.7)	**15.8** (12.0-21.3)	**17.5** (12.8-24.5)
10-day	**3.54** (3.14-4.08)	**4.86** (4.30-5.61)	**6.64** (5.86-7.68)	**8.13** (7.11-9.48)	**10.2** (8.64-12.3)	**11.8** (9.82-14.6)	**13.5** (11.0-17.1)	**15.3** (12.1-19.9)	**17.8** (13.5-24.1)	**19.8** (14.5-27.7)
20-day	**4.36** (3.86-5.03)	**6.06** (5.36-6.99)	**8.36** (7.37-9.67)	**10.3** (9.00-12.0)	**13.0** (11.0-15.7)	**15.2** (12.6-18.6)	**17.4** (14.1-21.9)	**19.8** (15.6-25.6)	**23.2** (17.5-31.2)	**25.9** (18.9-36.1)
30-day	**5.15** (4.56-5.93)	**7.16** (6.33-8.26)	**9.90** (8.73-11.4)	**12.2** (10.7-14.2)	**15.4** (13.1-18.6)	**18.0** (15.0-22.2)	**20.8** (16.8-26.1)	**23.6** (18.6-30.6)	**27.7** (21.0-37.4)	**31.0** (22.7-43.2)
45-day	**6.17** (5.47-7.11)	**8.55** (7.56-9.87)	**11.8** (10.4-13.6)	**14.5** (12.7-16.9)	**18.4** (15.6-22.1)	**21.4** (17.8-26.4)	**24.7** (20.0-31.1)	**28.1** (22.1-36.4)	**33.0** (24.9-44.4)	**36.9** (27.0-51.4)
60-day	**7.20** (6.38-8.30)	**9.90** (8.76-11.4)	**13.6** (12.0-15.7)	**16.7** (14.6-19.4)	**21.0** (17.8-25.3)	**24.5** (20.3-30.1)	**28.2** (22.8-35.5)	**32.1** (25.3-41.5)	**37.6** (28.4-50.6)	**42.0** (30.7-58.6)

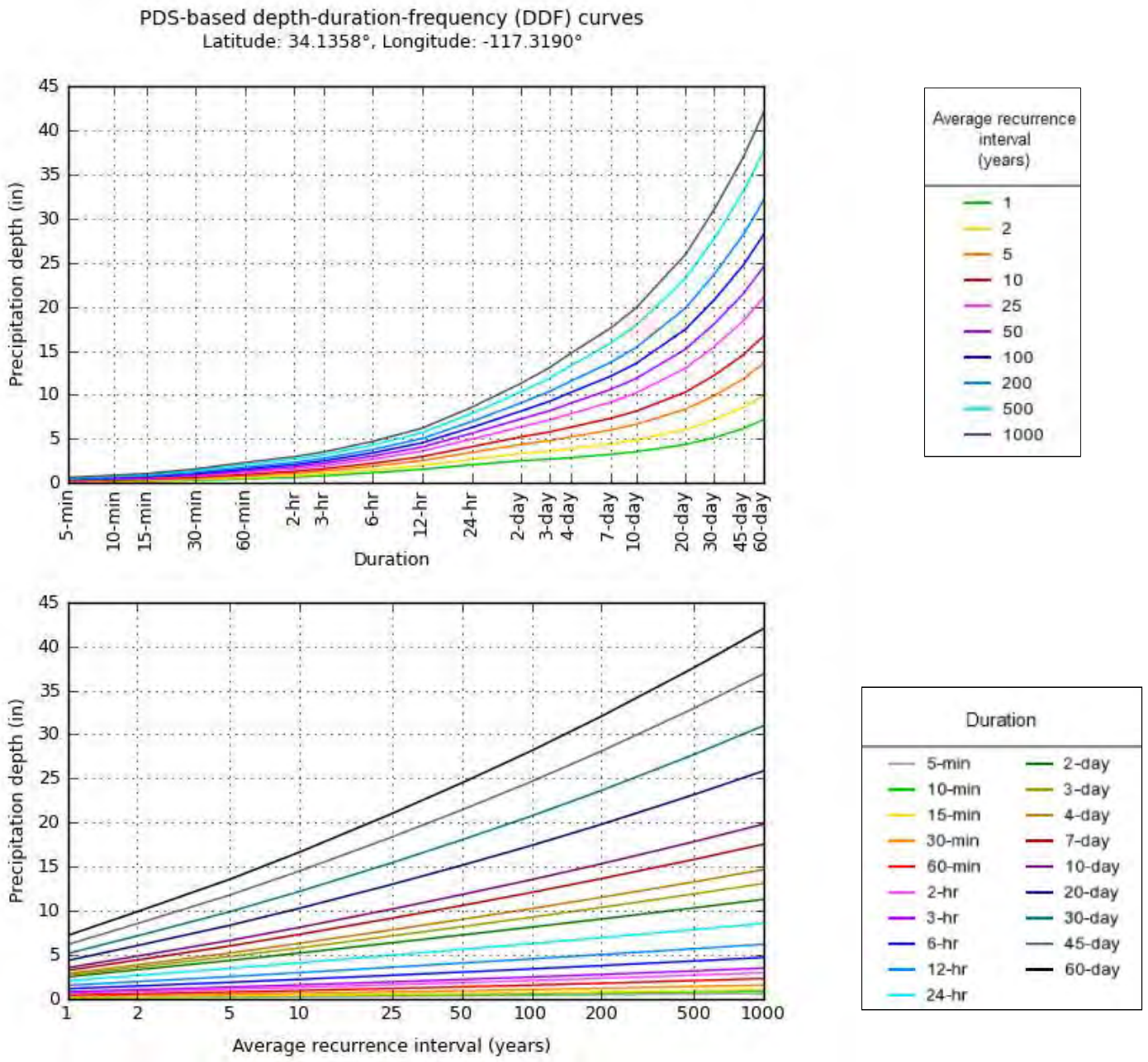
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National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
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Disclaimer

NOAA Atlas 14, Volume 6, Version 2
Location name: San Bernardino, California, USA*
Latitude: 34.1358°, Longitude: -117.319°
Elevation: 1212.37 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES @ W. Highland Street

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_&_aerials

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	**0.122** (0.102-0.148)	**0.160** (0.133-0.195)	**0.212** (0.176-0.258)	**0.255** (0.210-0.314)	**0.317** (0.251-0.403)	**0.366** (0.284-0.476)	**0.418** (0.317-0.557)	**0.473** (0.348-0.649)	**0.552** (0.390-0.790)	**0.616** (0.420-0.914)
10-min	**0.175** (0.146-0.213)	**0.230** (0.191-0.279)	**0.304** (0.252-0.370)	**0.366** (0.301-0.450)	**0.454** (0.360-0.578)	**0.525** (0.408-0.682)	**0.599** (0.454-0.798)	**0.678** (0.499-0.931)	**0.791** (0.558-1.13)	**0.883** (0.602-1.31)
15-min	**0.212** (0.176-0.257)	**0.278** (0.231-0.338)	**0.367** (0.304-0.448)	**0.443** (0.364-0.544)	**0.549** (0.436-0.699)	**0.634** (0.493-0.825)	**0.724** (0.549-0.965)	**0.820** (0.604-1.13)	**0.957** (0.675-1.37)	**1.07** (0.728-1.58)
30-min	**0.315** (0.262-0.383)	**0.414** (0.344-0.503)	**0.547** (0.453-0.667)	**0.659** (0.542-0.811)	**0.818** (0.649-1.04)	**0.945** (0.734-1.23)	**1.08** (0.817-1.44)	**1.22** (0.899-1.68)	**1.43** (1.00-2.04)	**1.59** (1.08-2.36)
60-min	**0.462** (0.384-0.561)	**0.606** (0.503-0.737)	**0.801** (0.664-0.977)	**0.966** (0.793-1.19)	**1.20** (0.951-1.52)	**1.38** (1.08-1.80)	**1.58** (1.20-2.11)	**1.79** (1.32-2.46)	**2.09** (1.47-2.99)	**2.33** (1.59-3.46)
2-hr	**0.671** (0.558-0.814)	**0.862** (0.716-1.05)	**1.12** (0.926-1.36)	**1.33** (1.09-1.64)	**1.63** (1.29-2.07)	**1.86** (1.44-2.42)	**2.10** (1.59-2.80)	**2.35** (1.73-3.23)	**2.71** (1.91-3.87)	**2.99** (2.04-4.43)
3-hr	**0.826** (0.687-1.00)	**1.05** (0.876-1.28)	**1.36** (1.12-1.65)	**1.61** (1.32-1.98)	**1.95** (1.55-2.48)	**2.22** (1.73-2.89)	**2.50** (1.89-3.33)	**2.79** (2.05-3.83)	**3.19** (2.25-4.57)	**3.51** (2.39-5.20)
6-hr	**1.17** (0.972-1.42)	**1.48** (1.23-1.80)	**1.90** (1.57-2.31)	**2.24** (1.84-2.75)	**2.70** (2.14-3.43)	**3.05** (2.37-3.97)	**3.42** (2.59-4.56)	**3.80** (2.80-5.21)	**4.31** (3.04-6.17)	**4.72** (3.21-6.99)
12-hr	**1.55** (1.29-1.88)	**1.98** (1.65-2.41)	**2.54** (2.10-3.10)	**3.00** (2.46-3.68)	**3.61** (2.87-4.59)	**4.08** (3.17-5.30)	**4.56** (3.45-6.07)	**5.05** (3.72-6.92)	**5.71** (4.03-8.17)	**6.22** (4.24-9.22)
24-hr	**2.07** (1.83-2.38)	**2.68** (2.37-3.09)	**3.47** (3.06-4.01)	**4.11** (3.60-4.79)	**4.97** (4.21-5.99)	**5.63** (4.67-6.92)	**6.29** (5.09-7.92)	**6.96** (5.49-9.02)	**7.87** (5.96-10.6)	**8.57** (6.27-12.0)
2-day	**2.52** (2.23-2.91)	**3.32** (2.94-3.83)	**4.37** (3.86-5.06)	**5.22** (4.57-6.09)	**6.38** (5.40-7.68)	**7.26** (6.02-8.93)	**8.16** (6.61-10.3)	**9.08** (7.16-11.8)	**10.3** (7.82-13.9)	**11.3** (8.26-15.8)
3-day	**2.70** (2.39-3.11)	**3.61** (3.19-4.17)	**4.81** (4.25-5.57)	**5.80** (5.08-6.76)	**7.15** (6.06-8.62)	**8.20** (6.81-10.1)	**9.28** (7.51-11.7)	**10.4** (8.19-13.5)	**11.9** (9.01-16.1)	**13.1** (9.59-18.3)
4-day	**2.87** (2.54-3.31)	**3.88** (3.43-4.47)	**5.21** (4.60-6.03)	**6.32** (5.53-7.37)	**7.84** (6.64-9.45)	**9.03** (7.49-11.1)	**10.3** (8.31-12.9)	**11.5** (9.09-14.9)	**13.3** (10.1-17.9)	**14.7** (10.7-20.5)
7-day	**3.25** (2.87-3.74)	**4.43** (3.92-5.11)	**6.01** (5.30-6.96)	**7.33** (6.42-8.55)	**9.16** (7.76-11.0)	**10.6** (8.79-13.0)	**12.1** (9.79-15.2)	**13.7** (10.8-17.7)	**15.8** (12.0-21.3)	**17.5** (12.8-24.5)
10-day	**3.54** (3.14-4.08)	**4.86** (4.30-5.61)	**6.64** (5.86-7.68)	**8.13** (7.11-9.48)	**10.2** (8.64-12.3)	**11.8** (9.82-14.6)	**13.5** (11.0-17.1)	**15.3** (12.1-19.9)	**17.8** (13.5-24.1)	**19.8** (14.5-27.7)
20-day	**4.36** (3.86-5.03)	**6.06** (5.36-6.99)	**8.36** (7.37-9.67)	**10.3** (9.00-12.0)	**13.0** (11.0-15.7)	**15.2** (12.6-18.6)	**17.4** (14.1-21.9)	**19.8** (15.6-25.6)	**23.2** (17.5-31.2)	**25.9** (18.9-36.1)
30-day	**5.15** (4.56-5.93)	**7.16** (6.33-8.26)	**9.90** (8.73-11.4)	**12.2** (10.7-14.2)	**15.4** (13.1-18.6)	**18.0** (15.0-22.2)	**20.8** (16.8-26.1)	**23.6** (18.6-30.6)	**27.7** (21.0-37.4)	**31.0** (22.7-43.2)
45-day	**6.17** (5.47-7.11)	**8.55** (7.56-9.87)	**11.8** (10.4-13.6)	**14.5** (12.7-16.9)	**18.4** (15.6-22.1)	**21.4** (17.8-26.4)	**24.7** (20.0-31.1)	**28.1** (22.1-36.4)	**33.0** (24.9-44.4)	**36.9** (27.0-51.4)
60-day	**7.20** (6.38-8.30)	**9.90** (8.76-11.4)	**13.6** (12.0-15.7)	**16.7** (14.6-19.4)	**21.0** (17.8-25.3)	**24.5** (20.3-30.1)	**28.2** (22.8-35.5)	**32.1** (25.3-41.5)	**37.6** (28.4-50.6)	**42.0** (30.7-58.6)

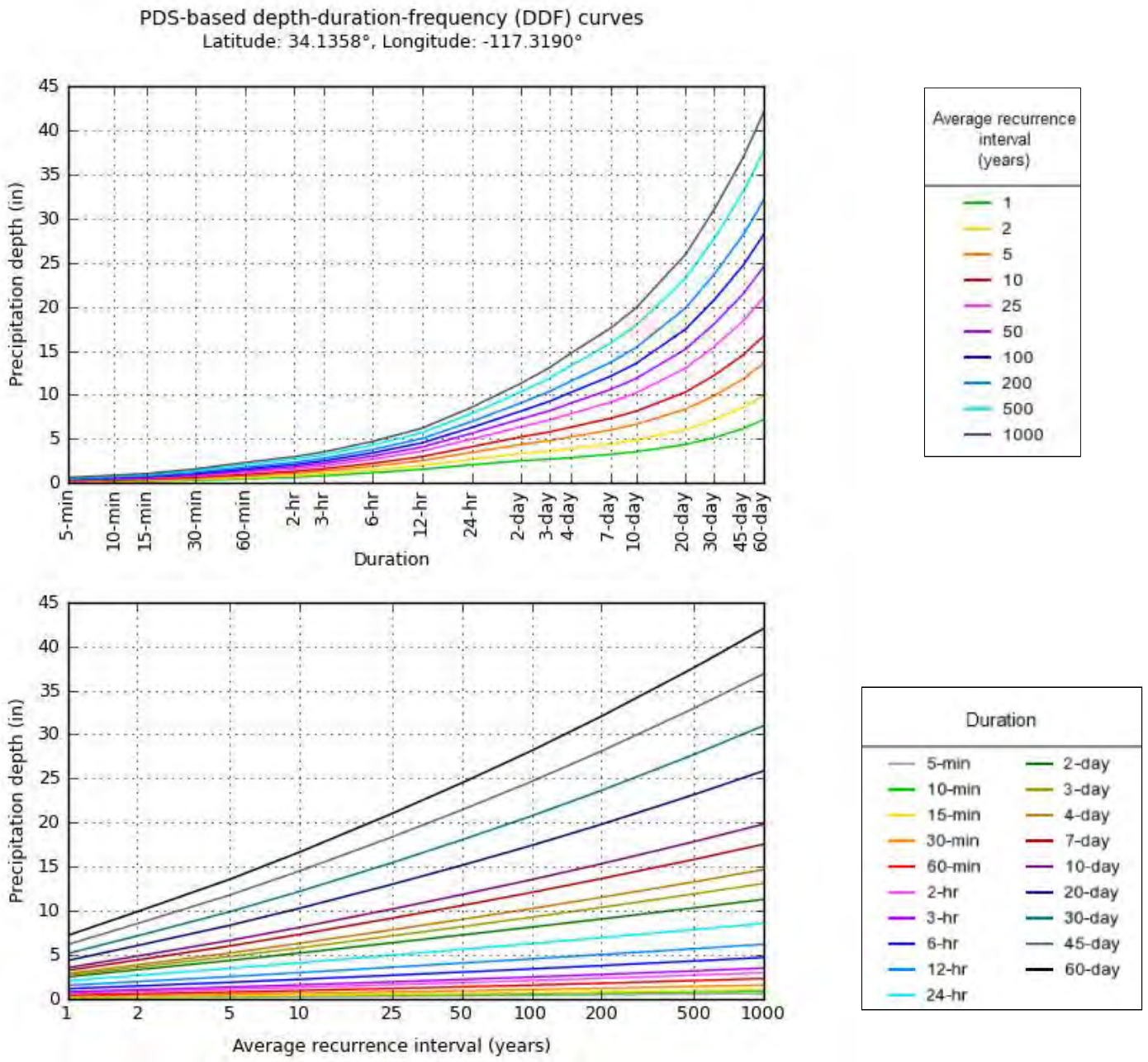
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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Silver Spring, MD 20910
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Reference-2

- ***Existing Flooding Pictures***



Cajon Blvd. & W. Highland Ave.

Cajon Blve & N. Mt Vernon Ave


D
Cajon Blvd. & N. Vernon Ave

Cajon Blvd. & University Pkwy



Cajon Blvd. & N. Vernon Ave

Cajon Blvd. & W. Highland Ave

N. 6th Street


N. 6th Street


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eco
7th Street

7th Street


8th Street



8th Street



8th Street


AIR-RIDE EQUIPPED
8th Street


W. 10th Street

Oliv Street

Oliv Street


W. 11th Street

Home Ave.


Home Ave.


Home Ave.


W.14th Street


15th Street



W. Evans Street


NO
STOPPING
ANY
TIME
W. Evans Street

W. Evans Street



w. 7th Street



W. 16th Street


EXIT 45
Baseline St
EXIT ONLY
17th Street

HYDROLOGY STUDY & CEQA ASSESSMENT FOR BNSF ONO LEAD TRACK

CITY OF SAN BERNARDINO
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OCTOBER 6, 2019
REVISED APRIL 6, 2020
REVISED DECEMBER 23, 2020

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This report has been prepared by or under the direction of the following registered civil engineer who attests to the technical information contained herein. The registered civil engineer has also judged the qualifications of any technical specialists providing engineering data upon which recommendations, conclusions, and decisions are based.



Joseph L. Castaneda RCE 59835 Registered Civil Engineer	12/23/2020 Date	Seal

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I. PURPOSE AND SCOPE

The purpose of this study is to supplement the Drainage Study prepared by JLC Engineering and Consulting dated March 30, 2020. The Drainage Study was prepared to determine the existing flooding condition and the proposed mitigation measures that would be required as part of the BNSF Ono Lead Track Extension project. The drainage Study provided proposed and potential storm drain systems that can be designed to improve the existing flooding condition for the proposed railway extension, existing streets and adjacent properties along the railway. The scope of the analysis includes the 100-year storm runoff calculations for the watershed area adjacent to the westerly limits of the BNSF Ono Lead Track Extension project.

The Drainage Study included the engineering recommendations that should be incorporated as part of the railroad track extension that is adjacent to Interstate 215.

The proposed "BNSF ONO Lead Track Extension Project" (the PROJECT) is processing an Environmental Impact Report (EIR) and other pertinent studies to comply with the California Environmental Quality Act (CEQA). CEQA requires projects to assess the levels of impact a project has as it relates to "Hydrology and Water Quality" for the following issues:

a. Will the project violate any water quality standards or waste discharge requirements?

b. Will the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

c. Will the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off- site?

d. Will the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site

e. Will the project create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?

f. Will the project otherwise substantially degrade water quality?

g. Will the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

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h. Will the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?

i. Will the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam

j. Will the project inundation by seiche, tsunami, or mudflow

The scope of the supplemental study will focus on assessing the factors outlined. The following is a description of additional analyses required to address the issues outlined by CEQA as part of the Hydrology and Water Quality section:

1. Determine the impervious area and area of disturbance created by the PROJECT.
2. Perform 100-year Unit Hydrograph analyses to assess the change in volume and flow rate that can be attributed to the PROJECT.
3. Perform calculations to determine the water quality volume the PROJECT must capture and treat through the use of "Best Management Practices" for potential pollutants of concern that are generated by the PROJECT.
4. Assess the flow patterns of the general watershed area and ensure that the PROJECT does not impact or alter drainage patterns or result in erosion or siltation.
5. Assess the hydrology and runoff from the PROJECT and ensure that the PROJECT will not impact downstream storm drain facilities.
6. Assess how the PROJECT will impact or deplete groundwater or degrade water quality.
7. Provide and identify water quality basins that would mitigate potential impacts for the PROJECT.
8. Prepare a study, which consists of hydrological results and an assessment how the project is mitigating PROJECT impacts.

II. PROJECT SITE AND DRAINAGE AREA OVERVIEW

The PROJECT is a proposed track extension project that is proposed by BNSF. The PROJECT would involve construction of the fourth lead track within/along 4.3 miles of existing BNSF corridor generally from the BNSF overpass at State Street/University Parkway on the north to the existing SBD Intermodal A Yard at West 5th Street on the south. The existing railroad corridor is essentially parallel to the Interstate 215 Freeway. The existing railroad corridor and the proposed project improvements are within a 41 acre area that is located between University Parkway to the north and 5th Street to the south, see Figure 1 - Vicinity Map.

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The project site is an existing graded and compacted area that is a railroad corridor that is used by BNSF. Figure 2 Topography Map was developed as an illustration that shows the general contours for the overall regional area. Additionally, Figure 2 shows the regional storm drain facilities that exist within the area that intercept flows from the drainage area. Based on the Topography Map, the general drainage pattern is in a northwest to southeast direction. The portion of the PROJECT north of Interstate 210 indicate that runoff flows parallel to the railroad corridor. The portion of the PROJECT south of Interstate 210 will collect flows from streets in the east/west direction that are east of Mount Vernon Avenue. The runoff from this general area has been identified in the Drainages. The runoff from these areas flow along the existing railroad corridor and adjacent streets. The Drainage Study provides drainage facilities that have been recommended for the PROJECT in order to provide flood protection for the PROJECT and surrounding area.

III. HYDROLOGY

The San Bernardino County Hydrology Manual (Reference 1), was used to develop the hydrological parameters for the hydrology analyses for the PROJECT. The unit hydrograph method was used for the analyses and the computations were performed using the computer program developed by Civil Cadd/Civil Design. The unit hydrograph method was used in order to assess impacts associated with increase runoff and volume.

The rainfall depths used in the hydrology calculations for the unit hydrograph method are as follows:

Storm Event & Duration	Rainfall (inches)
100-Year, 1-Hour	1.58
100-Year, 6-Hour	3.42
100-Year, 24-Hour	6.29

The rainfall depths were obtained from NOAA Atlas 14.

The existing soil classification for the area consists of Hydrologic Soil Group "A" for the entire project area which was obtained from the National Resource Conservation Service Websoil Survey. The 100-year unit hydrograph method used an AMC III to determine the volume and runoff generated by the pre-project and post project conditions.

The PROJECT assessed a total of 9 drainage areas that are shown on Exhibit 1 –Hydrology Map. The land cover and Curve Numbers used for the drainage areas are as follows based on AMC II which is the required input condition for the hydrology model:

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Table 1 – Land Cover and Curve Numbers

Description	Curve Number	Impervious %
Undeveloped Area	78	0
Existing Railroad	86	0
Residential Area	56	0.5
Industrial/Commercial Area	56	0.9
Street Area	56	0.9
Proposed Railroad	86	0
Proposed Street Area	56	0.9

The table above was used to develop the representative Curve Number and Impervious Area for the 9 drainage areas. Table 2 and Table 3 provide the representative Average Curve Number and Impervious Area for the pre-project and post-project conditions:

Table 2 – Pre-Project - Curve Numbers & Impervious %

Drainage Designation	Drainage Area (acres)	Curve Number (AMC III)	Impervious %
1	3.26	83.2	0
2	8.23	83.1	0
3	6.39	75.9	14%
4	5.12	79.9	5%
5	10.33	68	38%
6	7.49	68.2	43%
7	1.64	74.7	27%
8	2.8	73.3	16%
9	3.86	81.6	2%

Table 3 – Post-Project - Curve Numbers & Impervious %

Drainage Designation	Drainage Area (acres)	Curve Number (AMC III)	Impervious %
1	3.26	86	25%
2	8.23	86	0
3	6.39	86	0
4	5.12	85.4	6%
5	10.33	83.4	11%
6	7.49	85.3	2%
7	1.64	86	4%
8	2.8	80.7	19%
9	3.86	86	3%

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The unit hydrographs for the pre-project and post-project conditions have been included in Appendix A and B, respectively. The purpose of the unit hydrograph calculations was to determine the amount of additional runoff volume that the project would produce due to the regrading and compaction of the additional track extension. Table 4 provides the pre-project and post-project flow rates and volumes for the 9 drainage areas:

Table 4 –Pre-Project & Post-Project Volume and Flow Rates

Drainage Designation	Pre-Project Volume (acre-ft)	Pre-Project Flow Rate (ft^3/s)	Post-Project Volume (acre-ft)	Post-Project Flow Rate (ft^3/s)
1	1.59	16.0	1.63	14.7
2	4.00	30.7	4.10	34.6
3	2.93	29.2	3.19	32.3
4	2.42	18.8	2.55	20.2
5	4.55	39.5	5.07	47.5
6	3.35	29.3	3.73	34.9
7	0.76	8.0	0.82	8.8
8	0.93	11.1	1.35	14.1
9	1.85	19.3	1.93	19.5

The post-project unit hydrograph calculations indicate that the PROJECT will increase flow rate and volume for the 100-year, 24-hour storm durations. The pre-project and post-project unit hydrograph calculations have been included in Appendix A and Appendix B.

In order to address the increased runoff volume for the PROJECT three potential solutions can be incorporated in the design as follows:

1. The project can incorporate basins that can be used to store the additional volume in order to mitigate additional flooding due to the construction of the project. To mitigate the additional volume the project would be required to store approximately 2 acre-feet of volume.

2. The project can construct storm drain systems that connect to the existing Caltrans Storm Drains system located along Interstate 215 and shown in Figure 2 to reduce the flooding. The Caltrans storm drain was design to intercept the flows from the regional watershed area as shown on Figure 3. This system was designed to accept the flows from the project area and was designed to convey flows that range from 380 ft^3/s to 734 ft^3/s.

3. The project can implement a combination of basins and storm drains system that will reduce the potential flooding along the railroad corridor.

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IV. WATER QUALITY

The proposed project must address impacts associated with water quality runoff that is associated with the improvements related to the project. The proposed improvements being considered are as follows:

1. The addition of a fourth track adjacent to the existing railroad corridor.
2. The improvements will include earthen and concrete swales to perpetuate existing runoff patterns.
3. Proposed street improvements required as part of the project due to the relocation and reconfiguration of existing streets.

These improvements will require water quality to be addressed per the San Bernardino County "Technical Guidance Document for Water Quality Management Plan" (TG-WQMP). In order to address water quality, the project must determine the preliminary Water Quality Design Volume (DCV) that the project will generate. The DCV is calculated using the following parameters:

1. The PROJECT drainage areas (DA).
2. The runoff coefficient (Rc) defined as follows:

$R_c = 0.858\ (I^3) - 0.78\ (I^2) + 0.774\ (I) + 0.04$

Where:

R_c : Runoff Coefficient

I : Impervious %

3. Water Quality Precipitation (P_{WQ}) based on NOAA Atlas 14
4. Required drawdown time to drain the DCV within a 48 hour period.

The parameter above are used to calculate the preliminary DCV for the project to mitigate water quality impacts:

$DCV = (1/12) * DA * R_c * P_{WQ} * 1.963$

Please note that the DCV shown on Table 5 are based on preliminary layouts and impervious areas. These volume will require revisions in order to represent the final design that is to be constructed as part of the project improvement plans.

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Table 5 – Post-Project DCV

Drainage Designation	Drainage Area (acres)	Impervious %	DCV (ft^3)
1	3.26	25%	4,130.2
2	8.23	0	2,104.8
3	6.39	0	1,634.2
4	5.12	6%	2,743.8
5	10.33	11%	7,717.1
6	7.49	2%	2,642.2
7	1.64	4%	731.5
8	2.8	19%	2,950.1
9	3.86	3%	1,543.5

The calculations for the DCV for the PROJECT must be treated through the use of water quality basins as required by TG-WQMP. Water quality basins that can be used are 1) infiltration basins, 2) bio-treatment basins or other BMPs that area acceptable and outlined in the TG-WQMP. The PROJECT will be required to store or treat approximately 26,200 ft^3 or 0.6 acre-feet of DCV Volume. Due to PROJECT constraints and potential locations of the water quality basins, the PROJECT may elect to treat runoff from existing developed areas that produce similar constituents/pollutants to offset the PROJECT improvements.

The preferred treatment required for the DCV is to implement either infiltration type BMPs since these basins promotes groundwater infiltration and provide treatment as required by the TG-WQMP. The final basin type will be determined during final engineering once additional geotechnical testing and soil investigations are completed. Exhibit B – Water Quality Basin Map was prepared to show potential locations of the water quality basins. Preliminary infiltration testing was performed for a total of 4 infiltration basins to understand the existing infiltration rates. Prior to performing infiltration testing, research was performed using data from the Natural Resource Conservation Service (NRCS). The NRCS has identified that the project area has potential infiltration rates that are approximately 4.0 inches per hour. The following infiltration rates have been provided but do not include the use of a safety factor:

Table 6 – Infiltration Rates for Proposed Infiltration Basins

Basin	Basin Boundary (acres)	Bottom Area (acres)	Infiltration Rate Test #1 (in/hr)	Infiltration Rate Test #2 (in/hr)
1	0.7	0.7	20.8	17.4
3	0.4	0.2	5.4	7.2
6	0.7	0.2	0.2	0.2
9	1.0	0.6	2.2	4.4

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The infiltration rates obtained from the NRCS are represented by the infiltration testing performed.

The infiltration rate results demonstrate that infiltration basins are feasible. However, the TG-WQMP provides guidance and outlines requirements on the implementation of infiltration basins that are associated with existing soil conditions. The following requirements need to be thoroughly investigated when implementing infiltration basins: 1) soil contamination, 2) groundwater depths, 3) soil deficiency associated with constructability and re-compaction of the soil, 4) other geotechnical issues. If the underlying soil is deemed inadequate to support infiltration basins, the Project will implement the use of bio-retention basins, which is the preferred alternative if infiltration basins are not viable.

V. PROJECT MITIGATION MEASURES

The PROJECT has identified a total of 7 potential water quality basins that can be used to mitigate the increase runoff, water quality, and groundwater impacts associated with the PROJECT. The potential basins provide the following storage volume that will be treated by the proposed water quality basins:

Table 7 – Infiltration Basins Boundary Area and Storage Volume

Basin Designation	Boundary Area[1] (acres)	Bottom Area[2] (acres)	Storage Volume (acre-feet)
1	1.3	0.7	2.8
2	0.3	0.1	0.4
3	0.4	0.2	0.8
6	0.7	0.2	0.8
7	1.3	0.9	5.4
8	0.3	0.1	0.4
9	1.0	0.6	2.4
Total	5.3	2.8	13.0

(1) Boundary Area: The Boundary Area is defined as the total property area required to construct the infiltration basin including access ramps, setbacks from property lines/right-of-way, entrance areas and other grading features.
(2) Bottom Area: The Bottom Area is defined as the potential basin bottom area assuming that a basin is graded 7 feet deep with 2:1 slopes and 1 foot of freeboard.

The 7 Potential Basins can provide approximately 13.0 acre-feet of storage volume. The total potential storage volume exceeds the increase runoff volume of 2 acre-feet and the DCV volume of 0.6 acre-feet.

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The following design criteria has been outlined for the proposed water quality basins:

1. The basins would be designed to a depth of 7 feet below the proposed finish surface to accommodate storm drain pipes required to convey flows from future inlet and catch basin structures required for the project.
2. The allowable storage depth of the water quality basins will be limited to 4 feet of depth to ensure that proper freeboard, basin operation, and to meet the required drawdown time. It should be noted that bio-retention basins are typically limited to 1.5 feet since the conventional approach is to implement bio-retention basins as part of a planter. Since these systems are to be fenced and closed to the public, a depth of 4 feet is a viable alternative if the design incorporates landscape cover that can be inundated.
3. The basin bottom would be located a minimum of 10.0 feet above the historic groundwater.
4. The basin bottom would be located a minimum of 5.0 feet above bedrock or impermeable surface layer.
5. The basins would be located a minimum of 100 feet from wells, tanks, and springs.
6. The basins' design would implement the use of a forebay system as a pre-treatment device. The forebay systems would be required to store 0.5% of the water quality volume.
7. Basin side slopes would be limited to a 2:1 ratio and will be landscaped to prevent erosion and for stabilization. The landscaping would not use pesticides, herbicides, or fertilizers that would contribute to water quality impacts.
8. The water quality design volume would infiltrate or drawdown within 72 hours or as required by the local agency.
9. The basins would incorporate access ramps to allow vehicles to access the basin bottom for routine maintenance.
10. The basins would include access gates and fencing along the basins' perimeter to prevent disturbance and public access.
11. During final engineering, the project will be required to perform infiltration testing, geotechnical borings, soil research and soil testing at the final infiltration basin locations in order to substantiate the viability of implementing infiltration basins. In addition, the geotechnical assessment will be used to establish a safety factor that will be used for the basin infiltration rate. If the geotechnical assessment results indicate that infiltration basins are not viable, bio-retention basins will be used.
12. The current water quality basin assessment is based on using infiltration basins. The TG-WQMP and current data obtained for the project used a preliminary safety factor of 4 using the Worksheet H – Factor of Safety and Design Infiltration Rate and Worksheet included in the TG-WQMP.

VI. CONCLUSIONS

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The analyses evaluated the PROJECT and is proposing infiltration basins to mitigate impacts associated with increase in runoff volume and to treat water quality DCV. As a secondary alternative, the project may implement the use of water quality basins and storm drain systems to mitigate the increased runoff by connecting to the existing Caltrans storm drain system. The nine total proposed water basins are not required and have solely being identified as potential sites. During Final Engineering, the final water quality basins will be selected based on final geotechnical & infiltration rate testing. Based on the preliminary analyses conducted by this project, a total of approximately 0.6 acre-feet of volume must be stored to offset the project impacts associated with water quality. If the project implements the use of infiltration basins, as a potential drainage solution the project may store an additional 2.0 acre-feet to address impacts associated with increase runoff. As a secondary alternative, that project may elect to construct storm drain systems to connect to the existing Caltrans storm drain in order to offset the project impacts associated with increase runoff. Based upon the mitigation measures the following can be concluded as it relates to the CEQA Hydrology & Water Quality Issues:

a. Will the project violate any water quality standards or waste discharge requirements?

   Conclusion: The project is implementing the requirements outlined in the TG-WQMP and will address water quality and potential pollutants as required by the TG-WQMP. Therefore, the project is not violating any water quality standards or waste discharge requirements.

b. Will the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

   Conclusion: The project is proposing 7 infiltration or bio-filtration basins that may be used to mitigate increased runoff volume and to treat water quality runoff. The infiltration basins must mitigate 0.6 acre-feet of water quality DCV volume and 2.0 acre-feet of increased runoff volume. The proposed infiltration basins will store and promote groundwater infiltration. The existing condition runoff does not have any storage areas and do not currently promote groundwater recharge. If the geotechnical analyses deem infiltration basins not feasible due to adverse impacts to groundwater, the runoff will be required to be directed to the Caltrans storm drain system.

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c. Will the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off- site?

Conclusion: The project design and the recommendations in the Drainage Study is recommending drainage improvements that perpetuate the current flow patterns. Moreover, the proposed improvements assessed velocity potential associated with the PROJECT. Areas where velocities are potentially erosive, concrete swales/channels will be implemented.

d. Will the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

Conclusion: The project design and the recommendations in the Drainage Study will perpetuate the current flow patterns. Moreover, the infiltration basins proposed for the PROJECT will offset increases in runoff volume and flow rate to offset PROJECT impacts. As a secondary alternative, storm drain will be constructed to connect to the existing Caltrans Storm Drain which has been designed for the 100 year storm event and discharges into a concrete channel defined as Lytle Creek Channel which is considered an adequate outlet exempted for hydromodifications.

e. Will the project create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?

Conclusion: The infiltration basins proposed for the PROJECT have been proposed to offset increases in runoff volume and flow rate to mitigate the PROJECT impacts. As a secondary alternative, storm drain will be constructed to connect to the existing Caltrans Storm Drain which has been designed for the 100 year storm event and discharges into a concrete channel defined as Lytle Creek Channel which is considered an adequate outlet exempted for hydromodifications.

f. Will the project otherwise substantially degrade water quality?

Conclusion: The PROJECT is implementing the requirements outlined in the TG-WQMP and will address water quality and potential pollutants as required by the TG-WQMP. Therefore, the project will not degrade water quality standards.

g. Will the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

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Conclusion: The PROJECT is not within a 100 year flood plain or flood hazard area. Moreover, the PROJECT is not planning to construct any housing.

h. Will the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?

Conclusion: The PROJECT is not within a 100 year flood plain or flood hazard area. Moreover, the PROJECT is not planning to construct any habitable structures.

i. Will the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

Conclusion: The PROJECT is not constructing or located adjacent to any levees or dams.

j. Will the project inundation by seiche, tsunami, or mudflow

Conclusion: The PROJECT is not subjected to seiche, tsunami or mudflows.

Based on the Drainage Study and the Supplemental Report prepared for the PROJECT, the proposed improvements, water quality basins and recommendation will offset the PROJECT impacts to be less than significant since the increased runoff volume, DCV Volume are being infiltrated or discharged into a storm drain facility designed for the 100 year storm event. Moreover, the project improvements are perpetuating the existing flow patterns in a manner to offset impacts to adjacent properties.

VII. REFERENCES

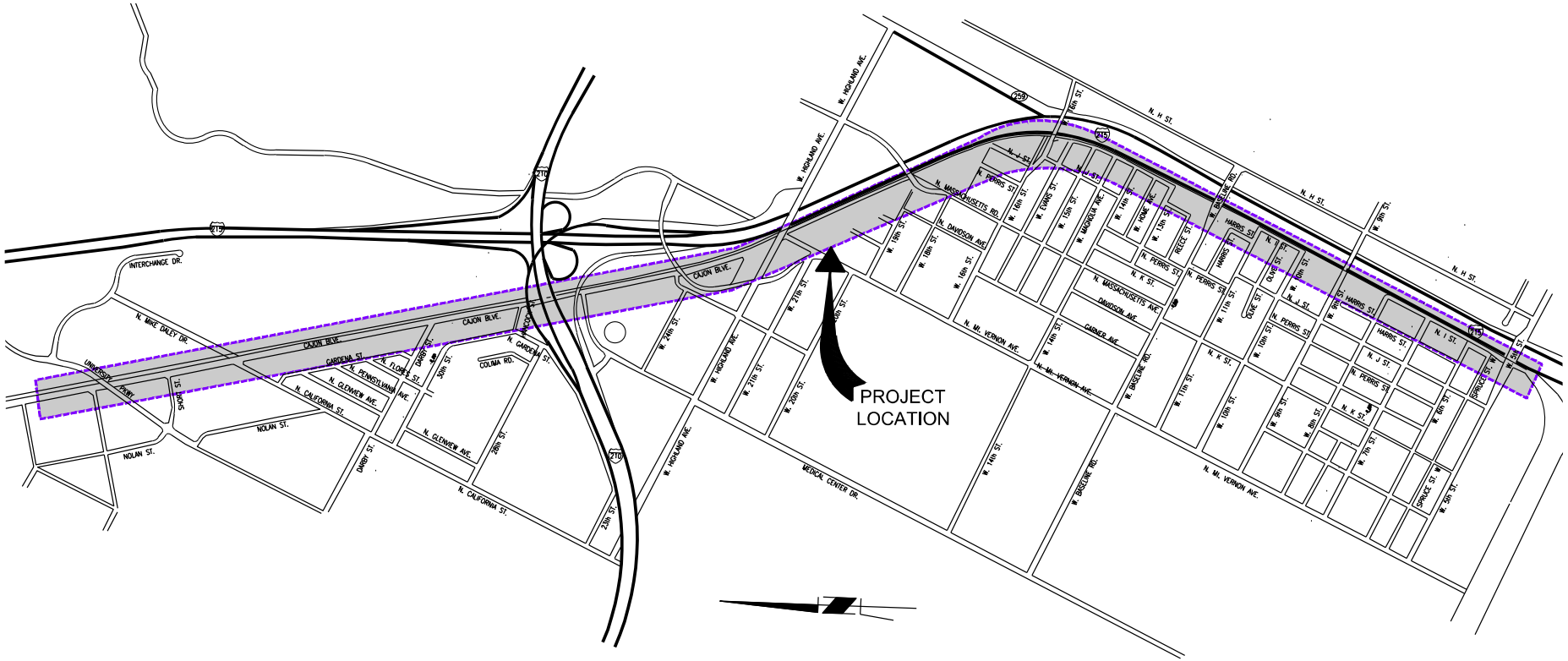
1. San Bernardino Flood Control Hydrology Manual, August 1986.
2. Drainage Study for BNSF Ono Lead Track, March 30 2020

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FIGURES

FIGURE 1: VICINITY MAP

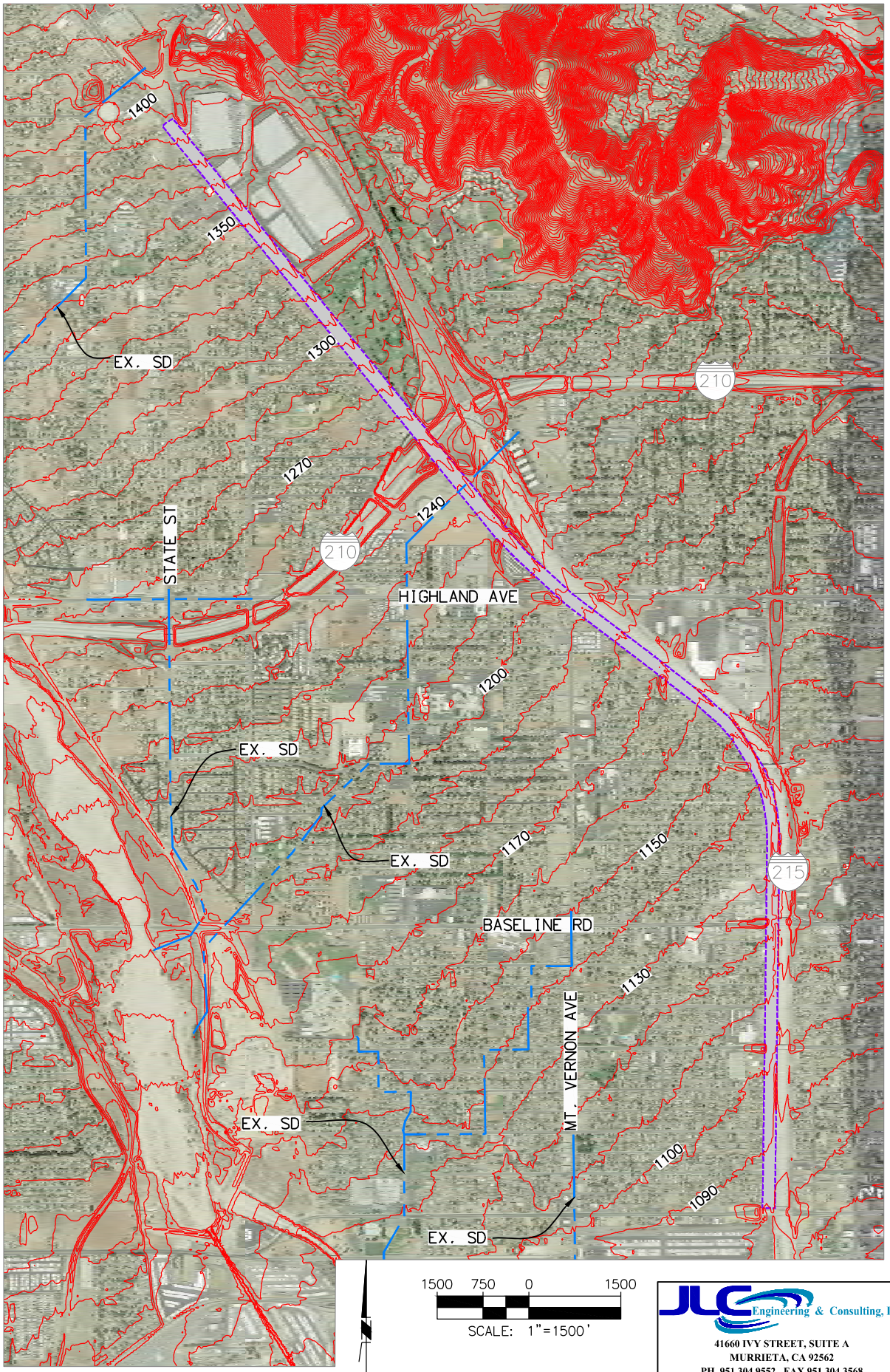
BNSF ONO LEAD TRACK EXTENSION
FIGURE 1 – VICINITY MAP



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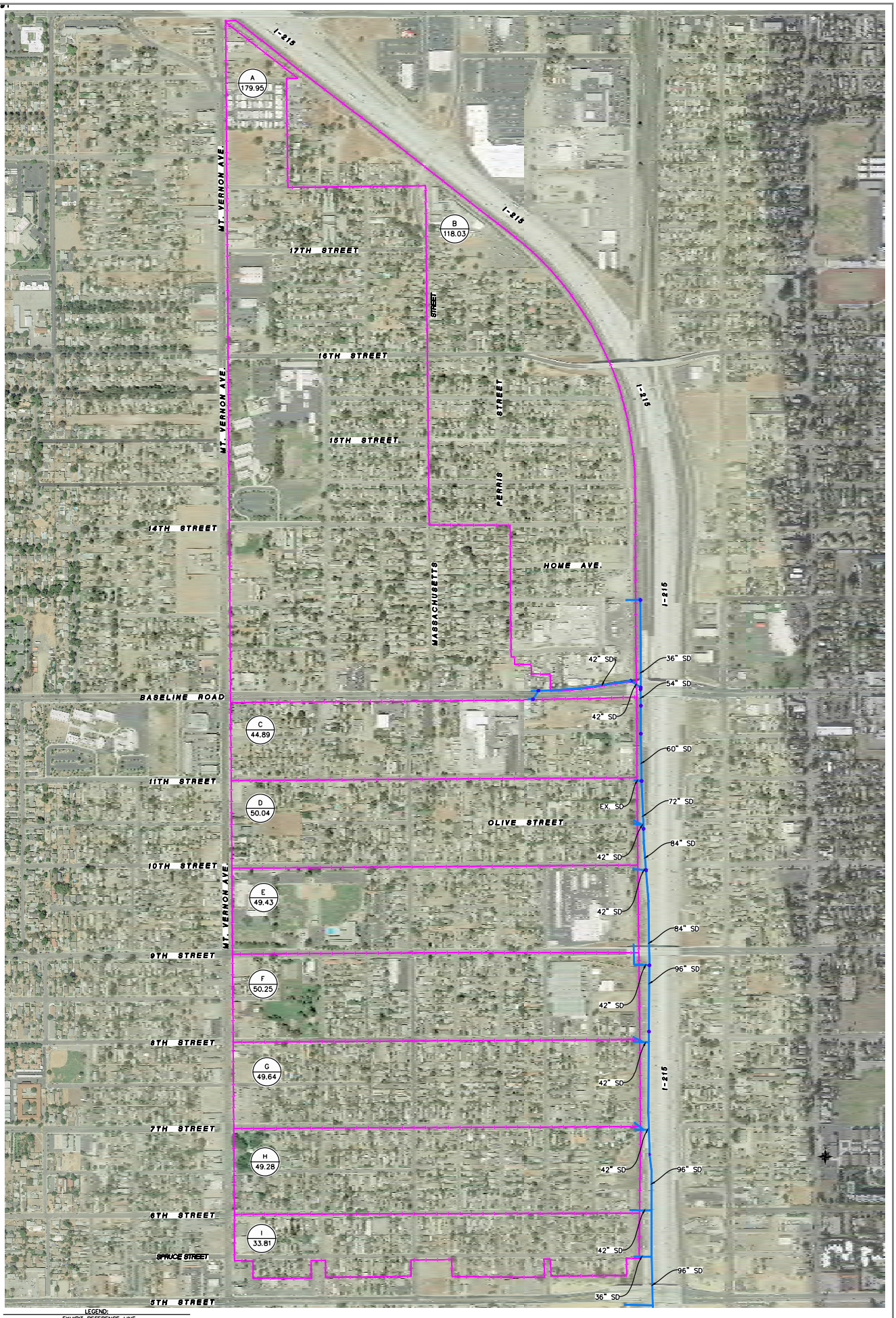
FIGURE 2: TOPOGRAPHY MAP

BNSF ONO LEAD TRACK EXTENSION
FIGURE 2 - TOPOGRAPHY MAP



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FIGURE 3: DRAINAGE STUDY WATERSHED MAP



LEGEND:
- EXHIBIT REFERENCE LINE
- POTENTIAL STORM DRAIN LATERAL
- EXISTING STORM DRAIN
- WATERSHED AREA
- POTENTIAL LOCATION FOR BIO-TREATMENT BASINS

AREA DESIGNATION / ACRES

N

FIGURE 3

BNSF ONO LEAD TRACK

DRAINAGE STUDY
WATERSHED MAP

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APPENDICES

APPENDIX A: PRE-PROJECT UNIT HYDROGRAPH METHOD HYDROLOGY

APPENDIX A.1: UNIT HYDROGRAPH, AREA "1"

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/20/19

++

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

Program License Serial Number 6279

BNSF
EXISTING HYDROLOGY
AREA 1

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
3.26	1	1.58
Rainfall data for year 100		
3.26	6	3.42
Rainfall data for year 100		
3.26	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
83.2	95.9	3.26	1.000	0.080	1.000	0.080

Area-averaged adjusted loss rate Fm (In/Hr) = 0.080

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
3.26	1.000	83.2	95.9	0.43	0.923

Area-averaged catchment yield fraction, Y = 0.923
Area-averaged low loss fraction, Yb = 0.077
++
Watercourse length = 1136.00(Ft.)
Length from concentration point to centroid = 569.00(Ft.)
Elevation difference along watercourse = 22.00(Ft.)
Mannings friction factor along watercourse = 0.025
Watershed area = 3.26(Ac.)
Catchment Lag time = 0.060 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 139.8691
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.080(In/Hr)
Average low loss rate fraction (Yb) = 0.077 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 3.26(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.585(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.580(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 39.43 (CFS))		
1	31.080	12.254
2	93.589	24.644
3	100.000	2.528

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5847	0.5847
2	0.7715	0.1868
3	0.9073	0.1358
4	1.0180	0.1107
5	1.1130	0.0950

6	1.1972	0.0842
7	1.2734	0.0761
8	1.3432	0.0699
9	1.4080	0.0648
10	1.4686	0.0606
11	1.5257	0.0571
12	1.5798	0.0540
13	1.6352	0.0555
14	1.6883	0.0531
15	1.7393	0.0510
16	1.7883	0.0491
17	1.8357	0.0474
18	1.8815	0.0458
19	1.9259	0.0444
20	1.9689	0.0431
21	2.0108	0.0419
22	2.0515	0.0407
23	2.0912	0.0397
24	2.1299	0.0387
25	2.1677	0.0378
26	2.2047	0.0370
27	2.2409	0.0362
28	2.2763	0.0354
29	2.3110	0.0347
30	2.3450	0.0340
31	2.3784	0.0334
32	2.4112	0.0328
33	2.4434	0.0322
34	2.4750	0.0316
35	2.5061	0.0311
36	2.5368	0.0306
37	2.5669	0.0301
38	2.5966	0.0297
39	2.6258	0.0292
40	2.6546	0.0288
41	2.6830	0.0284
42	2.7110	0.0280
43	2.7387	0.0276
44	2.7659	0.0273
45	2.7928	0.0269
46	2.8194	0.0266
47	2.8457	0.0263
48	2.8716	0.0259
49	2.8973	0.0256
50	2.9226	0.0253
51	2.9476	0.0251
52	2.9724	0.0248
53	2.9969	0.0245
54	3.0212	0.0242
55	3.0451	0.0240
56	3.0689	0.0237
57	3.0924	0.0235
58	3.1157	0.0233
59	3.1387	0.0230
60	3.1615	0.0228
61	3.1841	0.0226
62	3.2065	0.0224
63	3.2287	0.0222
64	3.2507	0.0220

65	3.2725	0.0218
66	3.2941	0.0216
67	3.3155	0.0214
68	3.3367	0.0212
69	3.3578	0.0211
70	3.3787	0.0209
71	3.3994	0.0207
72	3.4200	0.0206
73	3.4408	0.0208
74	3.4614	0.0206
75	3.4819	0.0205
76	3.5022	0.0203
77	3.5224	0.0202
78	3.5424	0.0200
79	3.5623	0.0199
80	3.5821	0.0197
81	3.6017	0.0196
82	3.6212	0.0195
83	3.6405	0.0193
84	3.6597	0.0192
85	3.6788	0.0191
86	3.6978	0.0190
87	3.7166	0.0188
88	3.7353	0.0187
89	3.7539	0.0186
90	3.7724	0.0185
91	3.7908	0.0184
92	3.8090	0.0183
93	3.8272	0.0181
94	3.8452	0.0180
95	3.8631	0.0179
96	3.8809	0.0178
97	3.8987	0.0177
98	3.9163	0.0176
99	3.9338	0.0175
100	3.9512	0.0174
101	3.9685	0.0173
102	3.9857	0.0172
103	4.0029	0.0171
104	4.0199	0.0170
105	4.0369	0.0169
106	4.0537	0.0169
107	4.0705	0.0168
108	4.0871	0.0167
109	4.1037	0.0166
110	4.1202	0.0165
111	4.1367	0.0164
112	4.1530	0.0163
113	4.1693	0.0163
114	4.1854	0.0162
115	4.2015	0.0161
116	4.2176	0.0160
117	4.2335	0.0159
118	4.2494	0.0159
119	4.2652	0.0158
120	4.2809	0.0157
121	4.2965	0.0156
122	4.3121	0.0156
123	4.3276	0.0155

124	4.3430	0.0154
125	4.3584	0.0154
126	4.3737	0.0153
127	4.3889	0.0152
128	4.4040	0.0152
129	4.4191	0.0151
130	4.4342	0.0150
131	4.4491	0.0150
132	4.4640	0.0149
133	4.4788	0.0148
134	4.4936	0.0148
135	4.5083	0.0147
136	4.5230	0.0146
137	4.5376	0.0146
138	4.5521	0.0145
139	4.5666	0.0145
140	4.5810	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6239	0.0142
144	4.6380	0.0142
145	4.6522	0.0141
146	4.6663	0.0141
147	4.6803	0.0140
148	4.6942	0.0140
149	4.7082	0.0139
150	4.7220	0.0139
151	4.7358	0.0138
152	4.7496	0.0138
153	4.7633	0.0137
154	4.7770	0.0137
155	4.7906	0.0136
156	4.8041	0.0136
157	4.8176	0.0135
158	4.8311	0.0135
159	4.8445	0.0134
160	4.8579	0.0134
161	4.8712	0.0133
162	4.8845	0.0133
163	4.8977	0.0132
164	4.9109	0.0132
165	4.9240	0.0131
166	4.9371	0.0131
167	4.9502	0.0131
168	4.9632	0.0130
169	4.9762	0.0130
170	4.9891	0.0129
171	5.0020	0.0129
172	5.0148	0.0128
173	5.0276	0.0128
174	5.0403	0.0128
175	5.0530	0.0127
176	5.0657	0.0127
177	5.0783	0.0126
178	5.0909	0.0126
179	5.1035	0.0126
180	5.1160	0.0125
181	5.1285	0.0125
182	5.1409	0.0124

183	5.1533	0.0124
184	5.1657	0.0124
185	5.1780	0.0123
186	5.1903	0.0123
187	5.2025	0.0122
188	5.2147	0.0122
189	5.2269	0.0122
190	5.2390	0.0121
191	5.2511	0.0121
192	5.2632	0.0121
193	5.2752	0.0120
194	5.2872	0.0120
195	5.2992	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3349	0.0119
199	5.3467	0.0118
200	5.3585	0.0118
201	5.3703	0.0118
202	5.3820	0.0117
203	5.3937	0.0117
204	5.4053	0.0117
205	5.4170	0.0116
206	5.4286	0.0116
207	5.4401	0.0116
208	5.4517	0.0115
209	5.4632	0.0115
210	5.4746	0.0115
211	5.4861	0.0114
212	5.4975	0.0114
213	5.5089	0.0114
214	5.5202	0.0114
215	5.5316	0.0113
216	5.5429	0.0113
217	5.5541	0.0113
218	5.5654	0.0112
219	5.5766	0.0112
220	5.5877	0.0112
221	5.5989	0.0111
222	5.6100	0.0111
223	5.6211	0.0111
224	5.6322	0.0111
225	5.6432	0.0110
226	5.6542	0.0110
227	5.6652	0.0110
228	5.6762	0.0110
229	5.6871	0.0109
230	5.6980	0.0109
231	5.7089	0.0109
232	5.7197	0.0108
233	5.7305	0.0108
234	5.7413	0.0108
235	5.7521	0.0108
236	5.7629	0.0107
237	5.7736	0.0107
238	5.7843	0.0107
239	5.7949	0.0107
240	5.8056	0.0106
241	5.8162	0.0106

242	5.8268	0.0106
243	5.8374	0.0106
244	5.8479	0.0105
245	5.8584	0.0105
246	5.8689	0.0105
247	5.8794	0.0105
248	5.8899	0.0105
249	5.9003	0.0104
250	5.9107	0.0104
251	5.9211	0.0104
252	5.9314	0.0104
253	5.9418	0.0103
254	5.9521	0.0103
255	5.9624	0.0103
256	5.9726	0.0103
257	5.9829	0.0102
258	5.9931	0.0102
259	6.0033	0.0102
260	6.0135	0.0102
261	6.0236	0.0102
262	6.0338	0.0101
263	6.0439	0.0101
264	6.0540	0.0101
265	6.0640	0.0101
266	6.0741	0.0100
267	6.0841	0.0100
268	6.0941	0.0100
269	6.1041	0.0100
270	6.1141	0.0100
271	6.1240	0.0099
272	6.1339	0.0099
273	6.1438	0.0099
274	6.1537	0.0099
275	6.1636	0.0099
276	6.1734	0.0098
277	6.1832	0.0098
278	6.1930	0.0098
279	6.2028	0.0098
280	6.2126	0.0098
281	6.2223	0.0097
282	6.2320	0.0097
283	6.2417	0.0097
284	6.2514	0.0097
285	6.2611	0.0097
286	6.2707	0.0096
287	6.2804	0.0096
288	6.2900	0.0096

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0007	0.0089
2	0.0096	0.0007	0.0089
3	0.0097	0.0007	0.0089
4	0.0097	0.0007	0.0089
5	0.0097	0.0007	0.0090
6	0.0097	0.0007	0.0090
7	0.0098	0.0008	0.0090
8	0.0098	0.0008	0.0090
9	0.0098	0.0008	0.0091
10	0.0099	0.0008	0.0091
11	0.0099	0.0008	0.0091
12	0.0099	0.0008	0.0092
13	0.0100	0.0008	0.0092
14	0.0100	0.0008	0.0092
15	0.0100	0.0008	0.0093
16	0.0100	0.0008	0.0093
17	0.0101	0.0008	0.0093
18	0.0101	0.0008	0.0093
19	0.0102	0.0008	0.0094
20	0.0102	0.0008	0.0094
21	0.0102	0.0008	0.0094
22	0.0102	0.0008	0.0095
23	0.0103	0.0008	0.0095
24	0.0103	0.0008	0.0095
25	0.0104	0.0008	0.0096
26	0.0104	0.0008	0.0096
27	0.0104	0.0008	0.0096
28	0.0105	0.0008	0.0096
29	0.0105	0.0008	0.0097
30	0.0105	0.0008	0.0097
31	0.0106	0.0008	0.0098
32	0.0106	0.0008	0.0098
33	0.0106	0.0008	0.0098
34	0.0107	0.0008	0.0099
35	0.0107	0.0008	0.0099
36	0.0107	0.0008	0.0099
37	0.0108	0.0008	0.0100
38	0.0108	0.0008	0.0100
39	0.0109	0.0008	0.0100
40	0.0109	0.0008	0.0101
41	0.0110	0.0008	0.0101
42	0.0110	0.0008	0.0101
43	0.0110	0.0008	0.0102
44	0.0111	0.0008	0.0102
45	0.0111	0.0009	0.0103
46	0.0111	0.0009	0.0103
47	0.0112	0.0009	0.0103
48	0.0112	0.0009	0.0104
49	0.0113	0.0009	0.0104
50	0.0113	0.0009	0.0105
51	0.0114	0.0009	0.0105
52	0.0114	0.0009	0.0105
53	0.0115	0.0009	0.0106
54	0.0115	0.0009	0.0106
55	0.0116	0.0009	0.0107
56	0.0116	0.0009	0.0107
57	0.0117	0.0009	0.0108
58	0.0117	0.0009	0.0108
59	0.0118	0.0009	0.0109
60	0.0118	0.0009	0.0109
61	0.0119	0.0009	0.0109
62	0.0119	0.0009	0.0110
63	0.0120	0.0009	0.0110
64	0.0120	0.0009	0.0111
65	0.0121	0.0009	0.0111
66	0.0121	0.0009	0.0112

67	0.0122	0.0009	0.0112
68	0.0122	0.0009	0.0113
69	0.0123	0.0009	0.0113
70	0.0123	0.0009	0.0114
71	0.0124	0.0010	0.0114
72	0.0124	0.0010	0.0115
73	0.0125	0.0010	0.0116
74	0.0126	0.0010	0.0116
75	0.0126	0.0010	0.0117
76	0.0127	0.0010	0.0117
77	0.0128	0.0010	0.0118
78	0.0128	0.0010	0.0118
79	0.0129	0.0010	0.0119
80	0.0129	0.0010	0.0119
81	0.0130	0.0010	0.0120
82	0.0131	0.0010	0.0120
83	0.0131	0.0010	0.0121
84	0.0132	0.0010	0.0122
85	0.0133	0.0010	0.0123
86	0.0133	0.0010	0.0123
87	0.0134	0.0010	0.0124
88	0.0135	0.0010	0.0124
89	0.0136	0.0010	0.0125
90	0.0136	0.0010	0.0126
91	0.0137	0.0011	0.0127
92	0.0138	0.0011	0.0127
93	0.0139	0.0011	0.0128
94	0.0139	0.0011	0.0128
95	0.0140	0.0011	0.0129
96	0.0141	0.0011	0.0130
97	0.0142	0.0011	0.0131
98	0.0142	0.0011	0.0131
99	0.0144	0.0011	0.0133
100	0.0144	0.0011	0.0133
101	0.0145	0.0011	0.0134
102	0.0146	0.0011	0.0135
103	0.0147	0.0011	0.0136
104	0.0148	0.0011	0.0136
105	0.0149	0.0011	0.0138
106	0.0150	0.0011	0.0138
107	0.0151	0.0012	0.0139
108	0.0152	0.0012	0.0140
109	0.0153	0.0012	0.0141
110	0.0154	0.0012	0.0142
111	0.0155	0.0012	0.0143
112	0.0156	0.0012	0.0144
113	0.0157	0.0012	0.0145
114	0.0158	0.0012	0.0146
115	0.0159	0.0012	0.0147
116	0.0160	0.0012	0.0148
117	0.0162	0.0012	0.0149
118	0.0163	0.0012	0.0150
119	0.0164	0.0013	0.0152
120	0.0165	0.0013	0.0152
121	0.0167	0.0013	0.0154
122	0.0168	0.0013	0.0155
123	0.0169	0.0013	0.0156
124	0.0170	0.0013	0.0157
125	0.0172	0.0013	0.0159

126	0.0173	0.0013	0.0160
127	0.0175	0.0013	0.0162
128	0.0176	0.0014	0.0163
129	0.0178	0.0014	0.0165
130	0.0179	0.0014	0.0165
131	0.0181	0.0014	0.0167
132	0.0183	0.0014	0.0169
133	0.0185	0.0014	0.0171
134	0.0186	0.0014	0.0172
135	0.0188	0.0014	0.0174
136	0.0190	0.0015	0.0175
137	0.0192	0.0015	0.0177
138	0.0193	0.0015	0.0179
139	0.0196	0.0015	0.0181
140	0.0197	0.0015	0.0182
141	0.0200	0.0015	0.0185
142	0.0202	0.0016	0.0186
143	0.0205	0.0016	0.0189
144	0.0206	0.0016	0.0191
145	0.0206	0.0016	0.0190
146	0.0207	0.0016	0.0191
147	0.0211	0.0016	0.0194
148	0.0212	0.0016	0.0196
149	0.0216	0.0017	0.0199
150	0.0218	0.0017	0.0201
151	0.0222	0.0017	0.0205
152	0.0224	0.0017	0.0207
153	0.0228	0.0018	0.0211
154	0.0230	0.0018	0.0213
155	0.0235	0.0018	0.0217
156	0.0237	0.0018	0.0219
157	0.0242	0.0019	0.0224
158	0.0245	0.0019	0.0226
159	0.0251	0.0019	0.0231
160	0.0253	0.0019	0.0234
161	0.0259	0.0020	0.0239
162	0.0263	0.0020	0.0242
163	0.0269	0.0021	0.0249
164	0.0273	0.0021	0.0252
165	0.0280	0.0022	0.0259
166	0.0284	0.0022	0.0262
167	0.0292	0.0022	0.0270
168	0.0297	0.0023	0.0274
169	0.0306	0.0024	0.0283
170	0.0311	0.0024	0.0287
171	0.0322	0.0025	0.0297
172	0.0328	0.0025	0.0303
173	0.0340	0.0026	0.0314
174	0.0347	0.0027	0.0320
175	0.0362	0.0028	0.0334
176	0.0370	0.0028	0.0341
177	0.0387	0.0030	0.0357
178	0.0397	0.0030	0.0366
179	0.0419	0.0032	0.0386
180	0.0431	0.0033	0.0398
181	0.0458	0.0035	0.0423
182	0.0474	0.0036	0.0437
183	0.0510	0.0039	0.0471
184	0.0531	0.0041	0.0490

185	0.0540	0.0042	0.0499
186	0.0571	0.0044	0.0527
187	0.0648	0.0050	0.0598
188	0.0699	0.0054	0.0645
189	0.0842	0.0065	0.0777
190	0.0950	0.0067	0.0883
191	0.1358	0.0067	0.1292
192	0.1868	0.0067	0.1801
193	0.5847	0.0067	0.5780
194	0.1107	0.0067	0.1040
195	0.0761	0.0058	0.0703
196	0.0606	0.0047	0.0560
197	0.0555	0.0043	0.0512
198	0.0491	0.0038	0.0453
199	0.0444	0.0034	0.0410
200	0.0407	0.0031	0.0376
201	0.0378	0.0029	0.0349
202	0.0354	0.0027	0.0327
203	0.0334	0.0026	0.0308
204	0.0316	0.0024	0.0292
205	0.0301	0.0023	0.0278
206	0.0288	0.0022	0.0266
207	0.0276	0.0021	0.0255
208	0.0266	0.0020	0.0245
209	0.0256	0.0020	0.0237
210	0.0248	0.0019	0.0229
211	0.0240	0.0018	0.0221
212	0.0233	0.0018	0.0215
213	0.0226	0.0017	0.0209
214	0.0220	0.0017	0.0203
215	0.0214	0.0016	0.0198
216	0.0209	0.0016	0.0193
217	0.0208	0.0016	0.0192
218	0.0203	0.0016	0.0188
219	0.0199	0.0015	0.0184
220	0.0195	0.0015	0.0180
221	0.0191	0.0015	0.0176
222	0.0187	0.0014	0.0173
223	0.0184	0.0014	0.0170
224	0.0180	0.0014	0.0166
225	0.0177	0.0014	0.0164
226	0.0174	0.0013	0.0161
227	0.0171	0.0013	0.0158
228	0.0169	0.0013	0.0156
229	0.0166	0.0013	0.0153
230	0.0163	0.0013	0.0151
231	0.0161	0.0012	0.0149
232	0.0159	0.0012	0.0146
233	0.0156	0.0012	0.0144
234	0.0154	0.0012	0.0142
235	0.0152	0.0012	0.0141
236	0.0150	0.0012	0.0139
237	0.0148	0.0011	0.0137
238	0.0146	0.0011	0.0135
239	0.0145	0.0011	0.0134
240	0.0143	0.0011	0.0132
241	0.0141	0.0011	0.0130
242	0.0140	0.0011	0.0129
243	0.0138	0.0011	0.0128

244	0.0137	0.0010	0.0126
245	0.0135	0.0010	0.0125
246	0.0134	0.0010	0.0123
247	0.0132	0.0010	0.0122
248	0.0131	0.0010	0.0121
249	0.0130	0.0010	0.0120
250	0.0128	0.0010	0.0119
251	0.0127	0.0010	0.0117
252	0.0126	0.0010	0.0116
253	0.0125	0.0010	0.0115
254	0.0124	0.0009	0.0114
255	0.0122	0.0009	0.0113
256	0.0121	0.0009	0.0112
257	0.0120	0.0009	0.0111
258	0.0119	0.0009	0.0110
259	0.0118	0.0009	0.0109
260	0.0117	0.0009	0.0108
261	0.0116	0.0009	0.0107
262	0.0115	0.0009	0.0106
263	0.0114	0.0009	0.0106
264	0.0114	0.0009	0.0105
265	0.0113	0.0009	0.0104
266	0.0112	0.0009	0.0103
267	0.0111	0.0009	0.0102
268	0.0110	0.0008	0.0102
269	0.0109	0.0008	0.0101
270	0.0108	0.0008	0.0100
271	0.0108	0.0008	0.0099
272	0.0107	0.0008	0.0099
273	0.0106	0.0008	0.0098
274	0.0105	0.0008	0.0097
275	0.0105	0.0008	0.0097
276	0.0104	0.0008	0.0096
277	0.0103	0.0008	0.0095
278	0.0103	0.0008	0.0095
279	0.0102	0.0008	0.0094
280	0.0101	0.0008	0.0094
281	0.0101	0.0008	0.0093
282	0.0100	0.0008	0.0092
283	0.0099	0.0008	0.0092
284	0.0099	0.0008	0.0091
285	0.0098	0.0008	0.0091
286	0.0098	0.0007	0.0090
287	0.0097	0.0007	0.0090
288	0.0096	0.0007	0.0089

Total soil rain loss = 0.43(In)
Total effective rainfall = 5.86(In)
Peak flow rate in flood hydrograph = 15.97(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	0.0007	0.11	Q				
0+10	0.0030	0.33	Q				
0+15	0.0054	0.35	Q				
0+20	0.0078	0.35	Q				
0+25	0.0103	0.35	Q				
0+30	0.0127	0.35	Q				
0+35	0.0152	0.36	Q				
0+40	0.0176	0.36	Q				
0+45	0.0201	0.36	Q				
0+50	0.0225	0.36	Q				
0+55	0.0250	0.36	Q				
1+ 0	0.0275	0.36	Q				
1+ 5	0.0300	0.36	Q				
1+10	0.0325	0.36	Q				
1+15	0.0350	0.36	Q				
1+20	0.0375	0.37	Q				
1+25	0.0400	0.37	QV				
1+30	0.0426	0.37	QV				
1+35	0.0451	0.37	QV				
1+40	0.0476	0.37	QV				
1+45	0.0502	0.37	QV				
1+50	0.0528	0.37	QV				
1+55	0.0553	0.37	QV				
2+ 0	0.0579	0.37	QV				
2+ 5	0.0605	0.38	QV				
2+10	0.0631	0.38	QV				
2+15	0.0657	0.38	QV				
2+20	0.0683	0.38	QV				
2+25	0.0709	0.38	QV				
2+30	0.0736	0.38	QV				
2+35	0.0762	0.38	QV				
2+40	0.0789	0.38	QV				
2+45	0.0815	0.39	Q V				
2+50	0.0842	0.39	Q V				
2+55	0.0869	0.39	Q V				
3+ 0	0.0896	0.39	Q V				
3+ 5	0.0923	0.39	Q V				
3+10	0.0950	0.39	Q V				
3+15	0.0977	0.39	Q V				
3+20	0.1004	0.40	Q V				
3+25	0.1031	0.40	Q V				
3+30	0.1059	0.40	Q V				
3+35	0.1086	0.40	Q V				
3+40	0.1114	0.40	Q V				
3+45	0.1142	0.40	Q V				
3+50	0.1170	0.40	Q V				
3+55	0.1198	0.41	Q V				
4+ 0	0.1226	0.41	Q V				
4+ 5	0.1254	0.41	Q V				
4+10	0.1282	0.41	Q V				
4+15	0.1311	0.41	Q V				
4+20	0.1339	0.41	Q V				
4+25	0.1368	0.42	Q V				
4+30	0.1397	0.42	Q V				
4+35	0.1426	0.42	Q V				
4+40	0.1455	0.42	Q V				
4+45	0.1484	0.42	Q V				
4+50	0.1513	0.42	Q V				

4+55	0.1542	0.43	Q V				
5+ 0	0.1572	0.43	Q V				
5+ 5	0.1602	0.43	Q V				
5+10	0.1631	0.43	Q V				
5+15	0.1661	0.43	Q V				
5+20	0.1691	0.44	Q V				
5+25	0.1721	0.44	Q V				
5+30	0.1752	0.44	Q V				
5+35	0.1782	0.44	Q V				
5+40	0.1812	0.44	Q V				
5+45	0.1843	0.45	Q V				
5+50	0.1874	0.45	Q V				
5+55	0.1905	0.45	Q V				
6+ 0	0.1936	0.45	Q V				
6+ 5	0.1967	0.45	Q V				
6+10	0.1999	0.46	Q V				
6+15	0.2030	0.46	Q V				
6+20	0.2062	0.46	Q V				
6+25	0.2094	0.46	Q V				
6+30	0.2126	0.46	Q V				
6+35	0.2158	0.47	Q V				
6+40	0.2190	0.47	Q V				
6+45	0.2222	0.47	Q V				
6+50	0.2255	0.47	Q V				
6+55	0.2288	0.48	Q V				
7+ 0	0.2321	0.48	Q V				
7+ 5	0.2354	0.48	Q V				
7+10	0.2387	0.48	Q V				
7+15	0.2421	0.49	Q V				
7+20	0.2454	0.49	Q V				
7+25	0.2488	0.49	Q V				
7+30	0.2522	0.49	Q V				
7+35	0.2556	0.50	Q V				
7+40	0.2591	0.50	Q V				
7+45	0.2625	0.50	IQ V				
7+50	0.2660	0.50	IQ V				
7+55	0.2695	0.51	IQ V				
8+ 0	0.2730	0.51	IQ V				
8+ 5	0.2766	0.51	IQ V				
8+10	0.2801	0.52	IQ V				
8+15	0.2837	0.52	IQ V				
8+20	0.2873	0.52	IQ V				
8+25	0.2909	0.53	IQ V				
8+30	0.2946	0.53	IQ V				
8+35	0.2982	0.53	IQ V				
8+40	0.3019	0.54	IQ V				
8+45	0.3056	0.54	IQ V				
8+50	0.3094	0.54	IQ V				
8+55	0.3131	0.55	IQ V				
9+ 0	0.3169	0.55	IQ V				
9+ 5	0.3207	0.55	IQ V				
9+10	0.3246	0.56	IQ V				
9+15	0.3284	0.56	IQ V				
9+20	0.3323	0.56	IQ V				
9+25	0.3362	0.57	IQ V				
9+30	0.3402	0.57	IQ V				
9+35	0.3441	0.58	IQ V				
9+40	0.3481	0.58	IQ V				
9+45	0.3522	0.58	IQ V				

9+50	0.3562	0.59	|Q V |	|	|	|
9+55	0.3603	0.59	|Q V|	|	|	|
10+ 0	0.3644	0.60	|Q V|	|	|	|
10+ 5	0.3686	0.60	|Q V|	|	|	|
10+10	0.3728	0.61	|Q V|	|	|	|
10+15	0.3770	0.61	|Q V|	|	|	|
10+20	0.3812	0.62	|Q V|	|	|	|
10+25	0.3855	0.62	|Q V|	|	|	|
10+30	0.3898	0.63	|Q V|	|	|	|
10+35	0.3942	0.63	|Q V|	|	|	|
10+40	0.3986	0.64	|Q V |	|	|	|
10+45	0.4030	0.64	|Q V |	|	|	|
10+50	0.4075	0.65	|Q V |	|	|	|
10+55	0.4120	0.65	|Q V |	|	|	|
11+ 0	0.4165	0.66	|Q V |	|	|	|
11+ 5	0.4211	0.67	|Q V |	|	|	|
11+10	0.4258	0.67	|Q V |	|	|	|
11+15	0.4304	0.68	|Q V |	|	|	|
11+20	0.4352	0.69	|Q V |	|	|	|
11+25	0.4399	0.69	|Q |V |	|	|	|
11+30	0.4448	0.70	|Q |V |	|	|	|
11+35	0.4496	0.71	|Q |V |	|	|	|
11+40	0.4546	0.71	|Q |V |	|	|	|
11+45	0.4595	0.72	|Q |V |	|	|	|
11+50	0.4646	0.73	|Q |V |	|	|	|
11+55	0.4696	0.74	|Q |V |	|	|	|
12+ 0	0.4748	0.75	|Q |V |	|	|	|
12+ 5	0.4799	0.75	|Q | V |	|	|	|
12+10	0.4851	0.75	|Q | V |	|	|	|
12+15	0.4903	0.76	|Q | V |	|	|	|
12+20	0.4956	0.77	|Q | V |	|	|	|
12+25	0.5010	0.78	|Q | V |	|	|	|
12+30	0.5064	0.79	|Q | V |	|	|	|
12+35	0.5119	0.80	|Q | V |	|	|	|
12+40	0.5175	0.81	|Q | V |	|	|	|
12+45	0.5231	0.82	|Q | V |	|	|	|
12+50	0.5288	0.83	|Q | V |	|	|	|
12+55	0.5346	0.84	|Q | V |	|	|	|
13+ 0	0.5405	0.86	|Q | V |	|	|	|
13+ 5	0.5465	0.87	|Q | V |	|	|	|
13+10	0.5526	0.88	|Q | V |	|	|	|
13+15	0.5588	0.90	|Q | V |	|	|	|
13+20	0.5651	0.91	|Q | V |	|	|	|
13+25	0.5715	0.93	|Q | V |	|	|	|
13+30	0.5780	0.95	|Q | V |	|	|	|
13+35	0.5846	0.96	|Q | V |	|	|	|
13+40	0.5914	0.98	|Q | V |	|	|	|
13+45	0.5983	1.00	| Q | V |	|	|	|
13+50	0.6053	1.02	| Q | V |	|	|	|
13+55	0.6125	1.04	| Q | V |	|	|	|
14+ 0	0.6198	1.07	| Q | V |	|	|	|
14+ 5	0.6273	1.09	| Q | V |	|	|	|
14+10	0.6350	1.12	| Q | V |	|	|	|
14+15	0.6429	1.14	| Q | V |	|	|	|
14+20	0.6510	1.18	| Q | V |	|	|	|
14+25	0.6593	1.21	| Q | V |	|	|	|
14+30	0.6679	1.24	| Q | V |	|	|	|
14+35	0.6767	1.28	| Q | V |	|	|	|
14+40	0.6858	1.32	| Q | V |	|	|	|

14+45	0.6952	1.36	| Q | V |	|	|	|
14+50	0.7049	1.42	| Q | V |	|	|	|
14+55	0.7150	1.47	| Q | V |	|	|	|
15+ 0	0.7256	1.53	| Q | V |	|	|	|
15+ 5	0.7366	1.60	| Q | V |	|	|	|
15+10	0.7481	1.68	| Q | V |	|	|	|
15+15	0.7603	1.76	| Q | V|	|	|	|
15+20	0.7731	1.87	| Q | V|	|	|	|
15+25	0.7865	1.94	| Q | V|	|	|	|
15+30	0.8003	2.00	| Q | V |	|	|	|
15+35	0.8151	2.16	| Q | V |	|	|	|
15+40	0.8316	2.40	| Q | V |	|	|	|
15+45	0.8502	2.69	| Q | V |	|	|	|
15+50	0.8720	3.16	| Q | V |	|	|	|
15+55	0.8992	3.96	| Q | V |	|	|	|
16+ 0	0.9379	5.61	| |Q | V |	|	|	|
16+ 5	1.0195	11.85	| | Q V |	|	|	|
16+10	1.1295	15.97	| | | V |Q |	|	|	|
16+15	1.1631	4.88	| Q| | V| |	|	|	|
16+20	1.1816	2.68	| Q | V| |	|	|	|
16+25	1.1966	2.18	| Q | V |	|	|	|
16+30	1.2101	1.96	| Q | V |	|	|	|
16+35	1.2221	1.75	| Q | V |	|	|	|
16+40	1.2330	1.58	| Q | |V |	|	|	|
16+45	1.2431	1.46	| Q | |V |	|	|	|
16+50	1.2524	1.36	| Q | |V |	|	|	|
16+55	1.2612	1.27	| Q | |V |	|	|	|
17+ 0	1.2695	1.20	| Q | |V |	|	|	|
17+ 5	1.2773	1.14	| Q | | V |	|	|	|
17+10	1.2848	1.09	| Q | | V |	|	|	|
17+15	1.2919	1.04	| Q | | V |	|	|	|
17+20	1.2988	1.00	|Q | | V |	|	|	|
17+25	1.3054	0.96	|Q | | V |	|	|	|
17+30	1.3118	0.93	|Q | | V |	|	|	|
17+35	1.3179	0.89	|Q | | V |	|	|	|
17+40	1.3239	0.87	|Q | | V |	|	|	|
17+45	1.3297	0.84	|Q | | V |	|	|	|
17+50	1.3353	0.82	|Q | | V |	|	|	|
17+55	1.3408	0.80	|Q | | V |	|	|	|
18+ 0	1.3461	0.77	|Q | | V |	|	|	|
18+ 5	1.3514	0.76	|Q | | V |	|	|	|
18+10	1.3565	0.75	|Q | | V |	|	|	|
18+15	1.3616	0.74	|Q | | V |	|	|	|
18+20	1.3666	0.72	|Q | | V |	|	|	|
18+25	1.3714	0.71	|Q | | V |	|	|	|
18+30	1.3762	0.69	|Q | | V |	|	|	|
18+35	1.3809	0.68	|Q | | V |	|	|	|
18+40	1.3855	0.67	|Q | | V |	|	|	|
18+45	1.3900	0.65	|Q | | V |	|	|	|
18+50	1.3944	0.64	|Q | | V |	|	|	|
18+55	1.3987	0.63	|Q | | V |	|	|	|
19+ 0	1.4030	0.62	|Q | | V |	|	|	|
19+ 5	1.4072	0.61	|Q | | V |	|	|	|
19+10	1.4114	0.60	|Q | | V |	|	|	|
19+15	1.4154	0.59	|Q | | V |	|	|	|
19+20	1.4195	0.58	|Q | | V |	|	|	|
19+25	1.4234	0.58	|Q | | V |	|	|	|
19+30	1.4273	0.57	|Q | | V |	|	|	|
19+35	1.4312	0.56	|Q | | V |	|	|	|

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   19+40       1.4350      0.55  |Q        |         |         |     V   |
   19+45       1.4387      0.55  |Q        |         |         |     V   |
   19+50       1.4424      0.54  |Q        |         |         |     V   |
   19+55       1.4461      0.53  |Q        |         |         |     V   |
   20+ 0       1.4497      0.53  |Q        |         |         |     V   |
   20+ 5       1.4533      0.52  |Q        |         |         |     V   |
   20+10       1.4568      0.51  |Q        |         |         |     V   |
   20+15       1.4603      0.51  |Q        |         |         |     V   |
   20+20       1.4638      0.50  |Q        |         |         |     V   |
   20+25       1.4672      0.50  Q         |         |         |     V   |
   20+30       1.4706      0.49  Q         |         |         |     V   |
   20+35       1.4739      0.49  Q         |         |         |      V  |
   20+40       1.4772      0.48  Q         |         |         |      V  |
   20+45       1.4805      0.48  Q         |         |         |      V  |
   20+50       1.4837      0.47  Q         |         |         |      V  |
   20+55       1.4869      0.47  Q         |         |         |      V  |
   21+ 0       1.4901      0.46  Q         |         |         |      V  |
   21+ 5       1.4933      0.46  Q         |         |         |      V  |
   21+10       1.4964      0.45  Q         |         |         |      V  |
   21+15       1.4995      0.45  Q         |         |         |      V  |
   21+20       1.5025      0.44  Q         |         |         |      V  |
   21+25       1.5056      0.44  Q         |         |         |      V  |
   21+30       1.5086      0.44  Q         |         |         |      V  |
   21+35       1.5116      0.43  Q         |         |         |       V |
   21+40       1.5145      0.43  Q         |         |         |       V |
   21+45       1.5175      0.43  Q         |         |         |       V |
   21+50       1.5204      0.42  Q         |         |         |       V |
   21+55       1.5233      0.42  Q         |         |         |       V |
   22+ 0       1.5261      0.42  Q         |         |         |       V |
   22+ 5       1.5290      0.41  Q         |         |         |       V |
   22+10       1.5318      0.41  Q         |         |         |       V |
   22+15       1.5346      0.41  Q         |         |         |       V |
   22+20       1.5374      0.40  Q         |         |         |       V |
   22+25       1.5401      0.40  Q         |         |         |       V |
   22+30       1.5428      0.40  Q         |         |         |       V |
   22+35       1.5456      0.39  Q         |         |         |       V |
   22+40       1.5483      0.39  Q         |         |         |       V |
   22+45       1.5509      0.39  Q         |         |         |       V |
   22+50       1.5536      0.39  Q         |         |         |        V|
   22+55       1.5562      0.38  Q         |         |         |        V|
   23+ 0       1.5588      0.38  Q         |         |         |        V|
   23+ 5       1.5615      0.38  Q         |         |         |        V|
   23+10       1.5640      0.38  Q         |         |         |        V|
   23+15       1.5666      0.37  Q         |         |         |        V|
   23+20       1.5692      0.37  Q         |         |         |        V|
   23+25       1.5717      0.37  Q         |         |         |        V|
   23+30       1.5742      0.37  Q         |         |         |        V|
   23+35       1.5767      0.36  Q         |         |         |        V|
   23+40       1.5792      0.36  Q         |         |         |        V|
   23+45       1.5817      0.36  Q         |         |         |        V|
   23+50       1.5841      0.36  Q         |         |         |        V|
   23+55       1.5866      0.35  Q         |         |         |        V|
   24+ 0       1.5890      0.35  Q         |         |         |        V|
   24+ 5       1.5907      0.24  Q         |         |         |        V|
   24+10       1.5908      0.02  Q         |         |         |         V
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APPENDIX A.2: UNIT HYDROGRAPH, AREA "2"

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0

Study date 06/20/19

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

Program License Serial Number 6279

BNSF
EXISTING HYDROLOGY
AREA 2

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
8.23	1	1.58
Rainfall data for year 100		
8.23	6	3.42
Rainfall data for year 100		
8.23	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
83.1	95.9	8.23	1.000	0.081	1.000	0.081

Area-averaged adjusted loss rate Fm (In/Hr) = 0.081

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
8.23	1.000	83.1	95.9	0.43	0.922

Area-averaged catchment yield fraction, Y = 0.922
Area-averaged low loss fraction, Yb = 0.078
++
Watercourse length = 3738.00(Ft.)
Length from concentration point to centroid = 1881.00(Ft.)
Elevation difference along watercourse = 70.00(Ft.)
Mannings friction factor along watercourse = 0.025
Watershed area = 8.23(Ac.)
Catchment Lag time = 0.149 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 56.1134
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.081(In/Hr)
Average low loss rate fraction (Yb) = 0.078 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 8.23(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.585(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.579(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 99.53 (CFS))		
1	5.722	5.696
2	36.871	31.003
3	77.562	40.500
4	93.795	16.158
5	98.261	4.445
6	99.355	1.089
7	100.000	0.642

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5845	0.5845

2	0.7713	0.1868
3	0.9071	0.1358
4	1.0177	0.1106
5	1.1128	0.0950
6	1.1970	0.0842
7	1.2731	0.0761
8	1.3429	0.0698
9	1.4077	0.0648
10	1.4683	0.0606
11	1.5254	0.0571
12	1.5794	0.0540
13	1.6349	0.0555
14	1.6880	0.0531
15	1.7389	0.0510
16	1.7880	0.0491
17	1.8354	0.0474
18	1.8812	0.0458
19	1.9256	0.0444
20	1.9687	0.0431
21	2.0105	0.0419
22	2.0513	0.0407
23	2.0910	0.0397
24	2.1297	0.0387
25	2.1675	0.0378
26	2.2045	0.0370
27	2.2407	0.0362
28	2.2761	0.0354
29	2.3108	0.0347
30	2.3449	0.0340
31	2.3783	0.0334
32	2.4110	0.0328
33	2.4433	0.0322
34	2.4749	0.0317
35	2.5061	0.0311
36	2.5367	0.0306
37	2.5668	0.0301
38	2.5965	0.0297
39	2.6257	0.0292
40	2.6545	0.0288
41	2.6829	0.0284
42	2.7110	0.0280
43	2.7386	0.0276
44	2.7659	0.0273
45	2.7928	0.0269
46	2.8194	0.0266
47	2.8456	0.0263
48	2.8716	0.0259
49	2.8972	0.0256
50	2.9225	0.0253
51	2.9476	0.0251
52	2.9723	0.0248
53	2.9969	0.0245
54	3.0211	0.0242
55	3.0451	0.0240
56	3.0688	0.0237
57	3.0923	0.0235
58	3.1156	0.0233
59	3.1386	0.0230
60	3.1615	0.0228

61	3.1841	0.0226
62	3.2064	0.0224
63	3.2286	0.0222
64	3.2506	0.0220
65	3.2724	0.0218
66	3.2940	0.0216
67	3.3154	0.0214
68	3.3367	0.0212
69	3.3577	0.0211
70	3.3786	0.0209
71	3.3994	0.0207
72	3.4199	0.0206
73	3.4407	0.0208
74	3.4613	0.0206
75	3.4818	0.0205
76	3.5022	0.0203
77	3.5223	0.0202
78	3.5424	0.0200
79	3.5623	0.0199
80	3.5820	0.0198
81	3.6016	0.0196
82	3.6211	0.0195
83	3.6404	0.0193
84	3.6597	0.0192
85	3.6787	0.0191
86	3.6977	0.0190
87	3.7165	0.0188
88	3.7353	0.0187
89	3.7539	0.0186
90	3.7723	0.0185
91	3.7907	0.0184
92	3.8090	0.0183
93	3.8271	0.0181
94	3.8451	0.0180
95	3.8631	0.0179
96	3.8809	0.0178
97	3.8986	0.0177
98	3.9162	0.0176
99	3.9337	0.0175
100	3.9511	0.0174
101	3.9685	0.0173
102	3.9857	0.0172
103	4.0028	0.0171
104	4.0199	0.0170
105	4.0368	0.0169
106	4.0537	0.0169
107	4.0704	0.0168
108	4.0871	0.0167
109	4.1037	0.0166
110	4.1202	0.0165
111	4.1366	0.0164
112	4.1530	0.0163
113	4.1692	0.0163
114	4.1854	0.0162
115	4.2015	0.0161
116	4.2175	0.0160
117	4.2334	0.0159
118	4.2493	0.0159
119	4.2651	0.0158

120	4.2808	0.0157
121	4.2965	0.0156
122	4.3120	0.0156
123	4.3275	0.0155
124	4.3430	0.0154
125	4.3583	0.0154
126	4.3736	0.0153
127	4.3888	0.0152
128	4.4040	0.0152
129	4.4191	0.0151
130	4.4341	0.0150
131	4.4491	0.0150
132	4.4640	0.0149
133	4.4788	0.0148
134	4.4936	0.0148
135	4.5083	0.0147
136	4.5229	0.0146
137	4.5375	0.0146
138	4.5520	0.0145
139	4.5665	0.0145
140	4.5809	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6238	0.0142
144	4.6380	0.0142
145	4.6521	0.0141
146	4.6662	0.0141
147	4.6802	0.0140
148	4.6942	0.0140
149	4.7081	0.0139
150	4.7220	0.0139
151	4.7358	0.0138
152	4.7495	0.0138
153	4.7632	0.0137
154	4.7769	0.0137
155	4.7905	0.0136
156	4.8041	0.0136
157	4.8176	0.0135
158	4.8311	0.0135
159	4.8445	0.0134
160	4.8578	0.0134
161	4.8712	0.0133
162	4.8844	0.0133
163	4.8977	0.0132
164	4.9108	0.0132
165	4.9240	0.0131
166	4.9371	0.0131
167	4.9501	0.0131
168	4.9631	0.0130
169	4.9761	0.0130
170	4.9890	0.0129
171	5.0019	0.0129
172	5.0147	0.0128
173	5.0275	0.0128
174	5.0403	0.0128
175	5.0530	0.0127
176	5.0657	0.0127
177	5.0783	0.0126
178	5.0909	0.0126

179	5.1034	0.0126
180	5.1160	0.0125
181	5.1284	0.0125
182	5.1409	0.0124
183	5.1533	0.0124
184	5.1656	0.0124
185	5.1779	0.0123
186	5.1902	0.0123
187	5.2025	0.0122
188	5.2147	0.0122
189	5.2269	0.0122
190	5.2390	0.0121
191	5.2511	0.0121
192	5.2632	0.0121
193	5.2752	0.0120
194	5.2872	0.0120
195	5.2991	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3348	0.0119
199	5.3467	0.0118
200	5.3584	0.0118
201	5.3702	0.0118
202	5.3819	0.0117
203	5.3936	0.0117
204	5.4053	0.0117
205	5.4169	0.0116
206	5.4285	0.0116
207	5.4401	0.0116
208	5.4516	0.0115
209	5.4631	0.0115
210	5.4746	0.0115
211	5.4860	0.0114
212	5.4975	0.0114
213	5.5088	0.0114
214	5.5202	0.0114
215	5.5315	0.0113
216	5.5428	0.0113
217	5.5541	0.0113
218	5.5653	0.0112
219	5.5765	0.0112
220	5.5877	0.0112
221	5.5988	0.0111
222	5.6100	0.0111
223	5.6211	0.0111
224	5.6321	0.0111
225	5.6432	0.0110
226	5.6542	0.0110
227	5.6652	0.0110
228	5.6761	0.0110
229	5.6870	0.0109
230	5.6979	0.0109
231	5.7088	0.0109
232	5.7197	0.0108
233	5.7305	0.0108
234	5.7413	0.0108
235	5.7521	0.0108
236	5.7628	0.0107
237	5.7735	0.0107

238	5.7842	0.0107
239	5.7949	0.0107
240	5.8055	0.0106
241	5.8162	0.0106
242	5.8268	0.0106
243	5.8373	0.0106
244	5.8479	0.0105
245	5.8584	0.0105
246	5.8689	0.0105
247	5.8794	0.0105
248	5.8898	0.0105
249	5.9002	0.0104
250	5.9106	0.0104
251	5.9210	0.0104
252	5.9314	0.0104
253	5.9417	0.0103
254	5.9520	0.0103
255	5.9623	0.0103
256	5.9726	0.0103
257	5.9828	0.0102
258	5.9931	0.0102
259	6.0033	0.0102
260	6.0134	0.0102
261	6.0236	0.0102
262	6.0337	0.0101
263	6.0438	0.0101
264	6.0539	0.0101
265	6.0640	0.0101
266	6.0740	0.0100
267	6.0841	0.0100
268	6.0941	0.0100
269	6.1040	0.0100
270	6.1140	0.0100
271	6.1240	0.0099
272	6.1339	0.0099
273	6.1438	0.0099
274	6.1537	0.0099
275	6.1635	0.0099
276	6.1734	0.0098
277	6.1832	0.0098
278	6.1930	0.0098
279	6.2028	0.0098
280	6.2125	0.0098
281	6.2223	0.0097
282	6.2320	0.0097
283	6.2417	0.0097
284	6.2514	0.0097
285	6.2611	0.0097
286	6.2707	0.0096
287	6.2803	0.0096
288	6.2899	0.0096

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0007	0.0089
2	0.0096	0.0008	0.0089
3	0.0097	0.0008	0.0089
4	0.0097	0.0008	0.0089
5	0.0097	0.0008	0.0090
6	0.0097	0.0008	0.0090
7	0.0098	0.0008	0.0090
8	0.0098	0.0008	0.0090
9	0.0098	0.0008	0.0091
10	0.0099	0.0008	0.0091
11	0.0099	0.0008	0.0091
12	0.0099	0.0008	0.0091
13	0.0100	0.0008	0.0092
14	0.0100	0.0008	0.0092
15	0.0100	0.0008	0.0092
16	0.0100	0.0008	0.0093
17	0.0101	0.0008	0.0093
18	0.0101	0.0008	0.0093
19	0.0102	0.0008	0.0094
20	0.0102	0.0008	0.0094
21	0.0102	0.0008	0.0094
22	0.0102	0.0008	0.0094
23	0.0103	0.0008	0.0095
24	0.0103	0.0008	0.0095
25	0.0104	0.0008	0.0096
26	0.0104	0.0008	0.0096
27	0.0104	0.0008	0.0096
28	0.0105	0.0008	0.0096
29	0.0105	0.0008	0.0097
30	0.0105	0.0008	0.0097
31	0.0106	0.0008	0.0097
32	0.0106	0.0008	0.0098
33	0.0106	0.0008	0.0098
34	0.0107	0.0008	0.0098
35	0.0107	0.0008	0.0099
36	0.0107	0.0008	0.0099
37	0.0108	0.0008	0.0100
38	0.0108	0.0008	0.0100
39	0.0109	0.0008	0.0100
40	0.0109	0.0008	0.0101
41	0.0110	0.0009	0.0101
42	0.0110	0.0009	0.0101
43	0.0110	0.0009	0.0102
44	0.0111	0.0009	0.0102
45	0.0111	0.0009	0.0103
46	0.0111	0.0009	0.0103
47	0.0112	0.0009	0.0103
48	0.0112	0.0009	0.0104
49	0.0113	0.0009	0.0104
50	0.0113	0.0009	0.0104
51	0.0114	0.0009	0.0105
52	0.0114	0.0009	0.0105
53	0.0115	0.0009	0.0106
54	0.0115	0.0009	0.0106
55	0.0116	0.0009	0.0107
56	0.0116	0.0009	0.0107
57	0.0117	0.0009	0.0108
58	0.0117	0.0009	0.0108
59	0.0118	0.0009	0.0108
60	0.0118	0.0009	0.0109
61	0.0119	0.0009	0.0109
62	0.0119	0.0009	0.0110

63	0.0120	0.0009	0.0110
64	0.0120	0.0009	0.0111
65	0.0121	0.0009	0.0111
66	0.0121	0.0009	0.0112
67	0.0122	0.0009	0.0112
68	0.0122	0.0010	0.0113
69	0.0123	0.0010	0.0113
70	0.0123	0.0010	0.0114
71	0.0124	0.0010	0.0114
72	0.0124	0.0010	0.0115
73	0.0125	0.0010	0.0115
74	0.0126	0.0010	0.0116
75	0.0126	0.0010	0.0116
76	0.0127	0.0010	0.0117
77	0.0128	0.0010	0.0118
78	0.0128	0.0010	0.0118
79	0.0129	0.0010	0.0119
80	0.0129	0.0010	0.0119
81	0.0130	0.0010	0.0120
82	0.0131	0.0010	0.0120
83	0.0131	0.0010	0.0121
84	0.0132	0.0010	0.0122
85	0.0133	0.0010	0.0122
86	0.0133	0.0010	0.0123
87	0.0134	0.0010	0.0124
88	0.0135	0.0010	0.0124
89	0.0136	0.0011	0.0125
90	0.0136	0.0011	0.0125
91	0.0137	0.0011	0.0126
92	0.0138	0.0011	0.0127
93	0.0139	0.0011	0.0128
94	0.0139	0.0011	0.0128
95	0.0140	0.0011	0.0129
96	0.0141	0.0011	0.0130
97	0.0142	0.0011	0.0131
98	0.0142	0.0011	0.0131
99	0.0144	0.0011	0.0132
100	0.0144	0.0011	0.0133
101	0.0145	0.0011	0.0134
102	0.0146	0.0011	0.0135
103	0.0147	0.0011	0.0136
104	0.0148	0.0012	0.0136
105	0.0149	0.0012	0.0137
106	0.0150	0.0012	0.0138
107	0.0151	0.0012	0.0139
108	0.0152	0.0012	0.0140
109	0.0153	0.0012	0.0141
110	0.0154	0.0012	0.0142
111	0.0155	0.0012	0.0143
112	0.0156	0.0012	0.0144
113	0.0157	0.0012	0.0145
114	0.0158	0.0012	0.0146
115	0.0159	0.0012	0.0147
116	0.0160	0.0012	0.0148
117	0.0162	0.0013	0.0149
118	0.0163	0.0013	0.0150
119	0.0164	0.0013	0.0151
120	0.0165	0.0013	0.0152
121	0.0167	0.0013	0.0154

122	0.0168	0.0013	0.0155
123	0.0169	0.0013	0.0156
124	0.0170	0.0013	0.0157
125	0.0172	0.0013	0.0159
126	0.0173	0.0013	0.0160
127	0.0175	0.0014	0.0161
128	0.0176	0.0014	0.0162
129	0.0178	0.0014	0.0164
130	0.0179	0.0014	0.0165
131	0.0181	0.0014	0.0167
132	0.0183	0.0014	0.0168
133	0.0185	0.0014	0.0170
134	0.0186	0.0014	0.0171
135	0.0188	0.0015	0.0174
136	0.0190	0.0015	0.0175
137	0.0192	0.0015	0.0177
138	0.0193	0.0015	0.0178
139	0.0196	0.0015	0.0181
140	0.0198	0.0015	0.0182
141	0.0200	0.0016	0.0185
142	0.0202	0.0016	0.0186
143	0.0205	0.0016	0.0189
144	0.0206	0.0016	0.0190
145	0.0206	0.0016	0.0190
146	0.0207	0.0016	0.0191
147	0.0211	0.0016	0.0194
148	0.0212	0.0017	0.0196
149	0.0216	0.0017	0.0199
150	0.0218	0.0017	0.0201
151	0.0222	0.0017	0.0205
152	0.0224	0.0017	0.0206
153	0.0228	0.0018	0.0210
154	0.0230	0.0018	0.0212
155	0.0235	0.0018	0.0217
156	0.0237	0.0019	0.0219
157	0.0242	0.0019	0.0224
158	0.0245	0.0019	0.0226
159	0.0251	0.0020	0.0231
160	0.0253	0.0020	0.0234
161	0.0259	0.0020	0.0239
162	0.0263	0.0020	0.0242
163	0.0269	0.0021	0.0248
164	0.0273	0.0021	0.0251
165	0.0280	0.0022	0.0258
166	0.0284	0.0022	0.0262
167	0.0292	0.0023	0.0270
168	0.0297	0.0023	0.0274
169	0.0306	0.0024	0.0282
170	0.0311	0.0024	0.0287
171	0.0322	0.0025	0.0297
172	0.0328	0.0026	0.0302
173	0.0340	0.0027	0.0314
174	0.0347	0.0027	0.0320
175	0.0362	0.0028	0.0334
176	0.0370	0.0029	0.0341
177	0.0387	0.0030	0.0357
178	0.0397	0.0031	0.0366
179	0.0419	0.0033	0.0386
180	0.0431	0.0034	0.0397

181	0.0458	0.0036	0.0422
182	0.0474	0.0037	0.0437
183	0.0510	0.0040	0.0470
184	0.0531	0.0041	0.0490
185	0.0540	0.0042	0.0498
186	0.0571	0.0044	0.0526
187	0.0648	0.0050	0.0597
188	0.0698	0.0054	0.0644
189	0.0842	0.0066	0.0776
190	0.0950	0.0068	0.0882
191	0.1358	0.0068	0.1290
192	0.1868	0.0068	0.1800
193	0.5845	0.0068	0.5778
194	0.1106	0.0068	0.1038
195	0.0761	0.0059	0.0702
196	0.0606	0.0047	0.0559
197	0.0555	0.0043	0.0512
198	0.0491	0.0038	0.0453
199	0.0444	0.0035	0.0409
200	0.0407	0.0032	0.0376
201	0.0378	0.0029	0.0349
202	0.0354	0.0028	0.0327
203	0.0334	0.0026	0.0308
204	0.0317	0.0025	0.0292
205	0.0301	0.0023	0.0278
206	0.0288	0.0022	0.0266
207	0.0276	0.0022	0.0255
208	0.0266	0.0021	0.0245
209	0.0256	0.0020	0.0236
210	0.0248	0.0019	0.0228
211	0.0240	0.0019	0.0221
212	0.0233	0.0018	0.0215
213	0.0226	0.0018	0.0208
214	0.0220	0.0017	0.0203
215	0.0214	0.0017	0.0198
216	0.0209	0.0016	0.0193
217	0.0208	0.0016	0.0192
218	0.0203	0.0016	0.0187
219	0.0199	0.0015	0.0183
220	0.0195	0.0015	0.0180
221	0.0191	0.0015	0.0176
222	0.0187	0.0015	0.0173
223	0.0184	0.0014	0.0169
224	0.0180	0.0014	0.0166
225	0.0177	0.0014	0.0163
226	0.0174	0.0014	0.0161
227	0.0171	0.0013	0.0158
228	0.0169	0.0013	0.0155
229	0.0166	0.0013	0.0153
230	0.0163	0.0013	0.0151
231	0.0161	0.0013	0.0148
232	0.0159	0.0012	0.0146
233	0.0156	0.0012	0.0144
234	0.0154	0.0012	0.0142
235	0.0152	0.0012	0.0140
236	0.0150	0.0012	0.0139
237	0.0148	0.0012	0.0137
238	0.0146	0.0011	0.0135
239	0.0145	0.0011	0.0133

240	0.0143	0.0011	0.0132
241	0.0141	0.0011	0.0130
242	0.0140	0.0011	0.0129
243	0.0138	0.0011	0.0127
244	0.0137	0.0011	0.0126
245	0.0135	0.0011	0.0125
246	0.0134	0.0010	0.0123
247	0.0132	0.0010	0.0122
248	0.0131	0.0010	0.0121
249	0.0130	0.0010	0.0120
250	0.0128	0.0010	0.0118
251	0.0127	0.0010	0.0117
252	0.0126	0.0010	0.0116
253	0.0125	0.0010	0.0115
254	0.0124	0.0010	0.0114
255	0.0122	0.0010	0.0113
256	0.0121	0.0009	0.0112
257	0.0120	0.0009	0.0111
258	0.0119	0.0009	0.0110
259	0.0118	0.0009	0.0109
260	0.0117	0.0009	0.0108
261	0.0116	0.0009	0.0107
262	0.0115	0.0009	0.0106
263	0.0114	0.0009	0.0106
264	0.0114	0.0009	0.0105
265	0.0113	0.0009	0.0104
266	0.0112	0.0009	0.0103
267	0.0111	0.0009	0.0102
268	0.0110	0.0009	0.0102
269	0.0109	0.0009	0.0101
270	0.0108	0.0008	0.0100
271	0.0108	0.0008	0.0099
272	0.0107	0.0008	0.0099
273	0.0106	0.0008	0.0098
274	0.0105	0.0008	0.0097
275	0.0105	0.0008	0.0097
276	0.0104	0.0008	0.0096
277	0.0103	0.0008	0.0095
278	0.0103	0.0008	0.0095
279	0.0102	0.0008	0.0094
280	0.0101	0.0008	0.0093
281	0.0101	0.0008	0.0093
282	0.0100	0.0008	0.0092
283	0.0099	0.0008	0.0092
284	0.0099	0.0008	0.0091
285	0.0098	0.0008	0.0091
286	0.0098	0.0008	0.0090
287	0.0097	0.0008	0.0089
288	0.0096	0.0008	0.0089

Total soil rain loss = 0.44(In)
Total effective rainfall = 5.85(In)
Peak flow rate in flood hydrograph = 30.65(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 10.0 20.0 30.0 40.0
0+ 5	0.0003	0.05	Q
0+10	0.0026	0.33	Q
0+15	0.0073	0.68	Q
0+20	0.0130	0.83	Q
0+25	0.0190	0.87	Q
0+30	0.0251	0.88	Q
0+35	0.0313	0.89	Q
0+40	0.0374	0.89	Q
0+45	0.0436	0.90	Q
0+50	0.0498	0.90	Q
0+55	0.0560	0.90	Q
1+ 0	0.0623	0.91	Q
1+ 5	0.0685	0.91	Q
1+10	0.0748	0.91	Q
1+15	0.0811	0.91	Q
1+20	0.0874	0.92	Q
1+25	0.0937	0.92	Q
1+30	0.1001	0.92	Q
1+35	0.1065	0.93	QV
1+40	0.1129	0.93	QV
1+45	0.1193	0.93	QV
1+50	0.1257	0.93	QV
1+55	0.1322	0.94	QV
2+ 0	0.1387	0.94	QV
2+ 5	0.1452	0.94	QV
2+10	0.1517	0.95	QV
2+15	0.1582	0.95	QV
2+20	0.1648	0.95	QV
2+25	0.1714	0.96	QV
2+30	0.1780	0.96	QV
2+35	0.1846	0.96	QV
2+40	0.1913	0.97	QV
2+45	0.1980	0.97	QV
2+50	0.2047	0.97	Q V
2+55	0.2114	0.98	Q V
3+ 0	0.2182	0.98	Q V
3+ 5	0.2249	0.98	Q V
3+10	0.2317	0.99	Q V
3+15	0.2386	0.99	Q V
3+20	0.2454	0.99	Q V
3+25	0.2523	1.00	Q V
3+30	0.2592	1.00	QV
3+35	0.2661	1.01	QV
3+40	0.2731	1.01	QV
3+45	0.2800	1.01	QV
3+50	0.2870	1.02	QV
3+55	0.2941	1.02	QV
4+ 0	0.3011	1.02	Q V
4+ 5	0.3082	1.03	Q V
4+10	0.3153	1.03	Q V
4+15	0.3224	1.04	Q V
4+20	0.3296	1.04	Q V
4+25	0.3368	1.04	Q V
4+30	0.3440	1.05	Q V

4+35	0.3513	1.05	Q V
4+40	0.3586	1.06	Q V
4+45	0.3659	1.06	Q V
4+50	0.3732	1.07	Q V
4+55	0.3806	1.07	Q V
5+ 0	0.3880	1.07	Q V
5+ 5	0.3954	1.08	Q V
5+10	0.4029	1.08	Q V
5+15	0.4104	1.09	Q V
5+20	0.4179	1.09	Q V
5+25	0.4255	1.10	Q V
5+30	0.4330	1.10	Q V
5+35	0.4407	1.11	Q V
5+40	0.4483	1.11	Q V
5+45	0.4560	1.12	Q V
5+50	0.4637	1.12	Q V
5+55	0.4715	1.13	Q V
6+ 0	0.4793	1.13	Q V
6+ 5	0.4871	1.14	Q V
6+10	0.4950	1.14	Q V
6+15	0.5029	1.15	Q V
6+20	0.5109	1.15	Q V
6+25	0.5188	1.16	Q V
6+30	0.5269	1.16	Q V
6+35	0.5349	1.17	Q V
6+40	0.5430	1.18	Q V
6+45	0.5512	1.18	Q V
6+50	0.5593	1.19	Q V
6+55	0.5676	1.19	Q V
7+ 0	0.5758	1.20	Q V
7+ 5	0.5841	1.21	Q V
7+10	0.5925	1.21	Q V
7+15	0.6009	1.22	Q V
7+20	0.6093	1.22	Q V
7+25	0.6178	1.23	Q V
7+30	0.6263	1.24	Q V
7+35	0.6349	1.24	Q V
7+40	0.6435	1.25	Q V
7+45	0.6521	1.26	Q V
7+50	0.6608	1.26	Q V
7+55	0.6696	1.27	Q V
8+ 0	0.6784	1.28	Q V
8+ 5	0.6873	1.29	Q V
8+10	0.6962	1.29	Q V
8+15	0.7052	1.30	Q V
8+20	0.7142	1.31	Q V
8+25	0.7232	1.32	Q V
8+30	0.7324	1.32	Q V
8+35	0.7415	1.33	Q V
8+40	0.7508	1.34	Q V
8+45	0.7601	1.35	Q V
8+50	0.7694	1.36	Q V
8+55	0.7788	1.37	Q V
9+ 0	0.7883	1.38	Q V
9+ 5	0.7979	1.38	Q V
9+10	0.8074	1.39	Q V
9+15	0.8171	1.40	Q V
9+20	0.8268	1.41	Q V
9+25	0.8366	1.42	Q V

9+30	0.8465	1.43	Q V				
9+35	0.8564	1.44	Q V				
9+40	0.8664	1.45	Q V				
9+45	0.8765	1.46	Q V				
9+50	0.8866	1.47	Q V				
9+55	0.8969	1.48	Q V				
10+ 0	0.9072	1.50	Q V				
10+ 5	0.9175	1.51	Q V				
10+10	0.9280	1.52	Q V				
10+15	0.9385	1.53	Q V				
10+20	0.9492	1.54	Q V				
10+25	0.9599	1.55	Q V				
10+30	0.9707	1.57	Q V				
10+35	0.9815	1.58	Q V				
10+40	0.9925	1.59	Q V				
10+45	1.0036	1.61	Q V				
10+50	1.0147	1.62	Q V				
10+55	1.0260	1.64	Q V				
11+ 0	1.0374	1.65	Q V				
11+ 5	1.0488	1.66	Q V				
11+10	1.0604	1.68	Q V				
11+15	1.0721	1.70	Q V				
11+20	1.0839	1.71	Q V				
11+25	1.0958	1.73	Q V				
11+30	1.1078	1.75	Q V				
11+35	1.1199	1.76	Q V				
11+40	1.1322	1.78	Q V				
11+45	1.1446	1.80	Q V				
11+50	1.1571	1.82	Q V				
11+55	1.1698	1.84	Q V				
12+ 0	1.1826	1.86	Q V				
12+ 5	1.1955	1.88	Q V				
12+10	1.2085	1.89	Q V				
12+15	1.2215	1.89	Q V				
12+20	1.2347	1.91	Q V				
12+25	1.2480	1.93	Q V				
12+30	1.2615	1.96	Q V				
12+35	1.2751	1.98	Q V				
12+40	1.2890	2.01	Q V				
12+45	1.3030	2.04	Q V				
12+50	1.3172	2.06	Q V				
12+55	1.3316	2.09	Q V				
13+ 0	1.3462	2.12	Q V				
13+ 5	1.3611	2.16	Q V				
13+10	1.3762	2.19	Q V				
13+15	1.3915	2.22	Q V				
13+20	1.4070	2.26	Q V				
13+25	1.4229	2.30	Q V				
13+30	1.4390	2.34	Q V				
13+35	1.4554	2.38	Q V				
13+40	1.4720	2.42	Q V				
13+45	1.4891	2.47	Q V				
13+50	1.5064	2.52	Q V				
13+55	1.5241	2.57	Q V				
14+ 0	1.5422	2.62	Q V				
14+ 5	1.5606	2.68	Q V				
14+10	1.5795	2.74	Q V				
14+15	1.5989	2.81	Q V				
14+20	1.6187	2.88	Q V				

14+25	1.6391	2.96	Q V				
14+30	1.6600	3.04	Q V				
14+35	1.6815	3.12	Q V				
14+40	1.7036	3.22	Q V				
14+45	1.7265	3.32	Q V				
14+50	1.7501	3.43	Q V				
14+55	1.7746	3.56	Q V				
15+ 0	1.8001	3.69	Q V				
15+ 5	1.8265	3.84	Q V				
15+10	1.8542	4.01	Q V				
15+15	1.8832	4.21	Q V				
15+20	1.9137	4.43	Q V				
15+25	1.9458	4.67	Q V				
15+30	1.9792	4.85	Q V				
15+35	2.0141	5.06	Q V				
15+40	2.0516	5.45	Q V				
15+45	2.0931	6.01	Q V				
15+50	2.1399	6.80	Q V				
15+55	2.1951	8.01	Q V				
16+ 0	2.2656	10.24	Q V				
16+ 5	2.3756	15.97	Q V				
16+10	2.5712	28.40	Q V				
16+15	2.7822	30.65	Q V				
16+20	2.8995	17.03	Q V				
16+25	2.9642	9.39	Q V				
16+30	3.0086	6.45	Q V				
16+35	3.0458	5.41	Q V				
16+40	3.0770	4.53	Q V				
16+45	3.1052	4.09	Q V				
16+50	3.1310	3.74	Q V				
16+55	3.1549	3.47	Q V				
17+ 0	3.1772	3.25	Q V				
17+ 5	3.1983	3.06	Q V				
17+10	3.2183	2.90	Q V				
17+15	3.2373	2.76	Q V				
17+20	3.2555	2.64	Q V				
17+25	3.2729	2.53	Q V				
17+30	3.2897	2.43	Q V				
17+35	3.3058	2.35	Q V				
17+40	3.3215	2.27	Q V				
17+45	3.3366	2.20	Q V				
17+50	3.3513	2.13	Q V				
17+55	3.3655	2.07	Q V				
18+ 0	3.3794	2.01	Q V				
18+ 5	3.3929	1.96	Q V				
18+10	3.4062	1.93	Q V				
18+15	3.4193	1.90	Q V				
18+20	3.4321	1.86	Q V				
18+25	3.4446	1.82	Q V				
18+30	3.4569	1.78	Q V				
18+35	3.4689	1.75	Q V				
18+40	3.4808	1.71	Q V				
18+45	3.4923	1.68	Q V				
18+50	3.5037	1.65	Q V				
18+55	3.5149	1.62	Q V				
19+ 0	3.5259	1.60	Q V				
19+ 5	3.5367	1.57	Q V				
19+10	3.5473	1.54	Q V				
19+15	3.5578	1.52	Q V				

```
19+20       3.5681      1.50  |Q        |         |         |    V    |
19+25       3.5783      1.48  |Q        |         |         |    V    |
19+30       3.5883      1.45  |Q        |         |         |    V    |
19+35       3.5982      1.43  |Q        |         |         |    V    |
19+40       3.6079      1.41  |Q        |         |         |    V    |
19+45       3.6175      1.40  |Q        |         |         |     V   |
19+50       3.6270      1.38  |Q        |         |         |     V   |
19+55       3.6364      1.36  |Q        |         |         |     V   |
20+ 0       3.6456      1.34  |Q        |         |         |     V   |
20+ 5       3.6548      1.33  |Q        |         |         |     V   |
20+10       3.6638      1.31  |Q        |         |         |     V   |
20+15       3.6727      1.30  |Q        |         |         |     V   |
20+20       3.6815      1.28  |Q        |         |         |     V   |
20+25       3.6902      1.27  |Q        |         |         |     V   |
20+30       3.6989      1.25  |Q        |         |         |     V   |
20+35       3.7074      1.24  |Q        |         |         |     V   |
20+40       3.7158      1.23  |Q        |         |         |      V  |
20+45       3.7242      1.21  |Q        |         |         |      V  |
20+50       3.7325      1.20  |Q        |         |         |      V  |
20+55       3.7406      1.19  |Q        |         |         |      V  |
21+ 0       3.7488      1.18  |Q        |         |         |      V  |
21+ 5       3.7568      1.17  |Q        |         |         |      V  |
21+10       3.7647      1.15  |Q        |         |         |      V  |
21+15       3.7726      1.14  |Q        |         |         |      V  |
21+20       3.7804      1.13  |Q        |         |         |      V  |
21+25       3.7881      1.12  |Q        |         |         |      V  |
21+30       3.7958      1.11  |Q        |         |         |      V  |
21+35       3.8034      1.10  |Q        |         |         |      V  |
21+40       3.8109      1.09  |Q        |         |         |      V  |
21+45       3.8184      1.08  |Q        |         |         |       V |
21+50       3.8258      1.08  |Q        |         |         |       V |
21+55       3.8332      1.07  |Q        |         |         |       V |
22+ 0       3.8404      1.06  |Q        |         |         |       V |
22+ 5       3.8477      1.05  |Q        |         |         |       V |
22+10       3.8548      1.04  |Q        |         |         |       V |
22+15       3.8620      1.03  |Q        |         |         |       V |
22+20       3.8690      1.03  |Q        |         |         |       V |
22+25       3.8760      1.02  |Q        |         |         |       V |
22+30       3.8830      1.01  |Q        |         |         |       V |
22+35       3.8899      1.00  |Q        |         |         |       V |
22+40       3.8967      0.99  Q         |         |         |       V |
22+45       3.9035      0.99  Q         |         |         |       V |
22+50       3.9103      0.98  Q         |         |         |       V |
22+55       3.9170      0.97  Q         |         |         |        V|
23+ 0       3.9237      0.97  Q         |         |         |        V|
23+ 5       3.9303      0.96  Q         |         |         |        V|
23+10       3.9368      0.95  Q         |         |         |        V|
23+15       3.9434      0.95  Q         |         |         |        V|
23+20       3.9499      0.94  Q         |         |         |        V|
23+25       3.9563      0.94  Q         |         |         |        V|
23+30       3.9627      0.93  Q         |         |         |        V|
23+35       3.9691      0.92  Q         |         |         |        V|
23+40       3.9754      0.92  Q         |         |         |        V|
23+45       3.9817      0.91  Q         |         |         |        V|
23+50       3.9879      0.91  Q         |         |         |        V|
23+55       3.9941      0.90  Q         |         |         |        V|
24+ 0       4.0003      0.90  Q         |         |         |        V|
24+ 5       4.0060      0.84  Q         |         |         |        V|
24+10       4.0099      0.56  Q         |         |         |        V|
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24+15       4.0113      0.20  Q         |         |         |        V|
24+20       4.0117      0.06  Q         |         |         |        V|
24+25       4.0118      0.02  Q         |         |         |        V|
24+30       4.0118      0.01  Q         |         |         |        V|
-------------------------------------------------------------------------
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APPENDIX A.3: UNIT HYDROGRAPH, AREA "3"

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0

Study date 06/20/19

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

Program License Serial Number 6279

BNSF
EXISTING HYDROLOGY
AREA 3

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
6.39	1	1.58
Rainfall data for year 100		
6.39	6	3.42
Rainfall data for year 100		
6.39	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
75.9	91.5	6.39	1.000	0.164	0.860	0.141

Area-averaged adjusted loss rate Fm (In/Hr) = 0.141

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
5.50	0.860	75.9	91.5	0.92	0.843
0.89	0.140	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.860
Area-averaged low loss fraction, Yb = 0.140
++
Watercourse length = 2154.00(Ft.)
Length from concentration point to centroid = 1025.00(Ft.)
Elevation difference along watercourse = 30.00(Ft.)
Mannings friction factor along watercourse = 0.025
Watershed area = 6.39(Ac.)
Catchment Lag time = 0.101 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 82.3754
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.141(In/Hr)
Average low loss rate fraction (Yb) = 0.140 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 6.39(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.585(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.580(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 77.28 (CFS))		
1	11.946	9.232
2	66.041	41.804
3	94.682	22.133
4	98.990	3.329
5	100.000	0.781

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5846	0.5846
2	0.7714	0.1868

3	0.9072	0.1358
4	1.0178	0.1106
5	1.1129	0.0950
6	1.1971	0.0842
7	1.2732	0.0761
8	1.3430	0.0699
9	1.4078	0.0648
10	1.4684	0.0606
11	1.5255	0.0571
12	1.5795	0.0540
13	1.6350	0.0555
14	1.6881	0.0531
15	1.7391	0.0510
16	1.7881	0.0491
17	1.8355	0.0474
18	1.8813	0.0458
19	1.9257	0.0444
20	1.9688	0.0431
21	2.0106	0.0419
22	2.0514	0.0407
23	2.0911	0.0397
24	2.1298	0.0387
25	2.1676	0.0378
26	2.2046	0.0370
27	2.2408	0.0362
28	2.2762	0.0354
29	2.3109	0.0347
30	2.3449	0.0340
31	2.3783	0.0334
32	2.4111	0.0328
33	2.4433	0.0322
34	2.4750	0.0317
35	2.5061	0.0311
36	2.5367	0.0306
37	2.5668	0.0301
38	2.5965	0.0297
39	2.6258	0.0292
40	2.6546	0.0288
41	2.6830	0.0284
42	2.7110	0.0280
43	2.7386	0.0276
44	2.7659	0.0273
45	2.7928	0.0269
46	2.8194	0.0266
47	2.8456	0.0263
48	2.8716	0.0259
49	2.8972	0.0256
50	2.9226	0.0253
51	2.9476	0.0251
52	2.9724	0.0248
53	2.9969	0.0245
54	3.0211	0.0242
55	3.0451	0.0240
56	3.0688	0.0237
57	3.0923	0.0235
58	3.1156	0.0233
59	3.1387	0.0230
60	3.1615	0.0228
61	3.1841	0.0226

62	3.2065	0.0224
63	3.2287	0.0222
64	3.2507	0.0220
65	3.2724	0.0218
66	3.2941	0.0216
67	3.3155	0.0214
68	3.3367	0.0212
69	3.3578	0.0211
70	3.3787	0.0209
71	3.3994	0.0207
72	3.4199	0.0206
73	3.4407	0.0208
74	3.4614	0.0206
75	3.4818	0.0205
76	3.5022	0.0203
77	3.5224	0.0202
78	3.5424	0.0200
79	3.5623	0.0199
80	3.5820	0.0198
81	3.6016	0.0196
82	3.6211	0.0195
83	3.6405	0.0193
84	3.6597	0.0192
85	3.6788	0.0191
86	3.6977	0.0190
87	3.7166	0.0188
88	3.7353	0.0187
89	3.7539	0.0186
90	3.7724	0.0185
91	3.7907	0.0184
92	3.8090	0.0183
93	3.8271	0.0181
94	3.8452	0.0180
95	3.8631	0.0179
96	3.8809	0.0178
97	3.8986	0.0177
98	3.9162	0.0176
99	3.9338	0.0175
100	3.9512	0.0174
101	3.9685	0.0173
102	3.9857	0.0172
103	4.0028	0.0171
104	4.0199	0.0170
105	4.0368	0.0169
106	4.0537	0.0169
107	4.0704	0.0168
108	4.0871	0.0167
109	4.1037	0.0166
110	4.1202	0.0165
111	4.1366	0.0164
112	4.1530	0.0163
113	4.1692	0.0163
114	4.1854	0.0162
115	4.2015	0.0161
116	4.2175	0.0160
117	4.2335	0.0159
118	4.2493	0.0159
119	4.2651	0.0158
120	4.2808	0.0157

121	4.2965	0.0156
122	4.3121	0.0156
123	4.3276	0.0155
124	4.3430	0.0154
125	4.3583	0.0154
126	4.3736	0.0153
127	4.3889	0.0152
128	4.4040	0.0152
129	4.4191	0.0151
130	4.4341	0.0150
131	4.4491	0.0150
132	4.4640	0.0149
133	4.4788	0.0148
134	4.4936	0.0148
135	4.5083	0.0147
136	4.5229	0.0146
137	4.5375	0.0146
138	4.5521	0.0145
139	4.5665	0.0145
140	4.5809	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6238	0.0142
144	4.6380	0.0142
145	4.6521	0.0141
146	4.6662	0.0141
147	4.6802	0.0140
148	4.6942	0.0140
149	4.7081	0.0139
150	4.7220	0.0139
151	4.7358	0.0138
152	4.7496	0.0138
153	4.7633	0.0137
154	4.7769	0.0137
155	4.7905	0.0136
156	4.8041	0.0136
157	4.8176	0.0135
158	4.8311	0.0135
159	4.8445	0.0134
160	4.8579	0.0134
161	4.8712	0.0133
162	4.8845	0.0133
163	4.8977	0.0132
164	4.9109	0.0132
165	4.9240	0.0131
166	4.9371	0.0131
167	4.9502	0.0131
168	4.9632	0.0130
169	4.9761	0.0130
170	4.9890	0.0129
171	5.0019	0.0129
172	5.0148	0.0128
173	5.0276	0.0128
174	5.0403	0.0128
175	5.0530	0.0127
176	5.0657	0.0127
177	5.0783	0.0126
178	5.0909	0.0126
179	5.1035	0.0126

180	5.1160	0.0125
181	5.1284	0.0125
182	5.1409	0.0124
183	5.1533	0.0124
184	5.1656	0.0124
185	5.1780	0.0123
186	5.1902	0.0123
187	5.2025	0.0122
188	5.2147	0.0122
189	5.2269	0.0122
190	5.2390	0.0121
191	5.2511	0.0121
192	5.2632	0.0121
193	5.2752	0.0120
194	5.2872	0.0120
195	5.2992	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3348	0.0119
199	5.3467	0.0118
200	5.3585	0.0118
201	5.3702	0.0118
202	5.3820	0.0117
203	5.3936	0.0117
204	5.4053	0.0117
205	5.4169	0.0116
206	5.4285	0.0116
207	5.4401	0.0116
208	5.4516	0.0115
209	5.4631	0.0115
210	5.4746	0.0115
211	5.4861	0.0114
212	5.4975	0.0114
213	5.5089	0.0114
214	5.5202	0.0114
215	5.5315	0.0113
216	5.5428	0.0113
217	5.5541	0.0113
218	5.5653	0.0112
219	5.5765	0.0112
220	5.5877	0.0112
221	5.5989	0.0111
222	5.6100	0.0111
223	5.6211	0.0111
224	5.6321	0.0111
225	5.6432	0.0110
226	5.6542	0.0110
227	5.6652	0.0110
228	5.6761	0.0110
229	5.6871	0.0109
230	5.6980	0.0109
231	5.7088	0.0109
232	5.7197	0.0108
233	5.7305	0.0108
234	5.7413	0.0108
235	5.7521	0.0108
236	5.7628	0.0107
237	5.7735	0.0107
238	5.7842	0.0107

239	5.7949	0.0107
240	5.8056	0.0106
241	5.8162	0.0106
242	5.8268	0.0106
243	5.8373	0.0106
244	5.8479	0.0105
245	5.8584	0.0105
246	5.8689	0.0105
247	5.8794	0.0105
248	5.8898	0.0105
249	5.9003	0.0104
250	5.9107	0.0104
251	5.9210	0.0104
252	5.9314	0.0104
253	5.9417	0.0103
254	5.9520	0.0103
255	5.9623	0.0103
256	5.9726	0.0103
257	5.9828	0.0102
258	5.9931	0.0102
259	6.0033	0.0102
260	6.0134	0.0102
261	6.0236	0.0102
262	6.0337	0.0101
263	6.0438	0.0101
264	6.0539	0.0101
265	6.0640	0.0101
266	6.0740	0.0100
267	6.0841	0.0100
268	6.0941	0.0100
269	6.1041	0.0100
270	6.1140	0.0100
271	6.1240	0.0099
272	6.1339	0.0099
273	6.1438	0.0099
274	6.1537	0.0099
275	6.1635	0.0099
276	6.1734	0.0098
277	6.1832	0.0098
278	6.1930	0.0098
279	6.2028	0.0098
280	6.2125	0.0098
281	6.2223	0.0097
282	6.2320	0.0097
283	6.2417	0.0097
284	6.2514	0.0097
285	6.2611	0.0097
286	6.2707	0.0096
287	6.2803	0.0096
288	6.2899	0.0096

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0013	0.0083
2	0.0096	0.0014	0.0083
3	0.0097	0.0014	0.0083
4	0.0097	0.0014	0.0083
5	0.0097	0.0014	0.0084
6	0.0097	0.0014	0.0084
7	0.0098	0.0014	0.0084
8	0.0098	0.0014	0.0084
9	0.0098	0.0014	0.0085
10	0.0099	0.0014	0.0085
11	0.0099	0.0014	0.0085
12	0.0099	0.0014	0.0085
13	0.0100	0.0014	0.0086
14	0.0100	0.0014	0.0086
15	0.0100	0.0014	0.0086
16	0.0100	0.0014	0.0086
17	0.0101	0.0014	0.0087
18	0.0101	0.0014	0.0087
19	0.0102	0.0014	0.0087
20	0.0102	0.0014	0.0087
21	0.0102	0.0014	0.0088
22	0.0102	0.0014	0.0088
23	0.0103	0.0014	0.0088
24	0.0103	0.0014	0.0089
25	0.0104	0.0015	0.0089
26	0.0104	0.0015	0.0089
27	0.0104	0.0015	0.0090
28	0.0105	0.0015	0.0090
29	0.0105	0.0015	0.0090
30	0.0105	0.0015	0.0090
31	0.0106	0.0015	0.0091
32	0.0106	0.0015	0.0091
33	0.0106	0.0015	0.0092
34	0.0107	0.0015	0.0092
35	0.0107	0.0015	0.0092
36	0.0107	0.0015	0.0092
37	0.0108	0.0015	0.0093
38	0.0108	0.0015	0.0093
39	0.0109	0.0015	0.0093
40	0.0109	0.0015	0.0094
41	0.0110	0.0015	0.0094
42	0.0110	0.0015	0.0094
43	0.0110	0.0015	0.0095
44	0.0111	0.0016	0.0095
45	0.0111	0.0016	0.0096
46	0.0111	0.0016	0.0096
47	0.0112	0.0016	0.0096
48	0.0112	0.0016	0.0097
49	0.0113	0.0016	0.0097
50	0.0113	0.0016	0.0097
51	0.0114	0.0016	0.0098
52	0.0114	0.0016	0.0098
53	0.0115	0.0016	0.0099
54	0.0115	0.0016	0.0099
55	0.0116	0.0016	0.0099
56	0.0116	0.0016	0.0100
57	0.0117	0.0016	0.0100
58	0.0117	0.0016	0.0101
59	0.0118	0.0017	0.0101
60	0.0118	0.0017	0.0101
61	0.0119	0.0017	0.0102
62	0.0119	0.0017	0.0102
63	0.0120	0.0017	0.0103

64	0.0120	0.0017	0.0103
65	0.0121	0.0017	0.0104
66	0.0121	0.0017	0.0104
67	0.0122	0.0017	0.0105
68	0.0122	0.0017	0.0105
69	0.0123	0.0017	0.0106
70	0.0123	0.0017	0.0106
71	0.0124	0.0017	0.0107
72	0.0124	0.0017	0.0107
73	0.0125	0.0018	0.0108
74	0.0126	0.0018	0.0108
75	0.0126	0.0018	0.0109
76	0.0127	0.0018	0.0109
77	0.0128	0.0018	0.0110
78	0.0128	0.0018	0.0110
79	0.0129	0.0018	0.0111
80	0.0129	0.0018	0.0111
81	0.0130	0.0018	0.0112
82	0.0131	0.0018	0.0112
83	0.0131	0.0018	0.0113
84	0.0132	0.0019	0.0113
85	0.0133	0.0019	0.0114
86	0.0133	0.0019	0.0115
87	0.0134	0.0019	0.0115
88	0.0135	0.0019	0.0116
89	0.0136	0.0019	0.0117
90	0.0136	0.0019	0.0117
91	0.0137	0.0019	0.0118
92	0.0138	0.0019	0.0118
93	0.0139	0.0019	0.0119
94	0.0139	0.0020	0.0120
95	0.0140	0.0020	0.0121
96	0.0141	0.0020	0.0121
97	0.0142	0.0020	0.0122
98	0.0142	0.0020	0.0122
99	0.0144	0.0020	0.0123
100	0.0144	0.0020	0.0124
101	0.0145	0.0020	0.0125
102	0.0146	0.0020	0.0125
103	0.0147	0.0021	0.0126
104	0.0148	0.0021	0.0127
105	0.0149	0.0021	0.0128
106	0.0150	0.0021	0.0129
107	0.0151	0.0021	0.0130
108	0.0152	0.0021	0.0130
109	0.0153	0.0021	0.0131
110	0.0154	0.0022	0.0132
111	0.0155	0.0022	0.0133
112	0.0156	0.0022	0.0134
113	0.0157	0.0022	0.0135
114	0.0158	0.0022	0.0136
115	0.0159	0.0022	0.0137
116	0.0160	0.0022	0.0138
117	0.0162	0.0023	0.0139
118	0.0163	0.0023	0.0140
119	0.0164	0.0023	0.0141
120	0.0165	0.0023	0.0142
121	0.0167	0.0023	0.0143
122	0.0168	0.0024	0.0144

123	0.0169	0.0024	0.0146
124	0.0170	0.0024	0.0146
125	0.0172	0.0024	0.0148
126	0.0173	0.0024	0.0149
127	0.0175	0.0025	0.0151
128	0.0176	0.0025	0.0151
129	0.0178	0.0025	0.0153
130	0.0179	0.0025	0.0154
131	0.0181	0.0025	0.0156
132	0.0183	0.0026	0.0157
133	0.0185	0.0026	0.0159
134	0.0186	0.0026	0.0160
135	0.0188	0.0026	0.0162
136	0.0190	0.0027	0.0163
137	0.0192	0.0027	0.0165
138	0.0193	0.0027	0.0166
139	0.0196	0.0028	0.0169
140	0.0198	0.0028	0.0170
141	0.0200	0.0028	0.0172
142	0.0202	0.0028	0.0173
143	0.0205	0.0029	0.0176
144	0.0206	0.0029	0.0177
145	0.0206	0.0029	0.0177
146	0.0207	0.0029	0.0178
147	0.0211	0.0030	0.0181
148	0.0212	0.0030	0.0183
149	0.0216	0.0030	0.0186
150	0.0218	0.0031	0.0187
151	0.0222	0.0031	0.0191
152	0.0224	0.0031	0.0193
153	0.0228	0.0032	0.0196
154	0.0230	0.0032	0.0198
155	0.0235	0.0033	0.0202
156	0.0237	0.0033	0.0204
157	0.0242	0.0034	0.0208
158	0.0245	0.0034	0.0211
159	0.0251	0.0035	0.0215
160	0.0253	0.0036	0.0218
161	0.0259	0.0036	0.0223
162	0.0263	0.0037	0.0226
163	0.0269	0.0038	0.0231
164	0.0273	0.0038	0.0234
165	0.0280	0.0039	0.0241
166	0.0284	0.0040	0.0244
167	0.0292	0.0041	0.0251
168	0.0297	0.0042	0.0255
169	0.0306	0.0043	0.0263
170	0.0311	0.0044	0.0268
171	0.0322	0.0045	0.0277
172	0.0328	0.0046	0.0282
173	0.0340	0.0048	0.0293
174	0.0347	0.0049	0.0298
175	0.0362	0.0051	0.0311
176	0.0370	0.0052	0.0318
177	0.0387	0.0054	0.0333
178	0.0397	0.0056	0.0341
179	0.0419	0.0059	0.0360
180	0.0431	0.0060	0.0370
181	0.0458	0.0064	0.0394

182	0.0474	0.0066	0.0407
183	0.0510	0.0072	0.0438
184	0.0531	0.0075	0.0456
185	0.0540	0.0076	0.0464
186	0.0571	0.0080	0.0491
187	0.0648	0.0091	0.0557
188	0.0699	0.0098	0.0601
189	0.0842	0.0117	0.0725
190	0.0950	0.0117	0.0833
191	0.1358	0.0117	0.1241
192	0.1868	0.0117	0.1750
193	0.5846	0.0117	0.5729
194	0.1106	0.0117	0.0989
195	0.0761	0.0107	0.0655
196	0.0606	0.0085	0.0521
197	0.0555	0.0078	0.0477
198	0.0491	0.0069	0.0422
199	0.0444	0.0062	0.0382
200	0.0407	0.0057	0.0350
201	0.0378	0.0053	0.0325
202	0.0354	0.0050	0.0304
203	0.0334	0.0047	0.0287
204	0.0317	0.0044	0.0272
205	0.0301	0.0042	0.0259
206	0.0288	0.0040	0.0248
207	0.0276	0.0039	0.0238
208	0.0266	0.0037	0.0229
209	0.0256	0.0036	0.0220
210	0.0248	0.0035	0.0213
211	0.0240	0.0034	0.0206
212	0.0233	0.0033	0.0200
213	0.0226	0.0032	0.0194
214	0.0220	0.0031	0.0189
215	0.0214	0.0030	0.0184
216	0.0209	0.0029	0.0180
217	0.0208	0.0029	0.0179
218	0.0203	0.0029	0.0175
219	0.0199	0.0028	0.0171
220	0.0195	0.0027	0.0167
221	0.0191	0.0027	0.0164
222	0.0187	0.0026	0.0161
223	0.0184	0.0026	0.0158
224	0.0180	0.0025	0.0155
225	0.0177	0.0025	0.0152
226	0.0174	0.0024	0.0150
227	0.0171	0.0024	0.0147
228	0.0169	0.0024	0.0145
229	0.0166	0.0023	0.0143
230	0.0163	0.0023	0.0140
231	0.0161	0.0023	0.0138
232	0.0159	0.0022	0.0136
233	0.0156	0.0022	0.0134
234	0.0154	0.0022	0.0133
235	0.0152	0.0021	0.0131
236	0.0150	0.0021	0.0129
237	0.0148	0.0021	0.0128
238	0.0146	0.0021	0.0126
239	0.0145	0.0020	0.0124
240	0.0143	0.0020	0.0123

241	0.0141	0.0020	0.0121
242	0.0140	0.0020	0.0120
243	0.0138	0.0019	0.0119
244	0.0137	0.0019	0.0117
245	0.0135	0.0019	0.0116
246	0.0134	0.0019	0.0115
247	0.0132	0.0019	0.0114
248	0.0131	0.0018	0.0113
249	0.0130	0.0018	0.0111
250	0.0128	0.0018	0.0110
251	0.0127	0.0018	0.0109
252	0.0126	0.0018	0.0108
253	0.0125	0.0018	0.0107
254	0.0124	0.0017	0.0106
255	0.0122	0.0017	0.0105
256	0.0121	0.0017	0.0104
257	0.0120	0.0017	0.0103
258	0.0119	0.0017	0.0103
259	0.0118	0.0017	0.0102
260	0.0117	0.0016	0.0101
261	0.0116	0.0016	0.0100
262	0.0115	0.0016	0.0099
263	0.0114	0.0016	0.0098
264	0.0114	0.0016	0.0098
265	0.0113	0.0016	0.0097
266	0.0112	0.0016	0.0096
267	0.0111	0.0016	0.0095
268	0.0110	0.0015	0.0095
269	0.0109	0.0015	0.0094
270	0.0108	0.0015	0.0093
271	0.0108	0.0015	0.0093
272	0.0107	0.0015	0.0092
273	0.0106	0.0015	0.0091
274	0.0105	0.0015	0.0091
275	0.0105	0.0015	0.0090
276	0.0104	0.0015	0.0089
277	0.0103	0.0015	0.0089
278	0.0103	0.0014	0.0088
279	0.0102	0.0014	0.0088
280	0.0101	0.0014	0.0087
281	0.0101	0.0014	0.0087
282	0.0100	0.0014	0.0086
283	0.0099	0.0014	0.0085
284	0.0099	0.0014	0.0085
285	0.0098	0.0014	0.0084
286	0.0098	0.0014	0.0084
287	0.0097	0.0014	0.0083
288	0.0096	0.0014	0.0083

Total soil rain loss = 0.79(In)
Total effective rainfall = 5.50(In)
Peak flow rate in flood hydrograph = 29.21(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	7.5	15.0	22.5	30.0
0+ 5	0.0005	0.08	Q				
0+10	0.0034	0.42	Q				
0+15	0.0076	0.61	Q				
0+20	0.0120	0.63	Q				
0+25	0.0164	0.64	Q				
0+30	0.0208	0.65	Q				
0+35	0.0253	0.65	Q				
0+40	0.0298	0.65	Q				
0+45	0.0343	0.65	Q				
0+50	0.0388	0.65	Q				
0+55	0.0433	0.65	Q				
1+ 0	0.0478	0.66	Q				
1+ 5	0.0523	0.66	Q				
1+10	0.0569	0.66	Q				
1+15	0.0614	0.66	Q				
1+20	0.0660	0.67	Q				
1+25	0.0706	0.67	Q				
1+30	0.0752	0.67	QV				
1+35	0.0799	0.67	QV				
1+40	0.0845	0.67	QV				
1+45	0.0891	0.68	QV				
1+50	0.0938	0.68	QV				
1+55	0.0985	0.68	QV				
2+ 0	0.1032	0.68	QV				
2+ 5	0.1079	0.68	QV				
2+10	0.1127	0.69	QV				
2+15	0.1174	0.69	QV				
2+20	0.1222	0.69	QV				
2+25	0.1269	0.69	QV				
2+30	0.1317	0.70	QV				
2+35	0.1366	0.70	QV				
2+40	0.1414	0.70	QV				
2+45	0.1462	0.70	QV				
2+50	0.1511	0.71	Q V				
2+55	0.1560	0.71	Q V				
3+ 0	0.1609	0.71	Q V				
3+ 5	0.1658	0.71	Q V				
3+10	0.1707	0.72	Q V				
3+15	0.1757	0.72	Q V				
3+20	0.1806	0.72	Q V				
3+25	0.1856	0.72	Q V				
3+30	0.1906	0.73	Q V				
3+35	0.1956	0.73	Q V				
3+40	0.2007	0.73	Q V				
3+45	0.2057	0.73	Q V				
3+50	0.2108	0.74	Q V				
3+55	0.2159	0.74	Q V				
4+ 0	0.2210	0.74	Q V				
4+ 5	0.2262	0.75	Q V				
4+10	0.2313	0.75	Q V				
4+15	0.2365	0.75	Q V				
4+20	0.2417	0.75	Q V				
4+25	0.2469	0.76	Q V				
4+30	0.2522	0.76	Q V				
4+35	0.2574	0.76	Q V				

4+40	0.2627	0.77	Q V				
4+45	0.2680	0.77	Q V				
4+50	0.2734	0.77	Q V				
4+55	0.2787	0.78	Q V				
5+ 0	0.2841	0.78	Q V				
5+ 5	0.2895	0.78	Q V				
5+10	0.2949	0.79	Q V				
5+15	0.3003	0.79	Q V				
5+20	0.3058	0.79	Q V				
5+25	0.3113	0.80	Q V				
5+30	0.3168	0.80	Q V				
5+35	0.3223	0.80	Q V				
5+40	0.3279	0.81	Q V				
5+45	0.3335	0.81	Q V				
5+50	0.3391	0.81	Q V				
5+55	0.3447	0.82	Q V				
6+ 0	0.3504	0.82	Q V				
6+ 5	0.3560	0.83	Q V				
6+10	0.3618	0.83	Q V				
6+15	0.3675	0.83	Q V				
6+20	0.3733	0.84	Q V				
6+25	0.3791	0.84	Q V				
6+30	0.3849	0.85	Q V				
6+35	0.3907	0.85	Q V				
6+40	0.3966	0.85	Q V				
6+45	0.4025	0.86	Q V				
6+50	0.4085	0.86	Q V				
6+55	0.4144	0.87	Q V				
7+ 0	0.4204	0.87	Q V				
7+ 5	0.4265	0.88	Q V				
7+10	0.4325	0.88	Q V				
7+15	0.4386	0.88	Q V				
7+20	0.4447	0.89	Q V				
7+25	0.4509	0.89	Q V				
7+30	0.4571	0.90	Q V				
7+35	0.4633	0.90	Q V				
7+40	0.4696	0.91	Q V				
7+45	0.4758	0.91	Q V				
7+50	0.4822	0.92	Q V				
7+55	0.4885	0.92	Q V				
8+ 0	0.4949	0.93	Q V				
8+ 5	0.5014	0.93	Q V				
8+10	0.5078	0.94	Q V				
8+15	0.5144	0.95	Q V				
8+20	0.5209	0.95	Q V				
8+25	0.5275	0.96	Q V				
8+30	0.5341	0.96	Q V				
8+35	0.5408	0.97	Q V				
8+40	0.5475	0.97	Q V				
8+45	0.5543	0.98	Q V				
8+50	0.5611	0.99	Q V				
8+55	0.5679	0.99	Q V				
9+ 0	0.5748	1.00	Q V				
9+ 5	0.5817	1.01	Q V				
9+10	0.5887	1.01	Q V				
9+15	0.5957	1.02	Q V				
9+20	0.6028	1.03	Q V				
9+25	0.6099	1.03	Q V				
9+30	0.6171	1.04	Q V				

9+35	0.6243	1.05	Q V			
9+40	0.6316	1.06	Q V			
9+45	0.6389	1.06	Q V			
9+50	0.6463	1.07	Q V			
9+55	0.6537	1.08	Q V			
10+ 0	0.6612	1.09	Q V			
10+ 5	0.6687	1.10	Q V			
10+10	0.6763	1.10	Q V			
10+15	0.6840	1.11	Q V			
10+20	0.6917	1.12	Q V			
10+25	0.6995	1.13	Q V			
10+30	0.7074	1.14	Q V			
10+35	0.7153	1.15	Q V			
10+40	0.7233	1.16	Q V			
10+45	0.7313	1.17	Q V			
10+50	0.7394	1.18	Q V			
10+55	0.7476	1.19	Q V			
11+ 0	0.7559	1.20	Q V			
11+ 5	0.7642	1.21	Q V			
11+10	0.7727	1.22	Q V			
11+15	0.7812	1.23	Q V			
11+20	0.7897	1.25	Q V			
11+25	0.7984	1.26	Q V			
11+30	0.8072	1.27	Q V			
11+35	0.8160	1.28	Q V			
11+40	0.8249	1.30	Q V			
11+45	0.8340	1.31	Q V			
11+50	0.8431	1.33	Q V			
11+55	0.8523	1.34	Q V			
12+ 0	0.8616	1.35	Q V			
12+ 5	0.8710	1.37	Q V			
12+10	0.8805	1.37	Q V			
12+15	0.8899	1.38	Q V			
12+20	0.8995	1.39	Q V			
12+25	0.9092	1.41	Q V			
12+30	0.9191	1.43	Q V			
12+35	0.9290	1.45	Q V			
12+40	0.9391	1.47	Q V			
12+45	0.9493	1.48	Q V			
12+50	0.9597	1.51	Q V			
12+55	0.9702	1.53	Q V			
13+ 0	0.9809	1.55	Q V			
13+ 5	0.9918	1.57	Q V			
13+10	1.0028	1.60	Q V			
13+15	1.0140	1.62	Q V			
13+20	1.0253	1.65	Q V			
13+25	1.0369	1.68	Q V			
13+30	1.0487	1.71	Q V			
13+35	1.0607	1.74	Q V			
13+40	1.0729	1.77	Q V			
13+45	1.0854	1.81	Q V			
13+50	1.0981	1.85	Q V			
13+55	1.1110	1.88	Q V			
14+ 0	1.1243	1.92	Q V			
14+ 5	1.1378	1.97	Q V			
14+10	1.1517	2.02	Q V			
14+15	1.1659	2.06	Q V			
14+20	1.1805	2.12	Q V			
14+25	1.1954	2.17	Q V			

14+30	1.2108	2.24	Q V			
14+35	1.2266	2.30	Q V			
14+40	1.2430	2.37	Q V			
14+45	1.2598	2.45	Q V			
14+50	1.2773	2.54	Q V			
14+55	1.2954	2.63	Q V			
15+ 0	1.3143	2.74	Q V			
15+ 5	1.3339	2.85	Q V			
15+10	1.3544	2.99	Q V			
15+15	1.3760	3.13	Q V			
15+20	1.3988	3.31	Q V			
15+25	1.4227	3.47	Q V			
15+30	1.4474	3.58	Q V			
15+35	1.4734	3.78	Q V			
15+40	1.5021	4.16	Q V			
15+45	1.5338	4.61	Q V			
15+50	1.5707	5.35	Q V			
15+55	1.6153	6.47	Q V			
16+ 0	1.6768	8.94	Q V			
16+ 5	1.7849	15.69	Q V			
16+10	1.9861	29.21	V			Q
16+15	2.1107	18.10	Q V			
16+20	2.1620	7.45	Q V			
16+25	2.1954	4.84	Q V			
16+30	2.2217	3.83	Q V			
16+35	2.2451	3.40	Q V			
16+40	2.2661	3.05	Q V			
16+45	2.2853	2.79	Q V			
16+50	2.3031	2.58	Q V			
16+55	2.3196	2.40	Q V			
17+ 0	2.3352	2.26	Q V			
17+ 5	2.3499	2.14	Q V			
17+10	2.3639	2.03	Q V			
17+15	2.3773	1.94	Q V			
17+20	2.3901	1.86	Q V			
17+25	2.4024	1.79	Q V			
17+30	2.4143	1.72	Q V			
17+35	2.4257	1.66	Q V			
17+40	2.4368	1.61	Q V			
17+45	2.4476	1.56	Q V			
17+50	2.4580	1.51	Q V			
17+55	2.4681	1.47	Q V			
18+ 0	2.4780	1.43	Q V			
18+ 5	2.4877	1.40	Q V			
18+10	2.4972	1.38	Q V			
18+15	2.5065	1.36	Q V			
18+20	2.5157	1.33	Q V			
18+25	2.5247	1.30	Q V			
18+30	2.5335	1.28	Q V			
18+35	2.5421	1.25	Q V			
18+40	2.5505	1.23	Q V			
18+45	2.5588	1.20	Q V			
18+50	2.5670	1.18	Q V			
18+55	2.5750	1.16	Q V			
19+ 0	2.5828	1.14	Q V			
19+ 5	2.5906	1.12	Q V			
19+10	2.5982	1.11	Q V			
19+15	2.6057	1.09	Q V			
19+20	2.6131	1.07	Q V			

19+25	2.6204	1.06	Q			V	
19+30	2.6276	1.04	Q			V	
19+35	2.6347	1.03	Q			V	
19+40	2.6417	1.02	Q			V	
19+45	2.6486	1.00	Q			V	
19+50	2.6554	0.99	Q			V	
19+55	2.6621	0.98	Q			V	
20+ 0	2.6688	0.96	Q			V	
20+ 5	2.6753	0.95	Q			V	
20+10	2.6818	0.94	Q			V	
20+15	2.6882	0.93	Q			V	
20+20	2.6946	0.92	Q			V	
20+25	2.7008	0.91	Q			V	
20+30	2.7070	0.90	Q			V	
20+35	2.7132	0.89	Q			V	
20+40	2.7193	0.88	Q			V	
20+45	2.7253	0.87	Q			V	
20+50	2.7312	0.86	Q			V	
20+55	2.7371	0.86	Q			V	
21+ 0	2.7429	0.85	Q			V	
21+ 5	2.7487	0.84	Q			V	
21+10	2.7544	0.83	Q			V	
21+15	2.7601	0.82	Q			V	
21+20	2.7657	0.82	Q			V	
21+25	2.7713	0.81	Q			V	
21+30	2.7768	0.80	Q			V	
21+35	2.7823	0.79	Q			V	
21+40	2.7877	0.79	Q			V	
21+45	2.7931	0.78	Q			V	
21+50	2.7984	0.77	Q			V	
21+55	2.8037	0.77	Q			V	
22+ 0	2.8090	0.76	Q			V	
22+ 5	2.8142	0.76	Q			V	
22+10	2.8193	0.75	Q			V	
22+15	2.8244	0.74	Q			V	
22+20	2.8295	0.74	Q			V	
22+25	2.8346	0.73	Q			V	
22+30	2.8396	0.73	Q			V	
22+35	2.8446	0.72	Q			V	
22+40	2.8495	0.72	Q			V	
22+45	2.8544	0.71	Q			V	
22+50	2.8593	0.71	Q			V	
22+55	2.8641	0.70	Q			V	
23+ 0	2.8689	0.70	Q			V	
23+ 5	2.8737	0.69	Q			V	
23+10	2.8784	0.69	Q			V	
23+15	2.8831	0.68	Q			V	
23+20	2.8878	0.68	Q			V	
23+25	2.8925	0.67	Q			V	
23+30	2.8971	0.67	Q			V	
23+35	2.9017	0.67	Q			V	
23+40	2.9062	0.66	Q			V	
23+45	2.9107	0.66	Q			V	
23+50	2.9152	0.65	Q			V	
23+55	2.9197	0.65	Q			V	
24+ 0	2.9242	0.65	Q			V	
24+ 5	2.9281	0.57	Q			V	
24+10	2.9296	0.22	Q			V	
24+15	2.9298	0.03	Q			V	

24+20	2.9298	0.01	Q				V

APPENDIX A.4: UNIT HYDROGRAPH, AREA "4"

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0

Study date 06/20/19

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

Program License Serial Number 6279

BNSF
EXISTING HYDROLOGY
AREA 4

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
5.12	1	1.58
Rainfall data for year 100		
5.12	6	3.42
Rainfall data for year 100		
5.12	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
79.9	93.9	5.12	1.000	0.118	0.950	0.112

Area-averaged adjusted loss rate Fm (In/Hr) = 0.112

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
4.86	0.950	79.9	93.9	0.65	0.887
0.26	0.050	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.890
Area-averaged low loss fraction, Yb = 0.110
++
Watercourse length = 4658.00(Ft.)
Length from concentration point to centroid = 1004.00(Ft.)
Elevation difference along watercourse = 25.00(Ft.)
Mannings friction factor along watercourse = 0.025
Watershed area = 5.12(Ac.)
Catchment Lag time = 0.161 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 51.6709
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.112(In/Hr)
Average low loss rate fraction (Yb) = 0.110 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 5.12(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.585(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.580(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 61.92 (CFS))		
1	4.875	3.019
2	31.704	16.612
3	71.372	24.563
4	91.227	12.294
5	97.469	3.865
6	98.915	0.896
7	100.000	0.672

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

1	0.5846	0.5846
2	0.7714	0.1868
3	0.9073	0.1358
4	1.0179	0.1106
5	1.1129	0.0950
6	1.1971	0.0842
7	1.2733	0.0761
8	1.3431	0.0699
9	1.4079	0.0648
10	1.4685	0.0606
11	1.5256	0.0571
12	1.5796	0.0540
13	1.6351	0.0555
14	1.6882	0.0531
15	1.7392	0.0510
16	1.7882	0.0491
17	1.8356	0.0474
18	1.8814	0.0458
19	1.9258	0.0444
20	1.9688	0.0431
21	2.0107	0.0419
22	2.0514	0.0407
23	2.0911	0.0397
24	2.1298	0.0387
25	2.1677	0.0378
26	2.2046	0.0370
27	2.2408	0.0362
28	2.2762	0.0354
29	2.3109	0.0347
30	2.3450	0.0340
31	2.3783	0.0334
32	2.4111	0.0328
33	2.4433	0.0322
34	2.4750	0.0317
35	2.5061	0.0311
36	2.5367	0.0306
37	2.5669	0.0301
38	2.5965	0.0297
39	2.6258	0.0292
40	2.6546	0.0288
41	2.6830	0.0284
42	2.7110	0.0280
43	2.7386	0.0276
44	2.7659	0.0273
45	2.7928	0.0269
46	2.8194	0.0266
47	2.8457	0.0263
48	2.8716	0.0259
49	2.8972	0.0256
50	2.9226	0.0253
51	2.9476	0.0251
52	2.9724	0.0248
53	2.9969	0.0245
54	3.0211	0.0242
55	3.0451	0.0240
56	3.0689	0.0237
57	3.0924	0.0235
58	3.1156	0.0233
59	3.1387	0.0230

60	3.1615	0.0228
61	3.1841	0.0226
62	3.2065	0.0224
63	3.2287	0.0222
64	3.2507	0.0220
65	3.2725	0.0218
66	3.2941	0.0216
67	3.3155	0.0214
68	3.3367	0.0212
69	3.3578	0.0211
70	3.3787	0.0209
71	3.3994	0.0207
72	3.4199	0.0206
73	3.4407	0.0208
74	3.4614	0.0206
75	3.4819	0.0205
76	3.5022	0.0203
77	3.5224	0.0202
78	3.5424	0.0200
79	3.5623	0.0199
80	3.5820	0.0198
81	3.6017	0.0196
82	3.6211	0.0195
83	3.6405	0.0193
84	3.6597	0.0192
85	3.6788	0.0191
86	3.6977	0.0190
87	3.7166	0.0188
88	3.7353	0.0187
89	3.7539	0.0186
90	3.7724	0.0185
91	3.7907	0.0184
92	3.8090	0.0183
93	3.8271	0.0181
94	3.8452	0.0180
95	3.8631	0.0179
96	3.8809	0.0178
97	3.8986	0.0177
98	3.9163	0.0176
99	3.9338	0.0175
100	3.9512	0.0174
101	3.9685	0.0173
102	3.9857	0.0172
103	4.0029	0.0171
104	4.0199	0.0170
105	4.0368	0.0169
106	4.0537	0.0169
107	4.0704	0.0168
108	4.0871	0.0167
109	4.1037	0.0166
110	4.1202	0.0165
111	4.1366	0.0164
112	4.1530	0.0163
113	4.1692	0.0163
114	4.1854	0.0162
115	4.2015	0.0161
116	4.2175	0.0160
117	4.2335	0.0159
118	4.2493	0.0159

119	4.2651	0.0158
120	4.2809	0.0157
121	4.2965	0.0156
122	4.3121	0.0156
123	4.3276	0.0155
124	4.3430	0.0154
125	4.3584	0.0154
126	4.3736	0.0153
127	4.3889	0.0152
128	4.4040	0.0152
129	4.4191	0.0151
130	4.4341	0.0150
131	4.4491	0.0150
132	4.4640	0.0149
133	4.4788	0.0148
134	4.4936	0.0148
135	4.5083	0.0147
136	4.5230	0.0146
137	4.5375	0.0146
138	4.5521	0.0145
139	4.5665	0.0145
140	4.5810	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6238	0.0142
144	4.6380	0.0142
145	4.6522	0.0141
146	4.6662	0.0141
147	4.6803	0.0140
148	4.6942	0.0140
149	4.7081	0.0139
150	4.7220	0.0139
151	4.7358	0.0138
152	4.7496	0.0138
153	4.7633	0.0137
154	4.7769	0.0137
155	4.7905	0.0136
156	4.8041	0.0136
157	4.8176	0.0135
158	4.8311	0.0135
159	4.8445	0.0134
160	4.8579	0.0134
161	4.8712	0.0133
162	4.8845	0.0133
163	4.8977	0.0132
164	4.9109	0.0132
165	4.9240	0.0131
166	4.9371	0.0131
167	4.9502	0.0131
168	4.9632	0.0130
169	4.9761	0.0130
170	4.9891	0.0129
171	5.0019	0.0129
172	5.0148	0.0128
173	5.0276	0.0128
174	5.0403	0.0128
175	5.0530	0.0127
176	5.0657	0.0127
177	5.0783	0.0126

178	5.0909	0.0126
179	5.1035	0.0126
180	5.1160	0.0125
181	5.1285	0.0125
182	5.1409	0.0124
183	5.1533	0.0124
184	5.1656	0.0124
185	5.1780	0.0123
186	5.1903	0.0123
187	5.2025	0.0122
188	5.2147	0.0122
189	5.2269	0.0122
190	5.2390	0.0121
191	5.2511	0.0121
192	5.2632	0.0121
193	5.2752	0.0120
194	5.2872	0.0120
195	5.2992	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3349	0.0119
199	5.3467	0.0118
200	5.3585	0.0118
201	5.3702	0.0118
202	5.3820	0.0117
203	5.3937	0.0117
204	5.4053	0.0117
205	5.4170	0.0116
206	5.4286	0.0116
207	5.4401	0.0116
208	5.4517	0.0115
209	5.4632	0.0115
210	5.4746	0.0115
211	5.4861	0.0114
212	5.4975	0.0114
213	5.5089	0.0114
214	5.5202	0.0114
215	5.5315	0.0113
216	5.5428	0.0113
217	5.5541	0.0113
218	5.5653	0.0112
219	5.5765	0.0112
220	5.5877	0.0112
221	5.5989	0.0111
222	5.6100	0.0111
223	5.6211	0.0111
224	5.6322	0.0111
225	5.6432	0.0110
226	5.6542	0.0110
227	5.6652	0.0110
228	5.6761	0.0110
229	5.6871	0.0109
230	5.6980	0.0109
231	5.7088	0.0109
232	5.7197	0.0108
233	5.7305	0.0108
234	5.7413	0.0108
235	5.7521	0.0108
236	5.7628	0.0107

237	5.7736	0.0107	
238	5.7843	0.0107	
239	5.7949	0.0107	
240	5.8056	0.0106	
241	5.8162	0.0106	
242	5.8268	0.0106	
243	5.8374	0.0106	
244	5.8479	0.0105	
245	5.8584	0.0105	
246	5.8689	0.0105	
247	5.8794	0.0105	
248	5.8898	0.0105	
249	5.9003	0.0104	
250	5.9107	0.0104	
251	5.9211	0.0104	
252	5.9314	0.0104	
253	5.9417	0.0103	
254	5.9521	0.0103	
255	5.9623	0.0103	
256	5.9726	0.0103	
257	5.9829	0.0102	
258	5.9931	0.0102	
259	6.0033	0.0102	
260	6.0135	0.0102	
261	6.0236	0.0102	
262	6.0337	0.0101	
263	6.0439	0.0101	
264	6.0539	0.0101	
265	6.0640	0.0101	
266	6.0741	0.0100	
267	6.0841	0.0100	
268	6.0941	0.0100	
269	6.1041	0.0100	
270	6.1140	0.0100	
271	6.1240	0.0099	
272	6.1339	0.0099	
273	6.1438	0.0099	
274	6.1537	0.0099	
275	6.1635	0.0099	
276	6.1734	0.0098	
277	6.1832	0.0098	
278	6.1930	0.0098	
279	6.2028	0.0098	
280	6.2126	0.0098	
281	6.2223	0.0097	
282	6.2320	0.0097	
283	6.2417	0.0097	
284	6.2514	0.0097	
285	6.2611	0.0097	
286	6.2707	0.0096	
287	6.2804	0.0096	
288	6.2900	0.0096	

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0011	0.0086
2	0.0096	0.0011	0.0086
3	0.0097	0.0011	0.0086
4	0.0097	0.0011	0.0086
5	0.0097	0.0011	0.0087
6	0.0097	0.0011	0.0087
7	0.0098	0.0011	0.0087
8	0.0098	0.0011	0.0087
9	0.0098	0.0011	0.0088
10	0.0099	0.0011	0.0088
11	0.0099	0.0011	0.0088
12	0.0099	0.0011	0.0088
13	0.0100	0.0011	0.0089
14	0.0100	0.0011	0.0089
15	0.0100	0.0011	0.0089
16	0.0100	0.0011	0.0089
17	0.0101	0.0011	0.0090
18	0.0101	0.0011	0.0090
19	0.0102	0.0011	0.0090
20	0.0102	0.0011	0.0091
21	0.0102	0.0011	0.0091
22	0.0102	0.0011	0.0091
23	0.0103	0.0011	0.0092
24	0.0103	0.0011	0.0092
25	0.0104	0.0011	0.0092
26	0.0104	0.0011	0.0092
27	0.0104	0.0011	0.0093
28	0.0105	0.0011	0.0093
29	0.0105	0.0012	0.0093
30	0.0105	0.0012	0.0094
31	0.0106	0.0012	0.0094
32	0.0106	0.0012	0.0094
33	0.0106	0.0012	0.0095
34	0.0107	0.0012	0.0095
35	0.0107	0.0012	0.0095
36	0.0107	0.0012	0.0096
37	0.0108	0.0012	0.0096
38	0.0108	0.0012	0.0096
39	0.0109	0.0012	0.0097
40	0.0109	0.0012	0.0097
41	0.0110	0.0012	0.0098
42	0.0110	0.0012	0.0098
43	0.0110	0.0012	0.0098
44	0.0111	0.0012	0.0099
45	0.0111	0.0012	0.0099
46	0.0111	0.0012	0.0099
47	0.0112	0.0012	0.0100
48	0.0112	0.0012	0.0100
49	0.0113	0.0012	0.0101
50	0.0113	0.0012	0.0101
51	0.0114	0.0012	0.0101
52	0.0114	0.0013	0.0102
53	0.0115	0.0013	0.0102
54	0.0115	0.0013	0.0102
55	0.0116	0.0013	0.0103
56	0.0116	0.0013	0.0103
57	0.0117	0.0013	0.0104
58	0.0117	0.0013	0.0104
59	0.0118	0.0013	0.0105
60	0.0118	0.0013	0.0105
61	0.0119	0.0013	0.0106

62	0.0119	0.0013	0.0106
63	0.0120	0.0013	0.0107
64	0.0120	0.0013	0.0107
65	0.0121	0.0013	0.0107
66	0.0121	0.0013	0.0108
67	0.0122	0.0013	0.0108
68	0.0122	0.0013	0.0109
69	0.0123	0.0013	0.0109
70	0.0123	0.0014	0.0110
71	0.0124	0.0014	0.0110
72	0.0124	0.0014	0.0111
73	0.0125	0.0014	0.0111
74	0.0126	0.0014	0.0112
75	0.0126	0.0014	0.0112
76	0.0127	0.0014	0.0113
77	0.0128	0.0014	0.0114
78	0.0128	0.0014	0.0114
79	0.0129	0.0014	0.0115
80	0.0129	0.0014	0.0115
81	0.0130	0.0014	0.0116
82	0.0131	0.0014	0.0116
83	0.0131	0.0014	0.0117
84	0.0132	0.0014	0.0117
85	0.0133	0.0015	0.0118
86	0.0133	0.0015	0.0119
87	0.0134	0.0015	0.0119
88	0.0135	0.0015	0.0120
89	0.0136	0.0015	0.0121
90	0.0136	0.0015	0.0121
91	0.0137	0.0015	0.0122
92	0.0138	0.0015	0.0123
93	0.0139	0.0015	0.0123
94	0.0139	0.0015	0.0124
95	0.0140	0.0015	0.0125
96	0.0141	0.0015	0.0125
97	0.0142	0.0016	0.0126
98	0.0142	0.0016	0.0127
99	0.0144	0.0016	0.0128
100	0.0144	0.0016	0.0128
101	0.0145	0.0016	0.0129
102	0.0146	0.0016	0.0130
103	0.0147	0.0016	0.0131
104	0.0148	0.0016	0.0132
105	0.0149	0.0016	0.0133
106	0.0150	0.0016	0.0133
107	0.0151	0.0017	0.0134
108	0.0152	0.0017	0.0135
109	0.0153	0.0017	0.0136
110	0.0154	0.0017	0.0137
111	0.0155	0.0017	0.0138
112	0.0156	0.0017	0.0139
113	0.0157	0.0017	0.0140
114	0.0158	0.0017	0.0141
115	0.0159	0.0017	0.0142
116	0.0160	0.0018	0.0143
117	0.0162	0.0018	0.0144
118	0.0163	0.0018	0.0145
119	0.0164	0.0018	0.0146
120	0.0165	0.0018	0.0147

121	0.0167	0.0018	0.0148
122	0.0168	0.0018	0.0149
123	0.0169	0.0019	0.0151
124	0.0170	0.0019	0.0152
125	0.0172	0.0019	0.0153
126	0.0173	0.0019	0.0154
127	0.0175	0.0019	0.0156
128	0.0176	0.0019	0.0157
129	0.0178	0.0020	0.0159
130	0.0179	0.0020	0.0160
131	0.0181	0.0020	0.0162
132	0.0183	0.0020	0.0163
133	0.0185	0.0020	0.0165
134	0.0186	0.0020	0.0166
135	0.0188	0.0021	0.0168
136	0.0190	0.0021	0.0169
137	0.0192	0.0021	0.0171
138	0.0193	0.0021	0.0172
139	0.0196	0.0021	0.0175
140	0.0198	0.0022	0.0176
141	0.0200	0.0022	0.0178
142	0.0202	0.0022	0.0180
143	0.0205	0.0022	0.0182
144	0.0206	0.0023	0.0184
145	0.0206	0.0023	0.0183
146	0.0207	0.0023	0.0184
147	0.0211	0.0023	0.0188
148	0.0212	0.0023	0.0189
149	0.0216	0.0024	0.0192
150	0.0218	0.0024	0.0194
151	0.0222	0.0024	0.0198
152	0.0224	0.0025	0.0199
153	0.0228	0.0025	0.0203
154	0.0230	0.0025	0.0205
155	0.0235	0.0026	0.0209
156	0.0237	0.0026	0.0211
157	0.0242	0.0027	0.0216
158	0.0245	0.0027	0.0218
159	0.0251	0.0027	0.0223
160	0.0253	0.0028	0.0226
161	0.0259	0.0028	0.0231
162	0.0263	0.0029	0.0234
163	0.0269	0.0029	0.0240
164	0.0273	0.0030	0.0243
165	0.0280	0.0031	0.0249
166	0.0284	0.0031	0.0253
167	0.0292	0.0032	0.0260
168	0.0297	0.0033	0.0264
169	0.0306	0.0034	0.0273
170	0.0311	0.0034	0.0277
171	0.0322	0.0035	0.0287
172	0.0328	0.0036	0.0292
173	0.0340	0.0037	0.0303
174	0.0347	0.0038	0.0309
175	0.0362	0.0040	0.0322
176	0.0370	0.0041	0.0329
177	0.0387	0.0042	0.0345
178	0.0397	0.0043	0.0353
179	0.0419	0.0046	0.0373

180	0.0431	0.0047	0.0383
181	0.0458	0.0050	0.0408
182	0.0474	0.0052	0.0422
183	0.0510	0.0056	0.0454
184	0.0531	0.0058	0.0473
185	0.0540	0.0059	0.0481
186	0.0571	0.0063	0.0508
187	0.0648	0.0071	0.0577
188	0.0699	0.0077	0.0622
189	0.0842	0.0092	0.0750
190	0.0950	0.0094	0.0857
191	0.1358	0.0094	0.1265
192	0.1868	0.0094	0.1774
193	0.5846	0.0094	0.5753
194	0.1106	0.0094	0.1013
195	0.0761	0.0083	0.0678
196	0.0606	0.0066	0.0540
197	0.0555	0.0061	0.0494
198	0.0491	0.0054	0.0437
199	0.0444	0.0049	0.0395
200	0.0407	0.0045	0.0363
201	0.0378	0.0041	0.0337
202	0.0354	0.0039	0.0315
203	0.0334	0.0037	0.0297
204	0.0317	0.0035	0.0282
205	0.0301	0.0033	0.0268
206	0.0288	0.0032	0.0257
207	0.0276	0.0030	0.0246
208	0.0266	0.0029	0.0237
209	0.0256	0.0028	0.0228
210	0.0248	0.0027	0.0221
211	0.0240	0.0026	0.0214
212	0.0233	0.0025	0.0207
213	0.0226	0.0025	0.0201
214	0.0220	0.0024	0.0196
215	0.0214	0.0023	0.0191
216	0.0209	0.0023	0.0186
217	0.0208	0.0023	0.0185
218	0.0203	0.0022	0.0181
219	0.0199	0.0022	0.0177
220	0.0195	0.0021	0.0173
221	0.0191	0.0021	0.0170
222	0.0187	0.0021	0.0167
223	0.0184	0.0020	0.0164
224	0.0180	0.0020	0.0161
225	0.0177	0.0019	0.0158
226	0.0174	0.0019	0.0155
227	0.0171	0.0019	0.0153
228	0.0169	0.0018	0.0150
229	0.0166	0.0018	0.0148
230	0.0163	0.0018	0.0145
231	0.0161	0.0018	0.0143
232	0.0159	0.0017	0.0141
233	0.0156	0.0017	0.0139
234	0.0154	0.0017	0.0137
235	0.0152	0.0017	0.0136
236	0.0150	0.0016	0.0134
237	0.0148	0.0016	0.0132
238	0.0146	0.0016	0.0130

239	0.0145	0.0016	0.0129
240	0.0143	0.0016	0.0127
241	0.0141	0.0015	0.0126
242	0.0140	0.0015	0.0124
243	0.0138	0.0015	0.0123
244	0.0137	0.0015	0.0122
245	0.0135	0.0015	0.0120
246	0.0134	0.0015	0.0119
247	0.0132	0.0014	0.0118
248	0.0131	0.0014	0.0117
249	0.0130	0.0014	0.0115
250	0.0128	0.0014	0.0114
251	0.0127	0.0014	0.0113
252	0.0126	0.0014	0.0112
253	0.0125	0.0014	0.0111
254	0.0124	0.0014	0.0110
255	0.0122	0.0013	0.0109
256	0.0121	0.0013	0.0108
257	0.0120	0.0013	0.0107
258	0.0119	0.0013	0.0106
259	0.0118	0.0013	0.0105
260	0.0117	0.0013	0.0104
261	0.0116	0.0013	0.0104
262	0.0115	0.0013	0.0103
263	0.0114	0.0013	0.0102
264	0.0114	0.0012	0.0101
265	0.0113	0.0012	0.0100
266	0.0112	0.0012	0.0100
267	0.0111	0.0012	0.0099
268	0.0110	0.0012	0.0098
269	0.0109	0.0012	0.0097
270	0.0108	0.0012	0.0097
271	0.0108	0.0012	0.0096
272	0.0107	0.0012	0.0095
273	0.0106	0.0012	0.0095
274	0.0105	0.0012	0.0094
275	0.0105	0.0011	0.0093
276	0.0104	0.0011	0.0093
277	0.0103	0.0011	0.0092
278	0.0103	0.0011	0.0091
279	0.0102	0.0011	0.0091
280	0.0101	0.0011	0.0090
281	0.0101	0.0011	0.0090
282	0.0100	0.0011	0.0089
283	0.0099	0.0011	0.0089
284	0.0099	0.0011	0.0088
285	0.0098	0.0011	0.0087
286	0.0098	0.0011	0.0087
287	0.0097	0.0011	0.0086
288	0.0096	0.0011	0.0086

Total soil rain loss = 0.61(In)
Total effective rainfall = 5.68(In)
Peak flow rate in flood hydrograph = 18.81(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	0.0002	0.03	Q				
0+10	0.0013	0.17	Q				
0+15	0.0039	0.38	Q				
0+20	0.0073	0.48	Q				
0+25	0.0109	0.52	VQ				
0+30	0.0145	0.53	VQ				
0+35	0.0182	0.54	VQ				
0+40	0.0219	0.54	VQ				
0+45	0.0256	0.54	VQ				
0+50	0.0293	0.54	VQ				
0+55	0.0331	0.54	VQ				
1+ 0	0.0368	0.54	VQ				
1+ 5	0.0406	0.55	VQ				
1+10	0.0443	0.55	VQ				
1+15	0.0481	0.55	VQ				
1+20	0.0519	0.55	VQ				
1+25	0.0557	0.55	VQ				
1+30	0.0595	0.55	VQ				
1+35	0.0634	0.56	|Q				
1+40	0.0672	0.56	|Q				
1+45	0.0710	0.56	|Q				
1+50	0.0749	0.56	|Q				
1+55	0.0788	0.56	|Q				
2+ 0	0.0827	0.56	|Q				
2+ 5	0.0866	0.57	|Q				
2+10	0.0905	0.57	|Q				
2+15	0.0944	0.57	|Q				
2+20	0.0984	0.57	|Q				
2+25	0.1023	0.57	|Q				
2+30	0.1063	0.58	|Q				
2+35	0.1103	0.58	|Q				
2+40	0.1143	0.58	|Q				
2+45	0.1183	0.58	|Q				
2+50	0.1223	0.58	|QV				
2+55	0.1264	0.59	|QV				
3+ 0	0.1304	0.59	|QV				
3+ 5	0.1345	0.59	|QV				
3+10	0.1386	0.59	|QV				
3+15	0.1427	0.59	|QV				
3+20	0.1468	0.60	|QV				
3+25	0.1509	0.60	|QV				
3+30	0.1550	0.60	|QV				
3+35	0.1592	0.60	|QV				
3+40	0.1634	0.61	|QV				
3+45	0.1676	0.61	|QV				
3+50	0.1718	0.61	|QV				
3+55	0.1760	0.61	|QV				
4+ 0	0.1802	0.62	|QV				
4+ 5	0.1845	0.62	|Q V				
4+10	0.1887	0.62	|Q V				
4+15	0.1930	0.62	|Q V				
4+20	0.1973	0.62	|Q V				
4+25	0.2016	0.63	|Q V				

4+30	0.2060	0.63	|Q V				
4+35	0.2103	0.63	|Q V				
4+40	0.2147	0.63	|Q V				
4+45	0.2191	0.64	|Q V				
4+50	0.2235	0.64	|Q V				
4+55	0.2279	0.64	|Q V				
5+ 0	0.2324	0.65	|Q V				
5+ 5	0.2368	0.65	|Q V				
5+10	0.2413	0.65	|Q V				
5+15	0.2458	0.65	|Q V				
5+20	0.2503	0.66	|Q V				
5+25	0.2549	0.66	|Q V				
5+30	0.2594	0.66	|Q V				
5+35	0.2640	0.66	|Q V				
5+40	0.2686	0.67	|Q V				
5+45	0.2732	0.67	|Q V				
5+50	0.2779	0.67	|Q V				
5+55	0.2825	0.68	|Q V				
6+ 0	0.2872	0.68	|Q V				
6+ 5	0.2919	0.68	|Q V				
6+10	0.2966	0.69	|Q V				
6+15	0.3014	0.69	|Q V				
6+20	0.3061	0.69	|Q V				
6+25	0.3109	0.70	|Q V				
6+30	0.3157	0.70	|Q V				
6+35	0.3206	0.70	|Q V				
6+40	0.3254	0.71	|Q V				
6+45	0.3303	0.71	|Q V				
6+50	0.3352	0.71	|Q V				
6+55	0.3402	0.72	|Q V				
7+ 0	0.3451	0.72	|Q V				
7+ 5	0.3501	0.72	|Q V				
7+10	0.3551	0.73	|Q V				
7+15	0.3602	0.73	|Q V				
7+20	0.3652	0.73	|Q V				
7+25	0.3703	0.74	|Q V				
7+30	0.3754	0.74	|Q V				
7+35	0.3806	0.75	|Q V				
7+40	0.3857	0.75	|Q V				
7+45	0.3909	0.76	|Q V				
7+50	0.3962	0.76	|Q V				
7+55	0.4014	0.76	|Q V				
8+ 0	0.4067	0.77	|Q V				
8+ 5	0.4120	0.77	|Q V				
8+10	0.4174	0.78	|Q V				
8+15	0.4228	0.78	|Q V				
8+20	0.4282	0.79	|Q V				
8+25	0.4336	0.79	|Q V				
8+30	0.4391	0.80	|Q V				
8+35	0.4446	0.80	|Q V				
8+40	0.4501	0.80	|Q V				
8+45	0.4557	0.81	|Q V				
8+50	0.4613	0.82	|Q V				
8+55	0.4670	0.82	|Q V				
9+ 0	0.4727	0.83	|Q V				
9+ 5	0.4784	0.83	|Q V				
9+10	0.4842	0.84	|Q V				
9+15	0.4900	0.84	|Q V				
9+20	0.4958	0.85	|Q V				

9+25	0.5017	0.85	Q V			
9+30	0.5076	0.86	Q V			
9+35	0.5135	0.87	Q V			
9+40	0.5196	0.87	Q V			
9+45	0.5256	0.88	Q V			
9+50	0.5317	0.88	Q V			
9+55	0.5378	0.89	Q V			
10+ 0	0.5440	0.90	Q V			
10+ 5	0.5502	0.90	Q V			
10+10	0.5565	0.91	Q V			
10+15	0.5628	0.92	Q V			
10+20	0.5692	0.93	Q V			
10+25	0.5756	0.93	Q V			
10+30	0.5821	0.94	Q V			
10+35	0.5886	0.95	Q V			
10+40	0.5952	0.96	Q V			
10+45	0.6018	0.96	Q V			
10+50	0.6085	0.97	Q V			
10+55	0.6153	0.98	Q V			
11+ 0	0.6221	0.99	Q V			
11+ 5	0.6290	1.00	Q V			
11+10	0.6359	1.01	Q V			
11+15	0.6429	1.02	Q V			
11+20	0.6500	1.03	Q V			
11+25	0.6571	1.04	Q V			
11+30	0.6644	1.05	Q V			
11+35	0.6716	1.06	Q V			
11+40	0.6790	1.07	Q V			
11+45	0.6864	1.08	Q V			
11+50	0.6939	1.09	Q V			
11+55	0.7015	1.10	Q V			
12+ 0	0.7092	1.11	Q V			
12+ 5	0.7170	1.13	Q V			
12+10	0.7248	1.13	Q V			
12+15	0.7326	1.14	Q V			
12+20	0.7405	1.15	Q V			
12+25	0.7485	1.16	Q V			
12+30	0.7565	1.17	Q V			
12+35	0.7647	1.19	Q V			
12+40	0.7730	1.20	Q V			
12+45	0.7814	1.22	Q V			
12+50	0.7899	1.24	Q V			
12+55	0.7986	1.25	Q V			
13+ 0	0.8074	1.27	Q V			
13+ 5	0.8163	1.29	Q V			
13+10	0.8253	1.31	Q V			
13+15	0.8345	1.33	Q V			
13+20	0.8438	1.35	Q V			
13+25	0.8533	1.38	Q V			
13+30	0.8629	1.40	Q V			
13+35	0.8727	1.43	Q V			
13+40	0.8827	1.45	Q V			
13+45	0.8929	1.48	Q V			
13+50	0.9033	1.51	Q V			
13+55	0.9139	1.54	Q V			
14+ 0	0.9247	1.57	Q V			
14+ 5	0.9358	1.61	Q V			
14+10	0.9471	1.64	Q V			
14+15	0.9587	1.68	Q V			

14+20	0.9705	1.72	Q V			
14+25	0.9827	1.77	Q V			
14+30	0.9952	1.82	Q V			
14+35	1.0081	1.87	Q V			
14+40	1.0213	1.92	Q V			
14+45	1.0350	1.98	Q V			
14+50	1.0491	2.05	Q V			
14+55	1.0637	2.12	Q V			
15+ 0	1.0789	2.20	Q V			
15+ 5	1.0947	2.29	Q V			
15+10	1.1112	2.39	Q V			
15+15	1.1285	2.51	Q V			
15+20	1.1467	2.64	Q V			
15+25	1.1658	2.78	Q V			
15+30	1.1858	2.90	Q V			
15+35	1.2066	3.02	Q V			
15+40	1.2289	3.24	Q V			
15+45	1.2534	3.56	Q V			
15+50	1.2810	4.01	Q V			
15+55	1.3135	4.71	Q V			
16+ 0	1.3547	5.99	Q V			
16+ 5	1.4183	9.23	Q V			
16+10	1.5300	16.21	Q V			
16+15	1.6595	18.81	Q V			
16+20	1.7401	11.71	Q V			
16+25	1.7844	6.42	Q V			
16+30	1.8129	4.14	Q V			
16+35	1.8367	3.46	Q V			
16+40	1.8559	2.78	Q V			
16+45	1.8731	2.50	Q V			
16+50	1.8888	2.28	Q V			
16+55	1.9033	2.11	Q V			
17+ 0	1.9169	1.97	Q V			
17+ 5	1.9297	1.86	Q V			
17+10	1.9418	1.76	Q V			
17+15	1.9533	1.67	Q V			
17+20	1.9643	1.60	Q V			
17+25	1.9749	1.53	Q V			
17+30	1.9850	1.47	Q V			
17+35	1.9948	1.42	Q V			
17+40	2.0042	1.37	Q V			
17+45	2.0133	1.33	Q V			
17+50	2.0222	1.29	Q V			
17+55	2.0308	1.25	Q V			
18+ 0	2.0392	1.22	Q V			
18+ 5	2.0473	1.18	Q V			
18+10	2.0553	1.16	Q V			
18+15	2.0632	1.14	Q V			
18+20	2.0709	1.12	Q V			
18+25	2.0785	1.10	Q V			
18+30	2.0859	1.08	Q V			
18+35	2.0931	1.05	Q V			
18+40	2.1003	1.03	Q V			
18+45	2.1072	1.01	Q V			
18+50	2.1141	1.00	Q V			
18+55	2.1208	0.98	Q V			
19+ 0	2.1275	0.96	Q V			
19+ 5	2.1340	0.95	Q V			
19+10	2.1404	0.93	Q V			

```
19+15       2.1467      0.92  |Q        |         |         |    V    |
19+20       2.1529      0.90  |Q        |         |         |    V    |
19+25       2.1590      0.89  |Q        |         |         |    V    |
19+30       2.1650      0.88  |Q        |         |         |    V    |
19+35       2.1710      0.86  |Q        |         |         |    V    |
19+40       2.1769      0.85  |Q        |         |         |    V    |
19+45       2.1826      0.84  |Q        |         |         |     V   |
19+50       2.1884      0.83  |Q        |         |         |     V   |
19+55       2.1940      0.82  |Q        |         |         |     V   |
20+ 0       2.1996      0.81  |Q        |         |         |     V   |
20+ 5       2.2051      0.80  |Q        |         |         |     V   |
20+10       2.2105      0.79  |Q        |         |         |     V   |
20+15       2.2159      0.78  |Q        |         |         |     V   |
20+20       2.2212      0.77  |Q        |         |         |     V   |
20+25       2.2264      0.76  |Q        |         |         |     V   |
20+30       2.2316      0.75  |Q        |         |         |     V   |
20+35       2.2367      0.75  |Q        |         |         |     V   |
20+40       2.2418      0.74  |Q        |         |         |      V  |
20+45       2.2468      0.73  |Q        |         |         |      V  |
20+50       2.2518      0.72  |Q        |         |         |      V  |
20+55       2.2567      0.72  |Q        |         |         |      V  |
21+ 0       2.2616      0.71  |Q        |         |         |      V  |
21+ 5       2.2664      0.70  |Q        |         |         |      V  |
21+10       2.2712      0.69  |Q        |         |         |      V  |
21+15       2.2760      0.69  |Q        |         |         |      V  |
21+20       2.2807      0.68  |Q        |         |         |      V  |
21+25       2.2853      0.68  |Q        |         |         |      V  |
21+30       2.2899      0.67  |Q        |         |         |      V  |
21+35       2.2945      0.66  |Q        |         |         |      V  |
21+40       2.2990      0.66  |Q        |         |         |      V  |
21+45       2.3035      0.65  |Q        |         |         |       V |
21+50       2.3080      0.65  |Q        |         |         |       V |
21+55       2.3124      0.64  |Q        |         |         |       V |
22+ 0       2.3168      0.64  |Q        |         |         |       V |
22+ 5       2.3211      0.63  |Q        |         |         |       V |
22+10       2.3254      0.63  |Q        |         |         |       V |
22+15       2.3297      0.62  |Q        |         |         |       V |
22+20       2.3340      0.62  |Q        |         |         |       V |
22+25       2.3382      0.61  |Q        |         |         |       V |
22+30       2.3424      0.61  |Q        |         |         |       V |
22+35       2.3465      0.60  |Q        |         |         |       V |
22+40       2.3506      0.60  |Q        |         |         |       V |
22+45       2.3547      0.59  |Q        |         |         |       V |
22+50       2.3588      0.59  |Q        |         |         |       V |
22+55       2.3628      0.59  |Q        |         |         |        V|
23+ 0       2.3668      0.58  |Q        |         |         |        V|
23+ 5       2.3708      0.58  |Q        |         |         |        V|
23+10       2.3748      0.57  |Q        |         |         |        V|
23+15       2.3787      0.57  |Q        |         |         |        V|
23+20       2.3826      0.57  |Q        |         |         |        V|
23+25       2.3865      0.56  |Q        |         |         |        V|
23+30       2.3903      0.56  |Q        |         |         |        V|
23+35       2.3941      0.56  |Q        |         |         |        V|
23+40       2.3979      0.55  |Q        |         |         |        V|
23+45       2.4017      0.55  |Q        |         |         |        V|
23+50       2.4055      0.55  |Q        |         |         |        V|
23+55       2.4092      0.54  |Q        |         |         |        V|
24+ 0       2.4129      0.54  |Q        |         |         |        V|
24+ 5       2.4164      0.51  |Q        |         |         |        V|
```



```
24+10       2.4189      0.36  Q        |         |         |        V|
24+15       2.4200      0.15  Q        |         |         |        V|
24+20       2.4203      0.05  Q        |         |         |        V|
24+25       2.4204      0.01  Q        |         |         |        V|
24+30       2.4204      0.01  Q        |         |         |        V|
-------------------------------------------------------------------------
```

APPENDIX A.5: UNIT HYDROGRAPH, AREA "5"

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0

Study date 06/20/19

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

Program License Serial Number 6279

BNSF
EXISTING HYDROLOGY
AREA 5

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
10.33	1	1.58
Rainfall data for year 100		
10.33	6	3.42
Rainfall data for year 100		
10.33	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
68.0	85.4	10.33	1.000	0.276	0.620	0.171

Area-averaged adjusted loss rate Fm (In/Hr) = 0.171

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
6.40	0.620	68.0	85.4	1.71	0.735
3.93	0.380	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.821
Area-averaged low loss fraction, Yb = 0.179
++
Watercourse length = 2513.00(Ft.)
Length from concentration point to centroid = 1404.00(Ft.)
Elevation difference along watercourse = 25.00(Ft.)
Mannings friction factor along watercourse = 0.025
Watershed area = 10.33(Ac.)
Catchment Lag time = 0.129 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 64.6650
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.171(In/Hr)
Average low loss rate fraction (Yb) = 0.179 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 10.33(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.584(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.579(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 124.93 (CFS))		
1	7.535	9.413
2	47.353	49.745
3	85.665	47.862
4	96.949	14.096
5	99.038	2.610
6	100.000	1.202

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5845	0.5845

2	0.7712	0.1867
3	0.9070	0.1358
4	1.0176	0.1106
5	1.1127	0.0950
6	1.1968	0.0842
7	1.2730	0.0761
8	1.3428	0.0698
9	1.4076	0.0648
10	1.4682	0.0606
11	1.5252	0.0571
12	1.5792	0.0540
13	1.6347	0.0555
14	1.6878	0.0531
15	1.7388	0.0510
16	1.7879	0.0491
17	1.8353	0.0474
18	1.8811	0.0458
19	1.9255	0.0444
20	1.9685	0.0431
21	2.0104	0.0419
22	2.0512	0.0408
23	2.0909	0.0397
24	2.1296	0.0387
25	2.1674	0.0378
26	2.2044	0.0370
27	2.2406	0.0362
28	2.2760	0.0354
29	2.3108	0.0347
30	2.3448	0.0340
31	2.3782	0.0334
32	2.4110	0.0328
33	2.4432	0.0322
34	2.4749	0.0317
35	2.5060	0.0311
36	2.5367	0.0306
37	2.5668	0.0301
38	2.5965	0.0297
39	2.6257	0.0292
40	2.6545	0.0288
41	2.6829	0.0284
42	2.7109	0.0280
43	2.7386	0.0276
44	2.7658	0.0273
45	2.7927	0.0269
46	2.8193	0.0266
47	2.8456	0.0263
48	2.8715	0.0259
49	2.8972	0.0256
50	2.9225	0.0253
51	2.9475	0.0251
52	2.9723	0.0248
53	2.9968	0.0245
54	3.0211	0.0242
55	3.0451	0.0240
56	3.0688	0.0237
57	3.0923	0.0235
58	3.1156	0.0233
59	3.1386	0.0230
60	3.1614	0.0228

61	3.1840	0.0226
62	3.2064	0.0224
63	3.2286	0.0222
64	3.2506	0.0220
65	3.2724	0.0218
66	3.2940	0.0216
67	3.3154	0.0214
68	3.3367	0.0212
69	3.3577	0.0211
70	3.3786	0.0209
71	3.3993	0.0207
72	3.4199	0.0206
73	3.4407	0.0208
74	3.4613	0.0206
75	3.4818	0.0205
76	3.5021	0.0203
77	3.5223	0.0202
78	3.5424	0.0200
79	3.5622	0.0199
80	3.5820	0.0198
81	3.6016	0.0196
82	3.6211	0.0195
83	3.6404	0.0193
84	3.6596	0.0192
85	3.6787	0.0191
86	3.6977	0.0190
87	3.7165	0.0188
88	3.7352	0.0187
89	3.7538	0.0186
90	3.7723	0.0185
91	3.7907	0.0184
92	3.8089	0.0183
93	3.8271	0.0181
94	3.8451	0.0180
95	3.8630	0.0179
96	3.8809	0.0178
97	3.8986	0.0177
98	3.9162	0.0176
99	3.9337	0.0175
100	3.9511	0.0174
101	3.9684	0.0173
102	3.9857	0.0172
103	4.0028	0.0171
104	4.0198	0.0170
105	4.0368	0.0169
106	4.0536	0.0169
107	4.0704	0.0168
108	4.0871	0.0167
109	4.1037	0.0166
110	4.1202	0.0165
111	4.1366	0.0164
112	4.1529	0.0163
113	4.1692	0.0163
114	4.1854	0.0162
115	4.2015	0.0161
116	4.2175	0.0160
117	4.2334	0.0159
118	4.2493	0.0159
119	4.2651	0.0158

120	4.2808	0.0157
121	4.2964	0.0156
122	4.3120	0.0156
123	4.3275	0.0155
124	4.3429	0.0154
125	4.3583	0.0154
126	4.3736	0.0153
127	4.3888	0.0152
128	4.4040	0.0152
129	4.4191	0.0151
130	4.4341	0.0150
131	4.4490	0.0150
132	4.4639	0.0149
133	4.4788	0.0148
134	4.4935	0.0148
135	4.5083	0.0147
136	4.5229	0.0146
137	4.5375	0.0146
138	4.5520	0.0145
139	4.5665	0.0145
140	4.5809	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6238	0.0142
144	4.6380	0.0142
145	4.6521	0.0141
146	4.6662	0.0141
147	4.6802	0.0140
148	4.6942	0.0140
149	4.7081	0.0139
150	4.7219	0.0139
151	4.7358	0.0138
152	4.7495	0.0138
153	4.7632	0.0137
154	4.7769	0.0137
155	4.7905	0.0136
156	4.8041	0.0136
157	4.8176	0.0135
158	4.8310	0.0135
159	4.8444	0.0134
160	4.8578	0.0134
161	4.8711	0.0133
162	4.8844	0.0133
163	4.8976	0.0132
164	4.9108	0.0132
165	4.9240	0.0131
166	4.9371	0.0131
167	4.9501	0.0131
168	4.9631	0.0130
169	4.9761	0.0130
170	4.9890	0.0129
171	5.0019	0.0129
172	5.0147	0.0128
173	5.0275	0.0128
174	5.0403	0.0128
175	5.0530	0.0127
176	5.0656	0.0127
177	5.0783	0.0126
178	5.0909	0.0126

179	5.1034	0.0126
180	5.1159	0.0125
181	5.1284	0.0125
182	5.1408	0.0124
183	5.1532	0.0124
184	5.1656	0.0124
185	5.1779	0.0123
186	5.1902	0.0123
187	5.2024	0.0122
188	5.2147	0.0122
189	5.2268	0.0122
190	5.2390	0.0121
191	5.2511	0.0121
192	5.2631	0.0121
193	5.2752	0.0120
194	5.2872	0.0120
195	5.2991	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3348	0.0119
199	5.3466	0.0118
200	5.3584	0.0118
201	5.3702	0.0118
202	5.3819	0.0117
203	5.3936	0.0117
204	5.4053	0.0117
205	5.4169	0.0116
206	5.4285	0.0116
207	5.4401	0.0116
208	5.4516	0.0115
209	5.4631	0.0115
210	5.4746	0.0115
211	5.4860	0.0114
212	5.4974	0.0114
213	5.5088	0.0114
214	5.5202	0.0114
215	5.5315	0.0113
216	5.5428	0.0113
217	5.5541	0.0113
218	5.5653	0.0112
219	5.5765	0.0112
220	5.5877	0.0112
221	5.5988	0.0111
222	5.6100	0.0111
223	5.6210	0.0111
224	5.6321	0.0111
225	5.6431	0.0110
226	5.6542	0.0110
227	5.6651	0.0110
228	5.6761	0.0110
229	5.6870	0.0109
230	5.6979	0.0109
231	5.7088	0.0109
232	5.7197	0.0108
233	5.7305	0.0108
234	5.7413	0.0108
235	5.7520	0.0108
236	5.7628	0.0107
237	5.7735	0.0107

238	5.7842	0.0107
239	5.7949	0.0107
240	5.8055	0.0106
241	5.8161	0.0106
242	5.8267	0.0106
243	5.8373	0.0106
244	5.8479	0.0105
245	5.8584	0.0105
246	5.8689	0.0105
247	5.8793	0.0105
248	5.8898	0.0105
249	5.9002	0.0104
250	5.9106	0.0104
251	5.9210	0.0104
252	5.9314	0.0104
253	5.9417	0.0103
254	5.9520	0.0103
255	5.9623	0.0103
256	5.9726	0.0103
257	5.9828	0.0102
258	5.9930	0.0102
259	6.0032	0.0102
260	6.0134	0.0102
261	6.0236	0.0102
262	6.0337	0.0101
263	6.0438	0.0101
264	6.0539	0.0101
265	6.0640	0.0101
266	6.0740	0.0100
267	6.0840	0.0100
268	6.0940	0.0100
269	6.1040	0.0100
270	6.1140	0.0100
271	6.1239	0.0099
272	6.1339	0.0099
273	6.1438	0.0099
274	6.1536	0.0099
275	6.1635	0.0099
276	6.1733	0.0098
277	6.1832	0.0098
278	6.1930	0.0098
279	6.2028	0.0098
280	6.2125	0.0098
281	6.2223	0.0097
282	6.2320	0.0097
283	6.2417	0.0097
284	6.2514	0.0097
285	6.2610	0.0097
286	6.2707	0.0096
287	6.2803	0.0096
288	6.2899	0.0096

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0017	0.0079
2	0.0096	0.0017	0.0079
3	0.0097	0.0017	0.0079
4	0.0097	0.0017	0.0080
5	0.0097	0.0017	0.0080
6	0.0097	0.0017	0.0080
7	0.0098	0.0018	0.0080
8	0.0098	0.0018	0.0080
9	0.0098	0.0018	0.0081
10	0.0099	0.0018	0.0081
11	0.0099	0.0018	0.0081
12	0.0099	0.0018	0.0081
13	0.0100	0.0018	0.0082
14	0.0100	0.0018	0.0082
15	0.0100	0.0018	0.0082
16	0.0100	0.0018	0.0082
17	0.0101	0.0018	0.0083
18	0.0101	0.0018	0.0083
19	0.0102	0.0018	0.0083
20	0.0102	0.0018	0.0084
21	0.0102	0.0018	0.0084
22	0.0102	0.0018	0.0084
23	0.0103	0.0018	0.0084
24	0.0103	0.0018	0.0085
25	0.0104	0.0019	0.0085
26	0.0104	0.0019	0.0085
27	0.0104	0.0019	0.0086
28	0.0105	0.0019	0.0086
29	0.0105	0.0019	0.0086
30	0.0105	0.0019	0.0086
31	0.0106	0.0019	0.0087
32	0.0106	0.0019	0.0087
33	0.0106	0.0019	0.0087
34	0.0107	0.0019	0.0088
35	0.0107	0.0019	0.0088
36	0.0107	0.0019	0.0088
37	0.0108	0.0019	0.0089
38	0.0108	0.0019	0.0089
39	0.0109	0.0019	0.0089
40	0.0109	0.0020	0.0090
41	0.0110	0.0020	0.0090
42	0.0110	0.0020	0.0090
43	0.0110	0.0020	0.0091
44	0.0111	0.0020	0.0091
45	0.0111	0.0020	0.0091
46	0.0111	0.0020	0.0092
47	0.0112	0.0020	0.0092
48	0.0112	0.0020	0.0092
49	0.0113	0.0020	0.0093
50	0.0113	0.0020	0.0093
51	0.0114	0.0020	0.0093
52	0.0114	0.0020	0.0094
53	0.0115	0.0021	0.0094
54	0.0115	0.0021	0.0094
55	0.0116	0.0021	0.0095
56	0.0116	0.0021	0.0095
57	0.0117	0.0021	0.0096
58	0.0117	0.0021	0.0096
59	0.0118	0.0021	0.0097
60	0.0118	0.0021	0.0097
61	0.0119	0.0021	0.0097
62	0.0119	0.0021	0.0098

63	0.0120	0.0021	0.0098
64	0.0120	0.0021	0.0098
65	0.0121	0.0022	0.0099
66	0.0121	0.0022	0.0099
67	0.0122	0.0022	0.0100
68	0.0122	0.0022	0.0100
69	0.0123	0.0022	0.0101
70	0.0123	0.0022	0.0101
71	0.0124	0.0022	0.0102
72	0.0124	0.0022	0.0102
73	0.0125	0.0022	0.0103
74	0.0126	0.0022	0.0103
75	0.0126	0.0023	0.0104
76	0.0127	0.0023	0.0104
77	0.0128	0.0023	0.0105
78	0.0128	0.0023	0.0105
79	0.0129	0.0023	0.0106
80	0.0129	0.0023	0.0106
81	0.0130	0.0023	0.0107
82	0.0131	0.0023	0.0107
83	0.0131	0.0024	0.0108
84	0.0132	0.0024	0.0108
85	0.0133	0.0024	0.0109
86	0.0133	0.0024	0.0109
87	0.0134	0.0024	0.0110
88	0.0135	0.0024	0.0111
89	0.0136	0.0024	0.0111
90	0.0136	0.0024	0.0112
91	0.0137	0.0025	0.0113
92	0.0138	0.0025	0.0113
93	0.0139	0.0025	0.0114
94	0.0139	0.0025	0.0114
95	0.0140	0.0025	0.0115
96	0.0141	0.0025	0.0116
97	0.0142	0.0025	0.0116
98	0.0142	0.0025	0.0117
99	0.0144	0.0026	0.0118
100	0.0144	0.0026	0.0118
101	0.0145	0.0026	0.0119
102	0.0146	0.0026	0.0120
103	0.0147	0.0026	0.0121
104	0.0148	0.0026	0.0121
105	0.0149	0.0027	0.0122
106	0.0150	0.0027	0.0123
107	0.0151	0.0027	0.0124
108	0.0152	0.0027	0.0124
109	0.0153	0.0027	0.0126
110	0.0154	0.0027	0.0126
111	0.0155	0.0028	0.0127
112	0.0156	0.0028	0.0128
113	0.0157	0.0028	0.0129
114	0.0158	0.0028	0.0130
115	0.0159	0.0029	0.0131
116	0.0160	0.0029	0.0132
117	0.0162	0.0029	0.0133
118	0.0163	0.0029	0.0133
119	0.0164	0.0029	0.0135
120	0.0165	0.0030	0.0136
121	0.0167	0.0030	0.0137

122	0.0168	0.0030	0.0138
123	0.0169	0.0030	0.0139
124	0.0170	0.0030	0.0140
125	0.0172	0.0031	0.0141
126	0.0173	0.0031	0.0142
127	0.0175	0.0031	0.0144
128	0.0176	0.0032	0.0145
129	0.0178	0.0032	0.0146
130	0.0179	0.0032	0.0147
131	0.0181	0.0032	0.0149
132	0.0183	0.0033	0.0150
133	0.0185	0.0033	0.0152
134	0.0186	0.0033	0.0153
135	0.0188	0.0034	0.0155
136	0.0190	0.0034	0.0156
137	0.0192	0.0034	0.0158
138	0.0193	0.0035	0.0159
139	0.0196	0.0035	0.0161
140	0.0198	0.0035	0.0162
141	0.0200	0.0036	0.0164
142	0.0202	0.0036	0.0166
143	0.0205	0.0037	0.0168
144	0.0206	0.0037	0.0169
145	0.0206	0.0037	0.0169
146	0.0207	0.0037	0.0170
147	0.0211	0.0038	0.0173
148	0.0212	0.0038	0.0174
149	0.0216	0.0039	0.0177
150	0.0218	0.0039	0.0179
151	0.0222	0.0040	0.0182
152	0.0224	0.0040	0.0184
153	0.0228	0.0041	0.0187
154	0.0230	0.0041	0.0189
155	0.0235	0.0042	0.0193
156	0.0237	0.0042	0.0195
157	0.0242	0.0043	0.0199
158	0.0245	0.0044	0.0201
159	0.0251	0.0045	0.0206
160	0.0253	0.0045	0.0208
161	0.0259	0.0046	0.0213
162	0.0263	0.0047	0.0216
163	0.0269	0.0048	0.0221
164	0.0273	0.0049	0.0224
165	0.0280	0.0050	0.0230
166	0.0284	0.0051	0.0233
167	0.0292	0.0052	0.0240
168	0.0297	0.0053	0.0244
169	0.0306	0.0055	0.0252
170	0.0311	0.0056	0.0256
171	0.0322	0.0058	0.0264
172	0.0328	0.0059	0.0269
173	0.0340	0.0061	0.0279
174	0.0347	0.0062	0.0285
175	0.0362	0.0065	0.0297
176	0.0370	0.0066	0.0304
177	0.0387	0.0069	0.0318
178	0.0397	0.0071	0.0326
179	0.0419	0.0075	0.0344
180	0.0431	0.0077	0.0354

181	0.0458	0.0082	0.0376
182	0.0474	0.0085	0.0389
183	0.0510	0.0091	0.0419
184	0.0531	0.0095	0.0436
185	0.0540	0.0097	0.0443
186	0.0571	0.0102	0.0468
187	0.0648	0.0116	0.0532
188	0.0698	0.0125	0.0573
189	0.0842	0.0142	0.0699
190	0.0950	0.0142	0.0808
191	0.1358	0.0142	0.1215
192	0.1867	0.0142	0.1725
193	0.5845	0.0142	0.5702
194	0.1106	0.0142	0.0964
195	0.0761	0.0136	0.0625
196	0.0606	0.0108	0.0497
197	0.0555	0.0099	0.0455
198	0.0491	0.0088	0.0403
199	0.0444	0.0079	0.0364
200	0.0408	0.0073	0.0335
201	0.0378	0.0068	0.0311
202	0.0354	0.0063	0.0291
203	0.0334	0.0060	0.0274
204	0.0317	0.0057	0.0260
205	0.0301	0.0054	0.0247
206	0.0288	0.0052	0.0237
207	0.0276	0.0049	0.0227
208	0.0266	0.0048	0.0218
209	0.0256	0.0046	0.0210
210	0.0248	0.0044	0.0203
211	0.0240	0.0043	0.0197
212	0.0233	0.0042	0.0191
213	0.0226	0.0040	0.0186
214	0.0220	0.0039	0.0181
215	0.0214	0.0038	0.0176
216	0.0209	0.0037	0.0171
217	0.0208	0.0037	0.0171
218	0.0203	0.0036	0.0167
219	0.0199	0.0036	0.0163
220	0.0195	0.0035	0.0160
221	0.0191	0.0034	0.0157
222	0.0187	0.0034	0.0154
223	0.0184	0.0033	0.0151
224	0.0180	0.0032	0.0148
225	0.0177	0.0032	0.0145
226	0.0174	0.0031	0.0143
227	0.0171	0.0031	0.0141
228	0.0169	0.0030	0.0138
229	0.0166	0.0030	0.0136
230	0.0163	0.0029	0.0134
231	0.0161	0.0029	0.0132
232	0.0159	0.0028	0.0130
233	0.0156	0.0028	0.0128
234	0.0154	0.0028	0.0127
235	0.0152	0.0027	0.0125
236	0.0150	0.0027	0.0123
237	0.0148	0.0027	0.0122
238	0.0146	0.0026	0.0120
239	0.0145	0.0026	0.0119

240	0.0143	0.0026	0.0117
241	0.0141	0.0025	0.0116
242	0.0140	0.0025	0.0115
243	0.0138	0.0025	0.0113
244	0.0137	0.0024	0.0112
245	0.0135	0.0024	0.0111
246	0.0134	0.0024	0.0110
247	0.0132	0.0024	0.0109
248	0.0131	0.0023	0.0108
249	0.0130	0.0023	0.0106
250	0.0128	0.0023	0.0105
251	0.0127	0.0023	0.0104
252	0.0126	0.0023	0.0103
253	0.0125	0.0022	0.0102
254	0.0124	0.0022	0.0101
255	0.0122	0.0022	0.0101
256	0.0121	0.0022	0.0100
257	0.0120	0.0022	0.0099
258	0.0119	0.0021	0.0098
259	0.0118	0.0021	0.0097
260	0.0117	0.0021	0.0096
261	0.0116	0.0021	0.0095
262	0.0115	0.0021	0.0095
263	0.0114	0.0020	0.0094
264	0.0114	0.0020	0.0093
265	0.0113	0.0020	0.0092
266	0.0112	0.0020	0.0092
267	0.0111	0.0020	0.0091
268	0.0110	0.0020	0.0090
269	0.0109	0.0020	0.0090
270	0.0108	0.0019	0.0089
271	0.0108	0.0019	0.0088
272	0.0107	0.0019	0.0088
273	0.0106	0.0019	0.0087
274	0.0105	0.0019	0.0087
275	0.0105	0.0019	0.0086
276	0.0104	0.0019	0.0085
277	0.0103	0.0018	0.0085
278	0.0103	0.0018	0.0084
279	0.0102	0.0018	0.0084
280	0.0101	0.0018	0.0083
281	0.0101	0.0018	0.0083
282	0.0100	0.0018	0.0082
283	0.0099	0.0018	0.0082
284	0.0099	0.0018	0.0081
285	0.0098	0.0018	0.0081
286	0.0098	0.0017	0.0080
287	0.0097	0.0017	0.0080
288	0.0096	0.0017	0.0079

Total soil rain loss = 1.00(In)
Total effective rainfall = 5.29(In)
Peak flow rate in flood hydrograph = 39.54(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	10.0	20.0	30.0	40.0
0+ 5	0.0005	0.07	Q				
0+10	0.0037	0.47	Q				
0+15	0.0095	0.85	Q				
0+20	0.0162	0.96	Q				
0+25	0.0229	0.98	Q				
0+30	0.0298	0.99	Q				
0+35	0.0366	1.00	Q				
0+40	0.0435	1.00	VQ				
0+45	0.0505	1.00	VQ				
0+50	0.0574	1.01	VQ				
0+55	0.0643	1.01	VQ				
1+ 0	0.0713	1.01	VQ				
1+ 5	0.0783	1.02	VQ				
1+10	0.0853	1.02	VQ				
1+15	0.0924	1.02	VQ				
1+20	0.0994	1.03	VQ				
1+25	0.1065	1.03	VQ				
1+30	0.1136	1.03	VQ				
1+35	0.1208	1.04	|Q				
1+40	0.1279	1.04	|Q				
1+45	0.1351	1.04	|Q				
1+50	0.1423	1.05	|Q				
1+55	0.1495	1.05	|Q				
2+ 0	0.1568	1.05	|Q				
2+ 5	0.1641	1.06	|Q				
2+10	0.1714	1.06	|Q				
2+15	0.1787	1.06	|Q				
2+20	0.1860	1.07	|Q				
2+25	0.1934	1.07	|Q				
2+30	0.2008	1.07	|Q				
2+35	0.2082	1.08	|Q				
2+40	0.2157	1.08	|Q				
2+45	0.2231	1.08	|Q				
2+50	0.2306	1.09	|QV				
2+55	0.2381	1.09	|QV				
3+ 0	0.2457	1.10	|QV				
3+ 5	0.2533	1.10	|QV				
3+10	0.2609	1.10	|QV				
3+15	0.2685	1.11	|QV				
3+20	0.2762	1.11	|QV				
3+25	0.2839	1.12	|QV				
3+30	0.2916	1.12	|QV				
3+35	0.2993	1.12	|QV				
3+40	0.3071	1.13	|QV				
3+45	0.3149	1.13	|QV				
3+50	0.3227	1.14	|QV				
3+55	0.3306	1.14	|QV				
4+ 0	0.3385	1.15	|QV				
4+ 5	0.3464	1.15	|Q V				
4+10	0.3544	1.15	|Q V				
4+15	0.3623	1.16	|Q V				
4+20	0.3704	1.16	|Q V				
4+25	0.3784	1.17	|Q V				
4+30	0.3865	1.17	|Q V				

4+35	0.3946	1.18	|Q V				
4+40	0.4027	1.18	|Q V				
4+45	0.4109	1.19	|Q V				
4+50	0.4191	1.19	|Q V				
4+55	0.4274	1.20	|Q V				
5+ 0	0.4357	1.20	|Q V				
5+ 5	0.4440	1.21	|Q V				
5+10	0.4523	1.21	|Q V				
5+15	0.4607	1.22	|Q V				
5+20	0.4691	1.22	|Q V				
5+25	0.4776	1.23	|Q V				
5+30	0.4861	1.23	|Q V				
5+35	0.4946	1.24	|Q V				
5+40	0.5032	1.24	|Q V				
5+45	0.5118	1.25	|Q V				
5+50	0.5204	1.26	|Q V				
5+55	0.5291	1.26	|Q V				
6+ 0	0.5378	1.27	|Q V				
6+ 5	0.5466	1.27	|Q V				
6+10	0.5554	1.28	|Q V				
6+15	0.5643	1.28	|Q V				
6+20	0.5731	1.29	|Q V				
6+25	0.5821	1.30	|Q V				
6+30	0.5911	1.30	|Q V				
6+35	0.6001	1.31	|Q V				
6+40	0.6091	1.32	|Q V				
6+45	0.6182	1.32	|Q V				
6+50	0.6274	1.33	|Q V				
6+55	0.6366	1.34	|Q V				
7+ 0	0.6458	1.34	|Q V				
7+ 5	0.6551	1.35	|Q V				
7+10	0.6645	1.36	|Q V				
7+15	0.6738	1.36	|Q V				
7+20	0.6833	1.37	|Q V				
7+25	0.6928	1.38	|Q V				
7+30	0.7023	1.38	|Q V				
7+35	0.7119	1.39	|Q V				
7+40	0.7215	1.40	|Q V				
7+45	0.7312	1.41	|Q V				
7+50	0.7410	1.42	|Q V				
7+55	0.7508	1.42	|Q V				
8+ 0	0.7606	1.43	|Q V				
8+ 5	0.7706	1.44	|Q V				
8+10	0.7805	1.45	|Q V				
8+15	0.7906	1.46	|Q V				
8+20	0.8007	1.47	|Q V				
8+25	0.8108	1.47	|Q V				
8+30	0.8210	1.48	|Q V				
8+35	0.8313	1.49	|Q V				
8+40	0.8416	1.50	|Q V				
8+45	0.8520	1.51	|Q V				
8+50	0.8625	1.52	|Q V				
8+55	0.8730	1.53	|Q V				
9+ 0	0.8837	1.54	|Q V				
9+ 5	0.8943	1.55	|Q V				
9+10	0.9051	1.56	|Q V				
9+15	0.9159	1.57	|Q V				
9+20	0.9268	1.58	|Q V				
9+25	0.9377	1.59	|Q V				

9+30	0.9488	1.60	Q V				
9+35	0.9599	1.61	Q V				
9+40	0.9711	1.63	Q V				
9+45	0.9824	1.64	Q V				
9+50	0.9937	1.65	Q V				
9+55	1.0052	1.66	Q V				
10+ 0	1.0167	1.67	Q V				
10+ 5	1.0283	1.69	Q V				
10+10	1.0400	1.70	Q V				
10+15	1.0518	1.71	Q V				
10+20	1.0637	1.73	Q V				
10+25	1.0757	1.74	Q V				
10+30	1.0878	1.76	Q V				
10+35	1.1000	1.77	Q V				
10+40	1.1123	1.78	Q V				
10+45	1.1247	1.80	Q V				
10+50	1.1372	1.82	Q V				
10+55	1.1498	1.83	Q V				
11+ 0	1.1625	1.85	Q V				
11+ 5	1.1754	1.86	Q V				
11+10	1.1883	1.88	Q V				
11+15	1.2014	1.90	Q V				
11+20	1.2146	1.92	Q V				
11+25	1.2279	1.94	Q V				
11+30	1.2414	1.96	Q V				
11+35	1.2550	1.97	Q V				
11+40	1.2687	2.00	Q V				
11+45	1.2826	2.02	Q V				
11+50	1.2967	2.04	Q V				
11+55	1.3108	2.06	Q V				
12+ 0	1.3252	2.08	Q V				
12+ 5	1.3397	2.10	Q V				
12+10	1.3542	2.11	Q V				
12+15	1.3688	2.12	Q V				
12+20	1.3835	2.14	Q V				
12+25	1.3985	2.17	Q V				
12+30	1.4136	2.19	Q V				
12+35	1.4289	2.22	Q V				
12+40	1.4444	2.25	Q V				
12+45	1.4601	2.28	Q V				
12+50	1.4760	2.31	Q V				
12+55	1.4922	2.35	Q V				
13+ 0	1.5086	2.38	Q V				
13+ 5	1.5253	2.42	Q V				
13+10	1.5422	2.46	Q V				
13+15	1.5594	2.49	Q V				
13+20	1.5768	2.54	Q V				
13+25	1.5946	2.58	Q V				
13+30	1.6127	2.62	Q V				
13+35	1.6311	2.67	Q V				
13+40	1.6498	2.72	Q V				
13+45	1.6689	2.77	Q V				
13+50	1.6884	2.83	Q V				
13+55	1.7083	2.89	Q V				
14+ 0	1.7286	2.95	Q V				
14+ 5	1.7493	3.01	Q V				
14+10	1.7706	3.08	Q V				
14+15	1.7923	3.16	Q V				
14+20	1.8146	3.24	Q V				

14+25	1.8375	3.32	Q V				
14+30	1.8611	3.42	Q V				
14+35	1.8853	3.51	Q V				
14+40	1.9102	3.62	Q V				
14+45	1.9360	3.74	Q V				
14+50	1.9626	3.87	Q V				
14+55	1.9902	4.01	Q V				
15+ 0	2.0189	4.17	Q V				
15+ 5	2.0488	4.34	Q V				
15+10	2.0800	4.54	Q V				
15+15	2.1128	4.76	Q V				
15+20	2.1473	5.02	Q V				
15+25	2.1837	5.28	Q V				
15+30	2.2214	5.47	Q V				
15+35	2.2608	5.72	Q V				
15+40	2.3036	6.22	Q V				
15+45	2.3510	6.88	Q V				
15+50	2.4055	7.91	Q V				
15+55	2.4710	9.51	Q V				
16+ 0	2.5587	12.73	Q V				
16+ 5	2.7044	21.16	Q V				
16+10	2.9767	39.54	Q V				
16+15	3.2213	35.52	Q V				
16+20	3.3372	16.82	Q V				
16+25	3.3988	8.95	Q V				
16+30	3.4460	6.84	Q V				
16+35	3.4839	5.51	Q V				
16+40	3.5177	4.90	Q V				
16+45	3.5483	4.45	Q V				
16+50	3.5765	4.09	Q V				
16+55	3.6027	3.81	Q V				
17+ 0	3.6273	3.57	Q V				
17+ 5	3.6505	3.37	Q V				
17+10	3.6725	3.20	Q V				
17+15	3.6935	3.05	Q V				
17+20	3.7136	2.92	Q V				
17+25	3.7329	2.80	Q V				
17+30	3.7514	2.69	Q V				
17+35	3.7693	2.60	Q V				
17+40	3.7866	2.51	Q V				
17+45	3.8034	2.44	Q V				
17+50	3.8197	2.36	Q V				
17+55	3.8355	2.30	Q V				
18+ 0	3.8509	2.24	Q V				
18+ 5	3.8659	2.18	Q V				
18+10	3.8807	2.14	Q V				
18+15	3.8952	2.11	Q V				
18+20	3.9095	2.07	Q V				
18+25	3.9234	2.03	Q V				
18+30	3.9371	1.98	Q V				
18+35	3.9505	1.94	Q V				
18+40	3.9636	1.91	Q V				
18+45	3.9765	1.87	Q V				
18+50	3.9892	1.84	Q V				
18+55	4.0016	1.81	Q V				
19+ 0	4.0138	1.78	Q V				
19+ 5	4.0259	1.75	Q V				
19+10	4.0377	1.72	Q V				
19+15	4.0494	1.69	Q V				

19+20	4.0608	1.67	Q			V	
19+25	4.0722	1.64	Q			V	
19+30	4.0833	1.62	Q			V	
19+35	4.0943	1.60	Q			V	
19+40	4.1052	1.58	Q			V	
19+45	4.1159	1.55	Q			V	
19+50	4.1264	1.53	Q			V	
19+55	4.1369	1.51	Q			V	
20+ 0	4.1472	1.50	Q			V	
20+ 5	4.1573	1.48	Q			V	
20+10	4.1674	1.46	Q			V	
20+15	4.1773	1.44	Q			V	
20+20	4.1872	1.43	Q			V	
20+25	4.1969	1.41	Q			V	
20+30	4.2065	1.40	Q			V	
20+35	4.2160	1.38	Q			V	
20+40	4.2254	1.37	Q			V	
20+45	4.2347	1.35	Q			V	
20+50	4.2439	1.34	Q			V	
20+55	4.2531	1.32	Q			V	
21+ 0	4.2621	1.31	Q			V	
21+ 5	4.2710	1.30	Q			V	
21+10	4.2799	1.29	Q			V	
21+15	4.2887	1.28	Q			V	
21+20	4.2974	1.26	Q			V	
21+25	4.3060	1.25	Q			V	
21+30	4.3146	1.24	Q			V	
21+35	4.3230	1.23	Q			V	
21+40	4.3314	1.22	Q			V	
21+45	4.3398	1.21	Q			V	
21+50	4.3480	1.20	Q			V	
21+55	4.3562	1.19	Q			V	
22+ 0	4.3643	1.18	Q			V	
22+ 5	4.3724	1.17	Q			V	
22+10	4.3804	1.16	Q			V	
22+15	4.3883	1.15	Q			V	
22+20	4.3962	1.14	Q			V	
22+25	4.4040	1.13	Q			V	
22+30	4.4118	1.13	Q			V	
22+35	4.4195	1.12	Q			V	
22+40	4.4271	1.11	Q			V	
22+45	4.4347	1.10	Q			V	
22+50	4.4423	1.09	Q			V	
22+55	4.4497	1.09	Q			V	
23+ 0	4.4572	1.08	Q			V	
23+ 5	4.4645	1.07	Q			V	
23+10	4.4719	1.06	Q			V	
23+15	4.4792	1.06	Q			V	
23+20	4.4864	1.05	Q			V	
23+25	4.4936	1.04	Q			V	
23+30	4.5007	1.04	Q			V	
23+35	4.5078	1.03	Q			V	
23+40	4.5149	1.02	Q			V	
23+45	4.5219	1.02	Q			V	
23+50	4.5288	1.01	Q			V	
23+55	4.5358	1.01	Q			V	
24+ 0	4.5426	1.00	Q			V	
24+ 5	4.5490	0.92	Q			V	
24+10	4.5526	0.52	Q			V	

24+15	4.5536	0.14	Q				V
24+20	4.5538	0.03	Q				V
24+25	4.5538	0.01	Q				V

APPENDIX A.6: UNIT HYDROGRAPH, AREA "6"

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/20/19

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

Program License Serial Number 6279

BNSF
EXISTING HYDROLOGY
AREA 6

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
7.49	1	1.58
Rainfall data for year 100		
7.49	6	3.42
Rainfall data for year 100		
7.49	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
68.2	85.6	7.49	1.000	0.273	0.570	0.156

Area-averaged adjusted loss rate Fm (In/Hr) = 0.156

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
4.27	0.570	68.2	85.6	1.69	0.737
3.22	0.430	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.834
Area-averaged low loss fraction, Yb = 0.166
++
Watercourse length = 2238.00(Ft.)
Length from concentration point to centroid = 1224.00(Ft.)
Elevation difference along watercourse = 15.00(Ft.)
Mannings friction factor along watercourse = 0.025
Watershed area = 7.49(Ac.)
Catchment Lag time = 0.126 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 66.0465
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.156(In/Hr)
Average low loss rate fraction (Yb) = 0.166 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 7.49(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.585(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.579(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 90.58 (CFS))		
1	7.849	7.109
2	48.994	37.270
3	86.683	34.140
4	97.250	9.572
5	99.150	1.721
6	100.000	0.770

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5846	0.5846

2	0.7713	0.1868
3	0.9072	0.1358
4	1.0178	0.1106
5	1.1128	0.0950
6	1.1970	0.0842
7	1.2731	0.0761
8	1.3430	0.0698
9	1.4078	0.0648
10	1.4684	0.0606
11	1.5254	0.0571
12	1.5794	0.0540
13	1.6349	0.0555
14	1.6880	0.0531
15	1.7390	0.0510
16	1.7881	0.0491
17	1.8354	0.0474
18	1.8812	0.0458
19	1.9256	0.0444
20	1.9687	0.0431
21	2.0106	0.0419
22	2.0513	0.0407
23	2.0910	0.0397
24	2.1297	0.0387
25	2.1676	0.0378
26	2.2045	0.0370
27	2.2407	0.0362
28	2.2761	0.0354
29	2.3108	0.0347
30	2.3449	0.0340
31	2.3783	0.0334
32	2.4111	0.0328
33	2.4433	0.0322
34	2.4749	0.0317
35	2.5061	0.0311
36	2.5367	0.0306
37	2.5668	0.0301
38	2.5965	0.0297
39	2.6257	0.0292
40	2.6545	0.0288
41	2.6829	0.0284
42	2.7110	0.0280
43	2.7386	0.0276
44	2.7659	0.0273
45	2.7928	0.0269
46	2.8194	0.0266
47	2.8456	0.0263
48	2.8716	0.0259
49	2.8972	0.0256
50	2.9225	0.0253
51	2.9476	0.0251
52	2.9724	0.0248
53	2.9969	0.0245
54	3.0211	0.0242
55	3.0451	0.0240
56	3.0688	0.0237
57	3.0923	0.0235
58	3.1156	0.0233
59	3.1386	0.0230
60	3.1615	0.0228

61	3.1841	0.0226
62	3.2065	0.0224
63	3.2286	0.0222
64	3.2506	0.0220
65	3.2724	0.0218
66	3.2940	0.0216
67	3.3155	0.0214
68	3.3367	0.0212
69	3.3578	0.0211
70	3.3786	0.0209
71	3.3994	0.0207
72	3.4199	0.0206
73	3.4407	0.0208
74	3.4614	0.0206
75	3.4818	0.0205
76	3.5022	0.0203
77	3.5223	0.0202
78	3.5424	0.0200
79	3.5623	0.0199
80	3.5820	0.0198
81	3.6016	0.0196
82	3.6211	0.0195
83	3.6405	0.0193
84	3.6597	0.0192
85	3.6788	0.0191
86	3.6977	0.0190
87	3.7166	0.0188
88	3.7353	0.0187
89	3.7539	0.0186
90	3.7723	0.0185
91	3.7907	0.0184
92	3.8090	0.0183
93	3.8271	0.0181
94	3.8451	0.0180
95	3.8631	0.0179
96	3.8809	0.0178
97	3.8986	0.0177
98	3.9162	0.0176
99	3.9337	0.0175
100	3.9512	0.0174
101	3.9685	0.0173
102	3.9857	0.0172
103	4.0028	0.0171
104	4.0199	0.0170
105	4.0368	0.0169
106	4.0537	0.0169
107	4.0704	0.0168
108	4.0871	0.0167
109	4.1037	0.0166
110	4.1202	0.0165
111	4.1366	0.0164
112	4.1530	0.0163
113	4.1692	0.0163
114	4.1854	0.0162
115	4.2015	0.0161
116	4.2175	0.0160
117	4.2335	0.0159
118	4.2493	0.0159
119	4.2651	0.0158

120	4.2808	0.0157
121	4.2965	0.0156
122	4.3120	0.0156
123	4.3275	0.0155
124	4.3430	0.0154
125	4.3583	0.0154
126	4.3736	0.0153
127	4.3888	0.0152
128	4.4040	0.0152
129	4.4191	0.0151
130	4.4341	0.0150
131	4.4491	0.0150
132	4.4640	0.0149
133	4.4788	0.0148
134	4.4936	0.0148
135	4.5083	0.0147
136	4.5229	0.0146
137	4.5375	0.0146
138	4.5521	0.0145
139	4.5665	0.0145
140	4.5809	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6238	0.0142
144	4.6380	0.0142
145	4.6521	0.0141
146	4.6662	0.0141
147	4.6802	0.0140
148	4.6942	0.0140
149	4.7081	0.0139
150	4.7220	0.0139
151	4.7358	0.0138
152	4.7495	0.0138
153	4.7633	0.0137
154	4.7769	0.0137
155	4.7905	0.0136
156	4.8041	0.0136
157	4.8176	0.0135
158	4.8311	0.0135
159	4.8445	0.0134
160	4.8578	0.0134
161	4.8712	0.0133
162	4.8844	0.0133
163	4.8977	0.0132
164	4.9109	0.0132
165	4.9240	0.0131
166	4.9371	0.0131
167	4.9501	0.0131
168	4.9631	0.0130
169	4.9761	0.0130
170	4.9890	0.0129
171	5.0019	0.0129
172	5.0147	0.0128
173	5.0275	0.0128
174	5.0403	0.0128
175	5.0530	0.0127
176	5.0657	0.0127
177	5.0783	0.0126
178	5.0909	0.0126

179	5.1034	0.0126
180	5.1160	0.0125
181	5.1284	0.0125
182	5.1409	0.0124
183	5.1533	0.0124
184	5.1656	0.0124
185	5.1779	0.0123
186	5.1902	0.0123
187	5.2025	0.0122
188	5.2147	0.0122
189	5.2269	0.0122
190	5.2390	0.0121
191	5.2511	0.0121
192	5.2632	0.0121
193	5.2752	0.0120
194	5.2872	0.0120
195	5.2992	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3348	0.0119
199	5.3467	0.0118
200	5.3585	0.0118
201	5.3702	0.0118
202	5.3819	0.0117
203	5.3936	0.0117
204	5.4053	0.0117
205	5.4169	0.0116
206	5.4285	0.0116
207	5.4401	0.0116
208	5.4516	0.0115
209	5.4631	0.0115
210	5.4746	0.0115
211	5.4861	0.0114
212	5.4975	0.0114
213	5.5088	0.0114
214	5.5202	0.0114
215	5.5315	0.0113
216	5.5428	0.0113
217	5.5541	0.0113
218	5.5653	0.0112
219	5.5765	0.0112
220	5.5877	0.0112
221	5.5989	0.0111
222	5.6100	0.0111
223	5.6211	0.0111
224	5.6321	0.0111
225	5.6432	0.0110
226	5.6542	0.0110
227	5.6652	0.0110
228	5.6761	0.0110
229	5.6871	0.0109
230	5.6980	0.0109
231	5.7088	0.0109
232	5.7197	0.0108
233	5.7305	0.0108
234	5.7413	0.0108
235	5.7521	0.0108
236	5.7628	0.0107
237	5.7735	0.0107

238	5.7842	0.0107
239	5.7949	0.0107
240	5.8055	0.0106
241	5.8162	0.0106
242	5.8268	0.0106
243	5.8373	0.0106
244	5.8479	0.0105
245	5.8584	0.0105
246	5.8689	0.0105
247	5.8794	0.0105
248	5.8898	0.0105
249	5.9003	0.0104
250	5.9107	0.0104
251	5.9210	0.0104
252	5.9314	0.0104
253	5.9417	0.0103
254	5.9520	0.0103
255	5.9623	0.0103
256	5.9726	0.0103
257	5.9828	0.0102
258	5.9931	0.0102
259	6.0033	0.0102
260	6.0134	0.0102
261	6.0236	0.0102
262	6.0337	0.0101
263	6.0438	0.0101
264	6.0539	0.0101
265	6.0640	0.0101
266	6.0740	0.0100
267	6.0841	0.0100
268	6.0941	0.0100
269	6.1041	0.0100
270	6.1140	0.0100
271	6.1240	0.0099
272	6.1339	0.0099
273	6.1438	0.0099
274	6.1537	0.0099
275	6.1635	0.0099
276	6.1734	0.0098
277	6.1832	0.0098
278	6.1930	0.0098
279	6.2028	0.0098
280	6.2125	0.0098
281	6.2223	0.0097
282	6.2320	0.0097
283	6.2417	0.0097
284	6.2514	0.0097
285	6.2611	0.0097
286	6.2707	0.0096
287	6.2803	0.0096
288	6.2899	0.0096

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0016	0.0080
2	0.0096	0.0016	0.0080
3	0.0097	0.0016	0.0081
4	0.0097	0.0016	0.0081
5	0.0097	0.0016	0.0081
6	0.0097	0.0016	0.0081
7	0.0098	0.0016	0.0082
8	0.0098	0.0016	0.0082
9	0.0098	0.0016	0.0082
10	0.0099	0.0016	0.0082
11	0.0099	0.0016	0.0083
12	0.0099	0.0016	0.0083
13	0.0100	0.0017	0.0083
14	0.0100	0.0017	0.0083
15	0.0100	0.0017	0.0084
16	0.0100	0.0017	0.0084
17	0.0101	0.0017	0.0084
18	0.0101	0.0017	0.0084
19	0.0102	0.0017	0.0085
20	0.0102	0.0017	0.0085
21	0.0102	0.0017	0.0085
22	0.0102	0.0017	0.0085
23	0.0103	0.0017	0.0086
24	0.0103	0.0017	0.0086
25	0.0104	0.0017	0.0086
26	0.0104	0.0017	0.0087
27	0.0104	0.0017	0.0087
28	0.0105	0.0017	0.0087
29	0.0105	0.0017	0.0088
30	0.0105	0.0017	0.0088
31	0.0106	0.0018	0.0088
32	0.0106	0.0018	0.0088
33	0.0106	0.0018	0.0089
34	0.0107	0.0018	0.0089
35	0.0107	0.0018	0.0089
36	0.0107	0.0018	0.0090
37	0.0108	0.0018	0.0090
38	0.0108	0.0018	0.0090
39	0.0109	0.0018	0.0091
40	0.0109	0.0018	0.0091
41	0.0110	0.0018	0.0091
42	0.0110	0.0018	0.0092
43	0.0110	0.0018	0.0092
44	0.0111	0.0018	0.0092
45	0.0111	0.0018	0.0093
46	0.0111	0.0019	0.0093
47	0.0112	0.0019	0.0093
48	0.0112	0.0019	0.0094
49	0.0113	0.0019	0.0094
50	0.0113	0.0019	0.0094
51	0.0114	0.0019	0.0095
52	0.0114	0.0019	0.0095
53	0.0115	0.0019	0.0096
54	0.0115	0.0019	0.0096
55	0.0116	0.0019	0.0096
56	0.0116	0.0019	0.0097
57	0.0117	0.0019	0.0097
58	0.0117	0.0019	0.0098
59	0.0118	0.0020	0.0098
60	0.0118	0.0020	0.0098
61	0.0119	0.0020	0.0099
62	0.0119	0.0020	0.0099

63	0.0120	0.0020	0.0100
64	0.0120	0.0020	0.0100
65	0.0121	0.0020	0.0101
66	0.0121	0.0020	0.0101
67	0.0122	0.0020	0.0102
68	0.0122	0.0020	0.0102
69	0.0123	0.0020	0.0102
70	0.0123	0.0020	0.0103
71	0.0124	0.0021	0.0103
72	0.0124	0.0021	0.0104
73	0.0125	0.0021	0.0104
74	0.0126	0.0021	0.0105
75	0.0126	0.0021	0.0105
76	0.0127	0.0021	0.0106
77	0.0128	0.0021	0.0106
78	0.0128	0.0021	0.0107
79	0.0129	0.0021	0.0107
80	0.0129	0.0021	0.0108
81	0.0130	0.0022	0.0108
82	0.0131	0.0022	0.0109
83	0.0131	0.0022	0.0110
84	0.0132	0.0022	0.0110
85	0.0133	0.0022	0.0111
86	0.0133	0.0022	0.0111
87	0.0134	0.0022	0.0112
88	0.0135	0.0022	0.0112
89	0.0136	0.0023	0.0113
90	0.0136	0.0023	0.0113
91	0.0137	0.0023	0.0114
92	0.0138	0.0023	0.0115
93	0.0139	0.0023	0.0116
94	0.0139	0.0023	0.0116
95	0.0140	0.0023	0.0117
96	0.0141	0.0023	0.0117
97	0.0142	0.0024	0.0118
98	0.0142	0.0024	0.0119
99	0.0144	0.0024	0.0120
100	0.0144	0.0024	0.0120
101	0.0145	0.0024	0.0121
102	0.0146	0.0024	0.0122
103	0.0147	0.0024	0.0123
104	0.0148	0.0025	0.0123
105	0.0149	0.0025	0.0124
106	0.0150	0.0025	0.0125
107	0.0151	0.0025	0.0126
108	0.0152	0.0025	0.0126
109	0.0153	0.0025	0.0128
110	0.0154	0.0026	0.0128
111	0.0155	0.0026	0.0129
112	0.0156	0.0026	0.0130
113	0.0157	0.0026	0.0131
114	0.0158	0.0026	0.0132
115	0.0159	0.0026	0.0133
116	0.0160	0.0027	0.0134
117	0.0162	0.0027	0.0135
118	0.0163	0.0027	0.0136
119	0.0164	0.0027	0.0137
120	0.0165	0.0027	0.0138
121	0.0167	0.0028	0.0139

122	0.0168	0.0028	0.0140
123	0.0169	0.0028	0.0141
124	0.0170	0.0028	0.0142
125	0.0172	0.0029	0.0144
126	0.0173	0.0029	0.0144
127	0.0175	0.0029	0.0146
128	0.0176	0.0029	0.0147
129	0.0178	0.0030	0.0149
130	0.0179	0.0030	0.0149
131	0.0181	0.0030	0.0151
132	0.0183	0.0030	0.0152
133	0.0185	0.0031	0.0154
134	0.0186	0.0031	0.0155
135	0.0188	0.0031	0.0157
136	0.0190	0.0031	0.0158
137	0.0192	0.0032	0.0160
138	0.0193	0.0032	0.0161
139	0.0196	0.0033	0.0164
140	0.0198	0.0033	0.0165
141	0.0200	0.0033	0.0167
142	0.0202	0.0034	0.0168
143	0.0205	0.0034	0.0171
144	0.0206	0.0034	0.0172
145	0.0206	0.0034	0.0171
146	0.0207	0.0034	0.0173
147	0.0211	0.0035	0.0176
148	0.0212	0.0035	0.0177
149	0.0216	0.0036	0.0180
150	0.0218	0.0036	0.0182
151	0.0222	0.0037	0.0185
152	0.0224	0.0037	0.0187
153	0.0228	0.0038	0.0190
154	0.0230	0.0038	0.0192
155	0.0235	0.0039	0.0196
156	0.0237	0.0039	0.0198
157	0.0242	0.0040	0.0202
158	0.0245	0.0041	0.0204
159	0.0251	0.0042	0.0209
160	0.0253	0.0042	0.0211
161	0.0259	0.0043	0.0216
162	0.0263	0.0044	0.0219
163	0.0269	0.0045	0.0225
164	0.0273	0.0045	0.0227
165	0.0280	0.0047	0.0234
166	0.0284	0.0047	0.0237
167	0.0292	0.0049	0.0244
168	0.0297	0.0049	0.0247
169	0.0306	0.0051	0.0255
170	0.0311	0.0052	0.0260
171	0.0322	0.0053	0.0269
172	0.0328	0.0054	0.0273
173	0.0340	0.0057	0.0284
174	0.0347	0.0058	0.0289
175	0.0362	0.0060	0.0302
176	0.0370	0.0061	0.0308
177	0.0387	0.0064	0.0323
178	0.0397	0.0066	0.0331
179	0.0419	0.0070	0.0349
180	0.0431	0.0072	0.0359

181	0.0458	0.0076	0.0382
182	0.0474	0.0079	0.0395
183	0.0510	0.0085	0.0425
184	0.0531	0.0088	0.0443
185	0.0540	0.0090	0.0451
186	0.0571	0.0095	0.0476
187	0.0648	0.0108	0.0540
188	0.0698	0.0116	0.0583
189	0.0842	0.0130	0.0712
190	0.0950	0.0130	0.0821
191	0.1358	0.0130	0.1229
192	0.1868	0.0130	0.1738
193	0.5846	0.0130	0.5716
194	0.1106	0.0130	0.0977
195	0.0761	0.0126	0.0635
196	0.0606	0.0101	0.0505
197	0.0555	0.0092	0.0463
198	0.0491	0.0081	0.0409
199	0.0444	0.0074	0.0370
200	0.0407	0.0068	0.0340
201	0.0378	0.0063	0.0315
202	0.0354	0.0059	0.0295
203	0.0334	0.0055	0.0278
204	0.0317	0.0053	0.0264
205	0.0301	0.0050	0.0251
206	0.0288	0.0048	0.0240
207	0.0276	0.0046	0.0230
208	0.0266	0.0044	0.0222
209	0.0256	0.0043	0.0214
210	0.0248	0.0041	0.0207
211	0.0240	0.0040	0.0200
212	0.0233	0.0039	0.0194
213	0.0226	0.0038	0.0189
214	0.0220	0.0037	0.0183
215	0.0214	0.0036	0.0179
216	0.0209	0.0035	0.0174
217	0.0208	0.0035	0.0173
218	0.0203	0.0034	0.0170
219	0.0199	0.0033	0.0166
220	0.0195	0.0032	0.0162
221	0.0191	0.0032	0.0159
222	0.0187	0.0031	0.0156
223	0.0184	0.0030	0.0153
224	0.0180	0.0030	0.0150
225	0.0177	0.0029	0.0148
226	0.0174	0.0029	0.0145
227	0.0171	0.0028	0.0143
228	0.0169	0.0028	0.0141
229	0.0166	0.0028	0.0138
230	0.0163	0.0027	0.0136
231	0.0161	0.0027	0.0134
232	0.0159	0.0026	0.0132
233	0.0156	0.0026	0.0130
234	0.0154	0.0026	0.0129
235	0.0152	0.0025	0.0127
236	0.0150	0.0025	0.0125
237	0.0148	0.0025	0.0124
238	0.0146	0.0024	0.0122
239	0.0145	0.0024	0.0121

240	0.0143	0.0024	0.0119
241	0.0141	0.0023	0.0118
242	0.0140	0.0023	0.0116
243	0.0138	0.0023	0.0115
244	0.0137	0.0023	0.0114
245	0.0135	0.0022	0.0113
246	0.0134	0.0022	0.0111
247	0.0132	0.0022	0.0110
248	0.0131	0.0022	0.0109
249	0.0130	0.0022	0.0108
250	0.0128	0.0021	0.0107
251	0.0127	0.0021	0.0106
252	0.0126	0.0021	0.0105
253	0.0125	0.0021	0.0104
254	0.0124	0.0021	0.0103
255	0.0122	0.0020	0.0102
256	0.0121	0.0020	0.0101
257	0.0120	0.0020	0.0100
258	0.0119	0.0020	0.0099
259	0.0118	0.0020	0.0099
260	0.0117	0.0019	0.0098
261	0.0116	0.0019	0.0097
262	0.0115	0.0019	0.0096
263	0.0114	0.0019	0.0095
264	0.0114	0.0019	0.0095
265	0.0113	0.0019	0.0094
266	0.0112	0.0019	0.0093
267	0.0111	0.0018	0.0093
268	0.0110	0.0018	0.0092
269	0.0109	0.0018	0.0091
270	0.0108	0.0018	0.0090
271	0.0108	0.0018	0.0090
272	0.0107	0.0018	0.0089
273	0.0106	0.0018	0.0089
274	0.0105	0.0018	0.0088
275	0.0105	0.0017	0.0087
276	0.0104	0.0017	0.0087
277	0.0103	0.0017	0.0086
278	0.0103	0.0017	0.0086
279	0.0102	0.0017	0.0085
280	0.0101	0.0017	0.0085
281	0.0101	0.0017	0.0084
282	0.0100	0.0017	0.0083
283	0.0099	0.0017	0.0083
284	0.0099	0.0016	0.0082
285	0.0098	0.0016	0.0082
286	0.0098	0.0016	0.0081
287	0.0097	0.0016	0.0081
288	0.0096	0.0016	0.0080

Total soil rain loss = 0.92(In)
Total effective rainfall = 5.37(In)
Peak flow rate in flood hydrograph = 29.30(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	7.5	15.0	22.5	30.0
0+ 5	0.0004	0.06	Q				
0+10	0.0028	0.36	Q				
0+15	0.0072	0.63	Q				
0+20	0.0121	0.71	Q				
0+25	0.0171	0.72	Q				
0+30	0.0221	0.73	Q				
0+35	0.0272	0.74	Q				
0+40	0.0322	0.74	Q				
0+45	0.0373	0.74	Q				
0+50	0.0424	0.74	Q				
0+55	0.0476	0.74	Q				
1+ 0	0.0527	0.75	Q				
1+ 5	0.0579	0.75	Q				
1+10	0.0630	0.75	VQ				
1+15	0.0682	0.75	VQ				
1+20	0.0734	0.76	VQ				
1+25	0.0786	0.76	VQ				
1+30	0.0839	0.76	|Q				
1+35	0.0891	0.76	|Q				
1+40	0.0944	0.77	|Q				
1+45	0.0997	0.77	|Q				
1+50	0.1050	0.77	|Q				
1+55	0.1103	0.77	|Q				
2+ 0	0.1157	0.78	|Q				
2+ 5	0.1210	0.78	|Q				
2+10	0.1264	0.78	|Q				
2+15	0.1318	0.78	|Q				
2+20	0.1372	0.79	|Q				
2+25	0.1426	0.79	|Q				
2+30	0.1481	0.79	|Q				
2+35	0.1535	0.79	|Q				
2+40	0.1590	0.80	|Q				
2+45	0.1645	0.80	|Q				
2+50	0.1700	0.80	|QV				
2+55	0.1756	0.80	|QV				
3+ 0	0.1811	0.81	|QV				
3+ 5	0.1867	0.81	|QV				
3+10	0.1923	0.81	|QV				
3+15	0.1980	0.82	|QV				
3+20	0.2036	0.82	|QV				
3+25	0.2093	0.82	|QV				
3+30	0.2149	0.83	|QV				
3+35	0.2207	0.83	|QV				
3+40	0.2264	0.83	|QV				
3+45	0.2321	0.83	|QV				
3+50	0.2379	0.84	|QV				
3+55	0.2437	0.84	|QV				
4+ 0	0.2495	0.84	|QV				
4+ 5	0.2553	0.85	|Q V				
4+10	0.2612	0.85	|Q V				
4+15	0.2671	0.85	|Q V				
4+20	0.2730	0.86	|Q V				
4+25	0.2789	0.86	|Q V				
4+30	0.2849	0.86	|Q V				

4+35	0.2908	0.87	|Q V				
4+40	0.2968	0.87	|Q V				
4+45	0.3029	0.87	|Q V				
4+50	0.3089	0.88	|Q V				
4+55	0.3150	0.88	|Q V				
5+ 0	0.3211	0.89	|Q V				
5+ 5	0.3272	0.89	|Q V				
5+10	0.3333	0.89	|Q V				
5+15	0.3395	0.90	|Q V				
5+20	0.3457	0.90	|Q V				
5+25	0.3520	0.90	|Q V				
5+30	0.3582	0.91	|Q V				
5+35	0.3645	0.91	|Q V				
5+40	0.3708	0.92	|Q V				
5+45	0.3772	0.92	|Q V				
5+50	0.3835	0.92	|Q V				
5+55	0.3899	0.93	|Q V				
6+ 0	0.3963	0.93	|Q V				
6+ 5	0.4028	0.94	|Q V				
6+10	0.4093	0.94	|Q V				
6+15	0.4158	0.95	|Q V				
6+20	0.4224	0.95	|Q V				
6+25	0.4289	0.96	|Q V				
6+30	0.4355	0.96	|Q V				
6+35	0.4422	0.96	|Q V				
6+40	0.4489	0.97	|Q V				
6+45	0.4556	0.97	|Q V				
6+50	0.4623	0.98	|Q V				
6+55	0.4691	0.98	|Q V				
7+ 0	0.4759	0.99	|Q V				
7+ 5	0.4827	0.99	|Q V				
7+10	0.4896	1.00	|Q V				
7+15	0.4965	1.00	|Q V				
7+20	0.5035	1.01	|Q V				
7+25	0.5105	1.01	|Q V				
7+30	0.5175	1.02	|Q V				
7+35	0.5246	1.03	|Q V				
7+40	0.5317	1.03	|Q V				
7+45	0.5388	1.04	|Q V				
7+50	0.5460	1.04	|Q V				
7+55	0.5532	1.05	|Q V				
8+ 0	0.5605	1.05	|Q V				
8+ 5	0.5678	1.06	|Q V				
8+10	0.5751	1.07	|Q V				
8+15	0.5825	1.07	|Q V				
8+20	0.5899	1.08	|Q V				
8+25	0.5974	1.09	|Q V				
8+30	0.6049	1.09	|Q V				
8+35	0.6125	1.10	|Q V				
8+40	0.6201	1.11	|Q V				
8+45	0.6278	1.11	|Q V				
8+50	0.6355	1.12	|Q V				
8+55	0.6433	1.13	|Q V				
9+ 0	0.6511	1.13	|Q V				
9+ 5	0.6589	1.14	|Q V				
9+10	0.6669	1.15	|Q V				
9+15	0.6748	1.16	|Q V				
9+20	0.6829	1.16	|Q V				
9+25	0.6909	1.17	|Q V				

9+30	0.6991	1.18	Q V				
9+35	0.7073	1.19	Q V				
9+40	0.7155	1.20	Q V				
9+45	0.7238	1.21	Q V				
9+50	0.7322	1.22	Q V				
9+55	0.7406	1.22	Q V				
10+ 0	0.7491	1.23	Q V				
10+ 5	0.7577	1.24	Q V				
10+10	0.7663	1.25	Q V				
10+15	0.7750	1.26	Q V				
10+20	0.7837	1.27	Q V				
10+25	0.7926	1.28	Q V				
10+30	0.8015	1.29	Q V				
10+35	0.8105	1.30	Q V				
10+40	0.8195	1.31	Q V				
10+45	0.8286	1.33	Q V				
10+50	0.8379	1.34	Q V				
10+55	0.8472	1.35	Q V				
11+ 0	0.8565	1.36	Q V				
11+ 5	0.8660	1.37	Q V				
11+10	0.8755	1.39	Q V				
11+15	0.8852	1.40	Q V				
11+20	0.8949	1.41	Q V				
11+25	0.9047	1.43	Q V				
11+30	0.9146	1.44	Q V				
11+35	0.9247	1.45	Q V				
11+40	0.9348	1.47	Q V				
11+45	0.9450	1.49	Q V				
11+50	0.9554	1.50	Q V				
11+55	0.9658	1.52	Q V				
12+ 0	0.9764	1.53	Q V				
12+ 5	0.9870	1.55	Q V				
12+10	0.9977	1.55	Q V				
12+15	1.0085	1.56	Q V				
12+20	1.0194	1.58	Q V				
12+25	1.0304	1.60	Q V				
12+30	1.0415	1.62	Q V				
12+35	1.0528	1.64	Q V				
12+40	1.0642	1.66	Q V				
12+45	1.0758	1.68	Q V				
12+50	1.0875	1.71	Q V				
12+55	1.0994	1.73	Q V				
13+ 0	1.1115	1.76	Q V				
13+ 5	1.1238	1.78	Q V				
13+10	1.1363	1.81	Q V				
13+15	1.1489	1.84	Q V				
13+20	1.1618	1.87	Q V				
13+25	1.1749	1.90	Q V				
13+30	1.1882	1.93	Q V				
13+35	1.2018	1.97	Q V				
13+40	1.2156	2.01	Q V				
13+45	1.2296	2.04	Q V				
13+50	1.2440	2.08	Q V				
13+55	1.2586	2.13	Q V				
14+ 0	1.2736	2.17	Q V				
14+ 5	1.2889	2.22	Q V				
14+10	1.3046	2.27	Q V				
14+15	1.3206	2.33	Q V				
14+20	1.3370	2.39	Q V				

14+25	1.3539	2.45	Q V				
14+30	1.3713	2.52	Q V				
14+35	1.3891	2.59	Q V				
14+40	1.4075	2.67	Q V				
14+45	1.4265	2.76	Q V				
14+50	1.4461	2.85	Q V				
14+55	1.4665	2.95	Q V				
15+ 0	1.4876	3.07	Q V				
15+ 5	1.5097	3.20	Q V				
15+10	1.5327	3.35	Q V				
15+15	1.5569	3.51	Q V				
15+20	1.5824	3.70	Q V				
15+25	1.6092	3.89	Q V				
15+30	1.6370	4.03	Q V				
15+35	1.6660	4.22	Q V				
15+40	1.6977	4.59	Q V				
15+45	1.7327	5.09	Q V				
15+50	1.7731	5.86	Q V				
15+55	1.8216	7.05	Q V				
16+ 0	1.8866	9.44	Q V				
16+ 5	1.9947	15.69	Q V				
16+10	2.1965	29.30	V	Q			
16+15	2.3724	25.54	V	Q			
16+20	2.4546	11.92	Q V				
16+25	2.4989	6.43	Q V				
16+30	2.5330	4.96	Q V				
16+35	2.5608	4.04	Q V				
16+40	2.5856	3.60	Q V				
16+45	2.6080	3.26	Q V				
16+50	2.6287	3.01	Q V				
16+55	2.6480	2.80	Q V				
17+ 0	2.6661	2.62	Q V				
17+ 5	2.6831	2.48	Q V				
17+10	2.6993	2.35	Q V				
17+15	2.7147	2.24	Q V				
17+20	2.7295	2.14	Q V				
17+25	2.7437	2.06	Q V				
17+30	2.7573	1.98	Q V				
17+35	2.7705	1.91	Q V				
17+40	2.7832	1.85	Q V				
17+45	2.7956	1.79	Q V				
17+50	2.8076	1.74	Q V				
17+55	2.8192	1.69	Q V				
18+ 0	2.8305	1.64	Q V				
18+ 5	2.8416	1.61	Q V				
18+10	2.8525	1.58	Q V				
18+15	2.8632	1.55	Q V				
18+20	2.8736	1.52	Q V				
18+25	2.8839	1.49	Q V				
18+30	2.8940	1.46	Q V				
18+35	2.9038	1.43	Q V				
18+40	2.9135	1.40	Q V				
18+45	2.9230	1.38	Q V				
18+50	2.9323	1.35	Q V				
18+55	2.9415	1.33	Q V				
19+ 0	2.9505	1.31	Q V				
19+ 5	2.9593	1.29	Q V				
19+10	2.9680	1.27	Q V				
19+15	2.9766	1.25	Q V				

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19+20       2.9851      1.23  |Q        |         |         |    V    |
19+25       2.9934      1.21  |Q        |         |         |    V    |
19+30       3.0016      1.19  |Q        |         |         |    V    |
19+35       3.0097      1.18  |Q        |         |         |    V    |
19+40       3.0177      1.16  |Q        |         |         |     V   |
19+45       3.0256      1.14  |Q        |         |         |     V   |
19+50       3.0333      1.13  |Q        |         |         |     V   |
19+55       3.0410      1.12  |Q        |         |         |     V   |
20+ 0       3.0486      1.10  |Q        |         |         |     V   |
20+ 5       3.0561      1.09  |Q        |         |         |     V   |
20+10       3.0635      1.08  |Q        |         |         |     V   |
20+15       3.0708      1.06  |Q        |         |         |     V   |
20+20       3.0781      1.05  |Q        |         |         |     V   |
20+25       3.0852      1.04  |Q        |         |         |     V   |
20+30       3.0923      1.03  |Q        |         |         |     V   |
20+35       3.0993      1.02  |Q        |         |         |      V  |
20+40       3.1062      1.01  |Q        |         |         |      V  |
20+45       3.1131      1.00  |Q        |         |         |      V  |
20+50       3.1199      0.99  |Q        |         |         |      V  |
20+55       3.1266      0.98  |Q        |         |         |      V  |
21+ 0       3.1332      0.97  |Q        |         |         |      V  |
21+ 5       3.1398      0.96  |Q        |         |         |      V  |
21+10       3.1463      0.95  |Q        |         |         |      V  |
21+15       3.1528      0.94  |Q        |         |         |      V  |
21+20       3.1592      0.93  |Q        |         |         |      V  |
21+25       3.1656      0.92  |Q        |         |         |      V  |
21+30       3.1719      0.91  |Q        |         |         |      V  |
21+35       3.1781      0.91  |Q        |         |         |      V  |
21+40       3.1843      0.90  |Q        |         |         |       V |
21+45       3.1904      0.89  |Q        |         |         |       V |
21+50       3.1965      0.88  |Q        |         |         |       V |
21+55       3.2025      0.88  |Q        |         |         |       V |
22+ 0       3.2085      0.87  |Q        |         |         |       V |
22+ 5       3.2144      0.86  |Q        |         |         |       V |
22+10       3.2203      0.86  |Q        |         |         |       V |
22+15       3.2262      0.85  |Q        |         |         |       V |
22+20       3.2320      0.84  |Q        |         |         |       V |
22+25       3.2377      0.84  |Q        |         |         |       V |
22+30       3.2434      0.83  |Q        |         |         |       V |
22+35       3.2491      0.82  |Q        |         |         |       V |
22+40       3.2547      0.82  |Q        |         |         |       V |
22+45       3.2603      0.81  |Q        |         |         |       V |
22+50       3.2659      0.81  |Q        |         |         |        V|
22+55       3.2714      0.80  |Q        |         |         |        V|
23+ 0       3.2769      0.79  |Q        |         |         |        V|
23+ 5       3.2823      0.79  |Q        |         |         |        V|
23+10       3.2877      0.78  |Q        |         |         |        V|
23+15       3.2930      0.78  |Q        |         |         |        V|
23+20       3.2984      0.77  |Q        |         |         |        V|
23+25       3.3037      0.77  |Q        |         |         |        V|
23+30       3.3089      0.76  |Q        |         |         |        V|
23+35       3.3142      0.76  |Q        |         |         |        V|
23+40       3.3193      0.75  |Q        |         |         |        V|
23+45       3.3245      0.75  Q         |         |         |        V|
23+50       3.3296      0.74  Q         |         |         |        V|
23+55       3.3347      0.74  Q         |         |         |        V|
24+ 0       3.3398      0.74  Q         |         |         |        V|
24+ 5       3.3444      0.67  Q         |         |         |        V|
24+10       3.3470      0.37  Q         |         |         |        V|
```



```
24+15       3.3477      0.10  Q         |         |         |        V|
24+20       3.3478      0.02  Q         |         |         |        V|
24+25       3.3479      0.01  Q         |         |         |        V|
-------------------------------------------------------------------------
```

APPENDIX A.7: UNIT HYDROGRAPH, AREA "7"

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/20/19

++

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

Program License Serial Number 6279

BNSF
EXISTING HYDROLOGY
AREA 7

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
1.64	1	1.58
Rainfall data for year 100		
1.64	6	3.42
Rainfall data for year 100		
1.64	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
74.7	90.8	1.64	1.000	0.178	0.730	0.130

Area-averaged adjusted loss rate Fm (In/Hr) = 0.130

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
1.20	0.730	74.7	90.8	1.02	0.829
0.44	0.270	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.865
Area-averaged low loss fraction, Yb = 0.135

++
Watercourse length = 598.00(Ft.)
Length from concentration point to centroid = 231.00(Ft.)
Elevation difference along watercourse = 10.00(Ft.)
Mannings friction factor along watercourse = 0.025
Watershed area = 1.64(Ac.)
Catchment Lag time = 0.034 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 244.4992
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.130(In/Hr)
Average low loss rate fraction (Yb) = 0.135 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 1.64(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.585(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.580(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 19.83 (CFS))		
1	57.119	11.329
2	100.000	8.505

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5847	0.5847
2	0.7715	0.1868
3	0.9074	0.1359
4	1.0181	0.1107
5	1.1131	0.0950
6	1.1973	0.0842
7	1.2735	0.0762

8	1.3433	0.0699
9	1.4081	0.0648
10	1.4688	0.0606
11	1.5258	0.0571
12	1.5799	0.0540
13	1.6353	0.0555
14	1.6884	0.0531
15	1.7394	0.0510
16	1.7885	0.0491
17	1.8358	0.0474
18	1.8816	0.0458
19	1.9260	0.0444
20	1.9690	0.0431
21	2.0109	0.0418
22	2.0516	0.0407
23	2.0913	0.0397
24	2.1300	0.0387
25	2.1678	0.0378
26	2.2048	0.0370
27	2.2409	0.0362
28	2.2763	0.0354
29	2.3110	0.0347
30	2.3451	0.0340
31	2.3784	0.0334
32	2.4112	0.0328
33	2.4434	0.0322
34	2.4750	0.0316
35	2.5062	0.0311
36	2.5368	0.0306
37	2.5669	0.0301
38	2.5966	0.0297
39	2.6258	0.0292
40	2.6546	0.0288
41	2.6830	0.0284
42	2.7110	0.0280
43	2.7387	0.0276
44	2.7659	0.0273
45	2.7929	0.0269
46	2.8195	0.0266
47	2.8457	0.0263
48	2.8716	0.0259
49	2.8973	0.0256
50	2.9226	0.0253
51	2.9477	0.0251
52	2.9724	0.0248
53	2.9969	0.0245
54	3.0212	0.0242
55	3.0452	0.0240
56	3.0689	0.0237
57	3.0924	0.0235
58	3.1157	0.0233
59	3.1387	0.0230
60	3.1615	0.0228
61	3.1841	0.0226
62	3.2065	0.0224
63	3.2287	0.0222
64	3.2507	0.0220
65	3.2725	0.0218
66	3.2941	0.0216
67	3.3155	0.0214
68	3.3368	0.0212
69	3.3578	0.0211
70	3.3787	0.0209
71	3.3994	0.0207
72	3.4200	0.0206
73	3.4408	0.0208
74	3.4614	0.0206
75	3.4819	0.0205
76	3.5022	0.0203
77	3.5224	0.0202
78	3.5424	0.0200
79	3.5623	0.0199
80	3.5821	0.0197
81	3.6017	0.0196
82	3.6212	0.0195
83	3.6405	0.0193
84	3.6597	0.0192
85	3.6788	0.0191
86	3.6978	0.0190
87	3.7166	0.0188
88	3.7353	0.0187
89	3.7539	0.0186
90	3.7724	0.0185
91	3.7908	0.0184
92	3.8090	0.0183
93	3.8272	0.0181
94	3.8452	0.0180
95	3.8631	0.0179
96	3.8810	0.0178
97	3.8987	0.0177
98	3.9163	0.0176
99	3.9338	0.0175
100	3.9512	0.0174
101	3.9685	0.0173
102	3.9858	0.0172
103	4.0029	0.0171
104	4.0199	0.0170
105	4.0369	0.0169
106	4.0537	0.0169
107	4.0705	0.0168
108	4.0872	0.0167
109	4.1038	0.0166
110	4.1203	0.0165
111	4.1367	0.0164
112	4.1530	0.0163
113	4.1693	0.0163
114	4.1855	0.0162
115	4.2016	0.0161
116	4.2176	0.0160
117	4.2335	0.0159
118	4.2494	0.0159
119	4.2652	0.0158
120	4.2809	0.0157
121	4.2965	0.0156
122	4.3121	0.0156
123	4.3276	0.0155
124	4.3430	0.0154
125	4.3584	0.0154
126	4.3737	0.0153
127	4.3889	0.0152

128	4.4041	0.0152
129	4.4192	0.0151
130	4.4342	0.0150
131	4.4491	0.0150
132	4.4640	0.0149
133	4.4789	0.0148
134	4.4936	0.0148
135	4.5083	0.0147
136	4.5230	0.0146
137	4.5376	0.0146
138	4.5521	0.0145
139	4.5666	0.0145
140	4.5810	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6239	0.0142
144	4.6381	0.0142
145	4.6522	0.0141
146	4.6663	0.0141
147	4.6803	0.0140
148	4.6943	0.0140
149	4.7082	0.0139
150	4.7220	0.0139
151	4.7358	0.0138
152	4.7496	0.0138
153	4.7633	0.0137
154	4.7770	0.0137
155	4.7906	0.0136
156	4.8041	0.0136
157	4.8177	0.0135
158	4.8311	0.0135
159	4.8445	0.0134
160	4.8579	0.0134
161	4.8712	0.0133
162	4.8845	0.0133
163	4.8977	0.0132
164	4.9109	0.0132
165	4.9241	0.0131
166	4.9371	0.0131
167	4.9502	0.0131
168	4.9632	0.0130
169	4.9762	0.0130
170	4.9891	0.0129
171	5.0020	0.0129
172	5.0148	0.0128
173	5.0276	0.0128
174	5.0404	0.0128
175	5.0531	0.0127
176	5.0657	0.0127
177	5.0784	0.0126
178	5.0910	0.0126
179	5.1035	0.0126
180	5.1160	0.0125
181	5.1285	0.0125
182	5.1409	0.0124
183	5.1533	0.0124
184	5.1657	0.0124
185	5.1780	0.0123
186	5.1903	0.0123
187	5.2025	0.0122
188	5.2147	0.0122
189	5.2269	0.0122
190	5.2391	0.0121
191	5.2512	0.0121
192	5.2632	0.0121
193	5.2753	0.0120
194	5.2872	0.0120
195	5.2992	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3349	0.0119
199	5.3467	0.0118
200	5.3585	0.0118
201	5.3703	0.0118
202	5.3820	0.0117
203	5.3937	0.0117
204	5.4054	0.0117
205	5.4170	0.0116
206	5.4286	0.0116
207	5.4401	0.0116
208	5.4517	0.0115
209	5.4632	0.0115
210	5.4747	0.0115
211	5.4861	0.0114
212	5.4975	0.0114
213	5.5089	0.0114
214	5.5203	0.0114
215	5.5316	0.0113
216	5.5429	0.0113
217	5.5541	0.0113
218	5.5654	0.0112
219	5.5766	0.0112
220	5.5878	0.0112
221	5.5989	0.0111
222	5.6100	0.0111
223	5.6211	0.0111
224	5.6322	0.0111
225	5.6432	0.0110
226	5.6542	0.0110
227	5.6652	0.0110
228	5.6762	0.0110
229	5.6871	0.0109
230	5.6980	0.0109
231	5.7089	0.0109
232	5.7197	0.0108
233	5.7306	0.0108
234	5.7414	0.0108
235	5.7521	0.0108
236	5.7629	0.0107
237	5.7736	0.0107
238	5.7843	0.0107
239	5.7950	0.0107
240	5.8056	0.0106
241	5.8162	0.0106
242	5.8268	0.0106
243	5.8374	0.0106
244	5.8479	0.0105
245	5.8585	0.0105
246	5.8689	0.0105
247	5.8794	0.0105

248	5.8899	0.0105
249	5.9003	0.0104
250	5.9107	0.0104
251	5.9211	0.0104
252	5.9314	0.0104
253	5.9418	0.0103
254	5.9521	0.0103
255	5.9624	0.0103
256	5.9726	0.0103
257	5.9829	0.0102
258	5.9931	0.0102
259	6.0033	0.0102
260	6.0135	0.0102
261	6.0236	0.0102
262	6.0338	0.0101
263	6.0439	0.0101
264	6.0540	0.0101
265	6.0640	0.0101
266	6.0741	0.0100
267	6.0841	0.0100
268	6.0941	0.0100
269	6.1041	0.0100
270	6.1141	0.0100
271	6.1240	0.0099
272	6.1339	0.0099
273	6.1438	0.0099
274	6.1537	0.0099
275	6.1636	0.0099
276	6.1734	0.0098
277	6.1832	0.0098
278	6.1930	0.0098
279	6.2028	0.0098
280	6.2126	0.0098
281	6.2223	0.0097
282	6.2320	0.0097
283	6.2418	0.0097
284	6.2514	0.0097
285	6.2611	0.0097
286	6.2708	0.0096
287	6.2804	0.0096
288	6.2900	0.0096

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0013	0.0083
2	0.0096	0.0013	0.0083
3	0.0097	0.0013	0.0084
4	0.0097	0.0013	0.0084
5	0.0097	0.0013	0.0084
6	0.0097	0.0013	0.0084
7	0.0098	0.0013	0.0085
8	0.0098	0.0013	0.0085
9	0.0098	0.0013	0.0085
10	0.0099	0.0013	0.0085
11	0.0099	0.0013	0.0086
12	0.0099	0.0013	0.0086
13	0.0100	0.0013	0.0086
14	0.0100	0.0013	0.0086
15	0.0100	0.0014	0.0087
16	0.0100	0.0014	0.0087
17	0.0101	0.0014	0.0087
18	0.0101	0.0014	0.0087
19	0.0102	0.0014	0.0088
20	0.0102	0.0014	0.0088
21	0.0102	0.0014	0.0088
22	0.0102	0.0014	0.0089
23	0.0103	0.0014	0.0089
24	0.0103	0.0014	0.0089
25	0.0104	0.0014	0.0090
26	0.0104	0.0014	0.0090
27	0.0104	0.0014	0.0090
28	0.0105	0.0014	0.0090
29	0.0105	0.0014	0.0091
30	0.0105	0.0014	0.0091
31	0.0106	0.0014	0.0091
32	0.0106	0.0014	0.0092
33	0.0106	0.0014	0.0092
34	0.0107	0.0014	0.0092
35	0.0107	0.0014	0.0093
36	0.0107	0.0015	0.0093
37	0.0108	0.0015	0.0093
38	0.0108	0.0015	0.0094
39	0.0109	0.0015	0.0094
40	0.0109	0.0015	0.0094
41	0.0110	0.0015	0.0095
42	0.0110	0.0015	0.0095
43	0.0110	0.0015	0.0095
44	0.0111	0.0015	0.0096
45	0.0111	0.0015	0.0096
46	0.0111	0.0015	0.0096
47	0.0112	0.0015	0.0097
48	0.0112	0.0015	0.0097
49	0.0113	0.0015	0.0098
50	0.0113	0.0015	0.0098
51	0.0114	0.0015	0.0098
52	0.0114	0.0015	0.0099
53	0.0115	0.0015	0.0099
54	0.0115	0.0016	0.0100
55	0.0116	0.0016	0.0100
56	0.0116	0.0016	0.0100
57	0.0117	0.0016	0.0101
58	0.0117	0.0016	0.0101
59	0.0118	0.0016	0.0102
60	0.0118	0.0016	0.0102
61	0.0119	0.0016	0.0103
62	0.0119	0.0016	0.0103
63	0.0120	0.0016	0.0103
64	0.0120	0.0016	0.0104
65	0.0121	0.0016	0.0104
66	0.0121	0.0016	0.0105
67	0.0122	0.0016	0.0105
68	0.0122	0.0016	0.0106
69	0.0123	0.0017	0.0106
70	0.0123	0.0017	0.0107
71	0.0124	0.0017	0.0107
72	0.0124	0.0017	0.0108
73	0.0125	0.0017	0.0108
74	0.0126	0.0017	0.0109

75	0.0126	0.0017	0.0109	135	0.0188	0.0025	0.0163
76	0.0127	0.0017	0.0110	136	0.0190	0.0026	0.0164
77	0.0128	0.0017	0.0110	137	0.0192	0.0026	0.0166
78	0.0128	0.0017	0.0111	138	0.0193	0.0026	0.0167
79	0.0129	0.0017	0.0111	139	0.0196	0.0026	0.0170
80	0.0129	0.0017	0.0112	140	0.0197	0.0027	0.0171
81	0.0130	0.0018	0.0112	141	0.0200	0.0027	0.0173
82	0.0131	0.0018	0.0113	142	0.0202	0.0027	0.0175
83	0.0131	0.0018	0.0114	143	0.0205	0.0028	0.0177
84	0.0132	0.0018	0.0114	144	0.0206	0.0028	0.0179
85	0.0133	0.0018	0.0115	145	0.0206	0.0028	0.0178
86	0.0133	0.0018	0.0115	146	0.0207	0.0028	0.0179
87	0.0134	0.0018	0.0116	147	0.0211	0.0028	0.0182
88	0.0135	0.0018	0.0116	148	0.0212	0.0029	0.0184
89	0.0136	0.0018	0.0117	149	0.0216	0.0029	0.0187
90	0.0136	0.0018	0.0118	150	0.0218	0.0029	0.0189
91	0.0137	0.0019	0.0119	151	0.0222	0.0030	0.0192
92	0.0138	0.0019	0.0119	152	0.0224	0.0030	0.0194
93	0.0139	0.0019	0.0120	153	0.0228	0.0031	0.0197
94	0.0139	0.0019	0.0120	154	0.0230	0.0031	0.0199
95	0.0140	0.0019	0.0121	155	0.0235	0.0032	0.0203
96	0.0141	0.0019	0.0122	156	0.0237	0.0032	0.0205
97	0.0142	0.0019	0.0123	157	0.0242	0.0033	0.0210
98	0.0142	0.0019	0.0123	158	0.0245	0.0033	0.0212
99	0.0144	0.0019	0.0124	159	0.0251	0.0034	0.0217
100	0.0144	0.0019	0.0125	160	0.0253	0.0034	0.0219
101	0.0145	0.0020	0.0126	161	0.0259	0.0035	0.0224
102	0.0146	0.0020	0.0126	162	0.0263	0.0035	0.0227
103	0.0147	0.0020	0.0127	163	0.0269	0.0036	0.0233
104	0.0148	0.0020	0.0128	164	0.0273	0.0037	0.0236
105	0.0149	0.0020	0.0129	165	0.0280	0.0038	0.0242
106	0.0150	0.0020	0.0129	166	0.0284	0.0038	0.0246
107	0.0151	0.0020	0.0131	167	0.0292	0.0039	0.0253
108	0.0152	0.0020	0.0131	168	0.0297	0.0040	0.0257
109	0.0153	0.0021	0.0132	169	0.0306	0.0041	0.0265
110	0.0154	0.0021	0.0133	170	0.0311	0.0042	0.0269
111	0.0155	0.0021	0.0134	171	0.0322	0.0043	0.0278
112	0.0156	0.0021	0.0135	172	0.0328	0.0044	0.0283
113	0.0157	0.0021	0.0136	173	0.0340	0.0046	0.0294
114	0.0158	0.0021	0.0137	174	0.0347	0.0047	0.0300
115	0.0159	0.0022	0.0138	175	0.0362	0.0049	0.0313
116	0.0160	0.0022	0.0139	176	0.0370	0.0050	0.0320
117	0.0162	0.0022	0.0140	177	0.0387	0.0052	0.0335
118	0.0163	0.0022	0.0141	178	0.0397	0.0054	0.0343
119	0.0164	0.0022	0.0142	179	0.0418	0.0057	0.0362
120	0.0165	0.0022	0.0143	180	0.0431	0.0058	0.0372
121	0.0167	0.0023	0.0144	181	0.0458	0.0062	0.0396
122	0.0168	0.0023	0.0145	182	0.0474	0.0064	0.0410
123	0.0169	0.0023	0.0147	183	0.0510	0.0069	0.0441
124	0.0170	0.0023	0.0147	184	0.0531	0.0072	0.0459
125	0.0172	0.0023	0.0149	185	0.0540	0.0073	0.0467
126	0.0173	0.0023	0.0150	186	0.0571	0.0077	0.0494
127	0.0175	0.0024	0.0151	187	0.0648	0.0088	0.0560
128	0.0176	0.0024	0.0152	188	0.0699	0.0094	0.0604
129	0.0178	0.0024	0.0154	189	0.0842	0.0108	0.0734
130	0.0179	0.0024	0.0155	190	0.0950	0.0108	0.0842
131	0.0181	0.0025	0.0157	191	0.1359	0.0108	0.1250
132	0.0183	0.0025	0.0158	192	0.1868	0.0108	0.1760
133	0.0185	0.0025	0.0160	193	0.5847	0.0108	0.5739
134	0.0186	0.0025	0.0161	194	0.1107	0.0108	0.0998

195	0.0762	0.0103	0.0659
196	0.0606	0.0082	0.0524
197	0.0555	0.0075	0.0480
198	0.0491	0.0066	0.0424
199	0.0444	0.0060	0.0384
200	0.0407	0.0055	0.0352
201	0.0378	0.0051	0.0327
202	0.0354	0.0048	0.0306
203	0.0334	0.0045	0.0289
204	0.0316	0.0043	0.0274
205	0.0301	0.0041	0.0261
206	0.0288	0.0039	0.0249
207	0.0276	0.0037	0.0239
208	0.0266	0.0036	0.0230
209	0.0256	0.0035	0.0222
210	0.0248	0.0033	0.0214
211	0.0240	0.0032	0.0207
212	0.0233	0.0031	0.0201
213	0.0226	0.0031	0.0195
214	0.0220	0.0030	0.0190
215	0.0214	0.0029	0.0185
216	0.0209	0.0028	0.0181
217	0.0208	0.0028	0.0180
218	0.0203	0.0027	0.0176
219	0.0199	0.0027	0.0172
220	0.0195	0.0026	0.0168
221	0.0191	0.0026	0.0165
222	0.0187	0.0025	0.0162
223	0.0184	0.0025	0.0159
224	0.0180	0.0024	0.0156
225	0.0177	0.0024	0.0153
226	0.0174	0.0024	0.0151
227	0.0171	0.0023	0.0148
228	0.0169	0.0023	0.0146
229	0.0166	0.0022	0.0143
230	0.0163	0.0022	0.0141
231	0.0161	0.0022	0.0139
232	0.0159	0.0021	0.0137
233	0.0156	0.0021	0.0135
234	0.0154	0.0021	0.0133
235	0.0152	0.0021	0.0132
236	0.0150	0.0020	0.0130
237	0.0148	0.0020	0.0128
238	0.0146	0.0020	0.0127
239	0.0145	0.0020	0.0125
240	0.0143	0.0019	0.0124
241	0.0141	0.0019	0.0122
242	0.0140	0.0019	0.0121
243	0.0138	0.0019	0.0119
244	0.0137	0.0018	0.0118
245	0.0135	0.0018	0.0117
246	0.0134	0.0018	0.0116
247	0.0132	0.0018	0.0114
248	0.0131	0.0018	0.0113
249	0.0130	0.0018	0.0112
250	0.0128	0.0017	0.0111
251	0.0127	0.0017	0.0110
252	0.0126	0.0017	0.0109
253	0.0125	0.0017	0.0108
254	0.0124	0.0017	0.0107
255	0.0122	0.0017	0.0106
256	0.0121	0.0016	0.0105
257	0.0120	0.0016	0.0104
258	0.0119	0.0016	0.0103
259	0.0118	0.0016	0.0102
260	0.0117	0.0016	0.0101
261	0.0116	0.0016	0.0101
262	0.0115	0.0016	0.0100
263	0.0114	0.0015	0.0099
264	0.0114	0.0015	0.0098
265	0.0113	0.0015	0.0097
266	0.0112	0.0015	0.0097
267	0.0111	0.0015	0.0096
268	0.0110	0.0015	0.0095
269	0.0109	0.0015	0.0095
270	0.0108	0.0015	0.0094
271	0.0108	0.0015	0.0093
272	0.0107	0.0014	0.0093
273	0.0106	0.0014	0.0092
274	0.0105	0.0014	0.0091
275	0.0105	0.0014	0.0091
276	0.0104	0.0014	0.0090
277	0.0103	0.0014	0.0089
278	0.0103	0.0014	0.0089
279	0.0102	0.0014	0.0088
280	0.0101	0.0014	0.0088
281	0.0101	0.0014	0.0087
282	0.0100	0.0014	0.0087
283	0.0099	0.0013	0.0086
284	0.0099	0.0013	0.0085
285	0.0098	0.0013	0.0085
286	0.0098	0.0013	0.0084
287	0.0097	0.0013	0.0084
288	0.0096	0.0013	0.0083

Total soil rain loss = 0.75(In)
Total effective rainfall = 5.54(In)
Peak flow rate in flood hydrograph = 8.00(CFS)

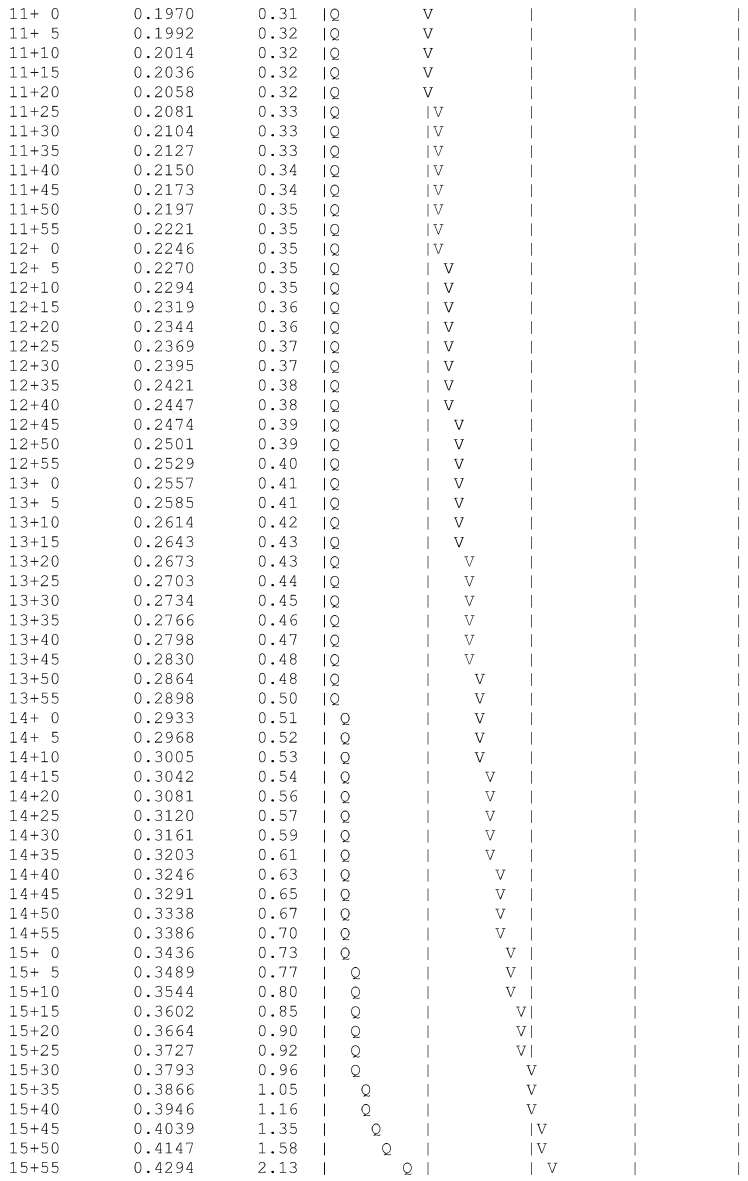
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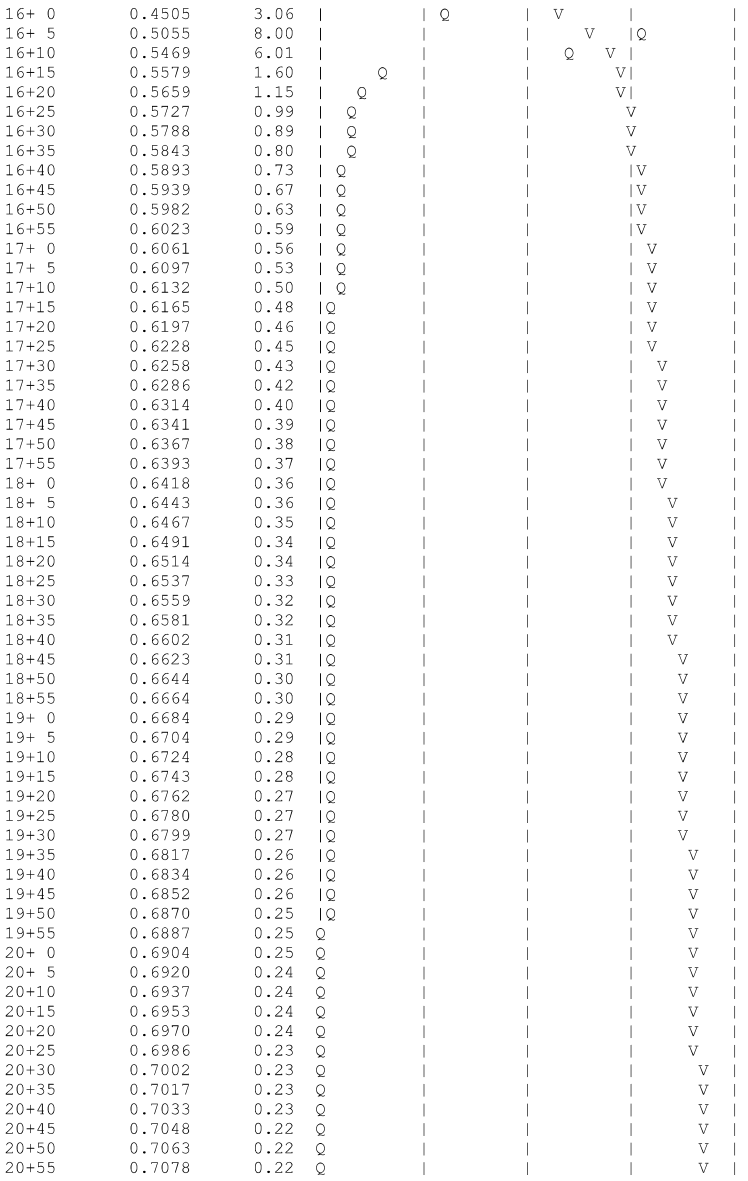
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

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	0.0006	0.09	Q	|	|	|	|
0+10	0.0018	0.17	Q	|	|	|	|
0+15	0.0029	0.17	Q	|	|	|	|
0+20	0.0041	0.17	Q	|	|	|	|
0+25	0.0052	0.17	Q	|	|	|	|
0+30	0.0064	0.17	Q	|	|	|	|
0+35	0.0075	0.17	Q	|	|	|	|
0+40	0.0087	0.17	Q	|	|	|	|
0+45	0.0098	0.17	Q	|	|	|	|
0+50	0.0110	0.17	Q	|	|	|	|
0+55	0.0122	0.17	Q	|	|	|	|

1+ 0	0.0133	0.17	Q				
1+ 5	0.0145	0.17	Q				
1+10	0.0157	0.17	Q				
1+15	0.0169	0.17	Q				
1+20	0.0181	0.17	Q				
1+25	0.0193	0.17	QV				
1+30	0.0204	0.17	QV				
1+35	0.0216	0.17	QV				
1+40	0.0228	0.17	QV				
1+45	0.0240	0.18	QV				
1+50	0.0253	0.18	QV				
1+55	0.0265	0.18	QV				
2+ 0	0.0277	0.18	QV				
2+ 5	0.0289	0.18	QV				
2+10	0.0301	0.18	QV				
2+15	0.0314	0.18	QV				
2+20	0.0326	0.18	QV				
2+25	0.0338	0.18	QV				
2+30	0.0351	0.18	QV				
2+35	0.0363	0.18	QV				
2+40	0.0376	0.18	QV				
2+45	0.0388	0.18	Q V				
2+50	0.0401	0.18	Q V				
2+55	0.0414	0.18	Q V				
3+ 0	0.0426	0.18	Q V				
3+ 5	0.0439	0.18	Q V				
3+10	0.0452	0.19	Q V				
3+15	0.0465	0.19	Q V				
3+20	0.0477	0.19	Q V				
3+25	0.0490	0.19	Q V				
3+30	0.0503	0.19	Q V				
3+35	0.0516	0.19	Q V				
3+40	0.0529	0.19	Q V				
3+45	0.0542	0.19	Q V				
3+50	0.0556	0.19	Q V				
3+55	0.0569	0.19	Q V				
4+ 0	0.0582	0.19	Q V				
4+ 5	0.0595	0.19	Q V				
4+10	0.0609	0.19	Q V				
4+15	0.0622	0.19	Q V				
4+20	0.0636	0.20	Q V				
4+25	0.0649	0.20	Q V				
4+30	0.0663	0.20	Q V				
4+35	0.0676	0.20	Q V				
4+40	0.0690	0.20	Q V				
4+45	0.0704	0.20	Q V				
4+50	0.0718	0.20	Q V				
4+55	0.0731	0.20	Q V				
5+ 0	0.0745	0.20	Q V				
5+ 5	0.0759	0.20	Q V				
5+10	0.0773	0.20	Q V				
5+15	0.0788	0.20	Q V				
5+20	0.0802	0.21	Q V				
5+25	0.0816	0.21	Q V				
5+30	0.0830	0.21	Q V				
5+35	0.0845	0.21	Q V				
5+40	0.0859	0.21	Q V				
5+45	0.0873	0.21	Q V				
5+50	0.0888	0.21	Q V				
5+55	0.0903	0.21	Q V				
6+ 0	0.0917	0.21	Q V				
6+ 5	0.0932	0.21	Q V				
6+10	0.0947	0.22	Q V				
6+15	0.0962	0.22	Q V				
6+20	0.0977	0.22	Q V				
6+25	0.0992	0.22	Q V				
6+30	0.1007	0.22	Q V				
6+35	0.1022	0.22	Q V				
6+40	0.1037	0.22	Q V				
6+45	0.1052	0.22	Q V				
6+50	0.1068	0.22	Q V				
6+55	0.1083	0.22	Q V				
7+ 0	0.1099	0.23	Q V				
7+ 5	0.1115	0.23	Q V				
7+10	0.1130	0.23	Q V				
7+15	0.1146	0.23	Q V				
7+20	0.1162	0.23	Q V				
7+25	0.1178	0.23	Q V				
7+30	0.1194	0.23	Q V				
7+35	0.1210	0.23	Q V				
7+40	0.1226	0.24	Q V				
7+45	0.1243	0.24	Q V				
7+50	0.1259	0.24	Q V				
7+55	0.1276	0.24	Q V				
8+ 0	0.1292	0.24	Q V				
8+ 5	0.1309	0.24	Q V				
8+10	0.1326	0.24	Q V				
8+15	0.1343	0.25	Q V				
8+20	0.1360	0.25	Q V				
8+25	0.1377	0.25	Q V				
8+30	0.1394	0.25	Q V				
8+35	0.1411	0.25	|Q V				
8+40	0.1429	0.25	|Q V				
8+45	0.1446	0.25	|Q V				
8+50	0.1464	0.26	|Q V				
8+55	0.1482	0.26	|Q V				
9+ 0	0.1499	0.26	|Q V				
9+ 5	0.1517	0.26	|Q V				
9+10	0.1536	0.26	|Q V				
9+15	0.1554	0.26	|Q V				
9+20	0.1572	0.27	|Q V				
9+25	0.1591	0.27	|Q V				
9+30	0.1609	0.27	|Q V				
9+35	0.1628	0.27	|Q V				
9+40	0.1647	0.27	|Q V				
9+45	0.1666	0.28	|Q V				
9+50	0.1685	0.28	|Q V				
9+55	0.1704	0.28	|Q V				
10+ 0	0.1724	0.28	|Q V				
10+ 5	0.1743	0.28	|Q V				
10+10	0.1763	0.29	|Q V				
10+15	0.1783	0.29	|Q V				
10+20	0.1803	0.29	|Q V				
10+25	0.1823	0.29	|Q V				
10+30	0.1844	0.30	|Q V				
10+35	0.1865	0.30	|Q V				
10+40	0.1885	0.30	|Q V				
10+45	0.1906	0.30	|Q V				
10+50	0.1927	0.31	|Q V				
10+55	0.1949	0.31	|Q V				


11+ 0 0.1970 0.31
11+ 5 0.1992 0.32
11+10 0.2014 0.32
11+15 0.2036 0.32
11+20 0.2058 0.32
11+25 0.2081 0.33
11+30 0.2104 0.33
11+35 0.2127 0.33
11+40 0.2150 0.34
11+45 0.2173 0.34
11+50 0.2197 0.35
11+55 0.2221 0.35
12+ 0 0.2246 0.35
12+ 5 0.2270 0.35
12+10 0.2294 0.35
12+15 0.2319 0.36
12+20 0.2344 0.36
12+25 0.2369 0.37
12+30 0.2395 0.37
12+35 0.2421 0.38
12+40 0.2447 0.38
12+45 0.2474 0.39
12+50 0.2501 0.39
12+55 0.2529 0.40
13+ 0 0.2557 0.41
13+ 5 0.2585 0.41
13+10 0.2614 0.42
13+15 0.2643 0.43
13+20 0.2673 0.43
13+25 0.2703 0.44
13+30 0.2734 0.45
13+35 0.2766 0.46
13+40 0.2798 0.47
13+45 0.2830 0.48
13+50 0.2864 0.48
13+55 0.2898 0.50
14+ 0 0.2933 0.51
14+ 5 0.2968 0.52
14+10 0.3005 0.53
14+15 0.3042 0.54
14+20 0.3081 0.56
14+25 0.3120 0.57
14+30 0.3161 0.59
14+35 0.3203 0.61
14+40 0.3246 0.63
14+45 0.3291 0.65
14+50 0.3338 0.67
14+55 0.3386 0.70
15+ 0 0.3436 0.73
15+ 5 0.3489 0.77
15+10 0.3544 0.80
15+15 0.3602 0.85
15+20 0.3664 0.90
15+25 0.3727 0.92
15+30 0.3793 0.96
15+35 0.3866 1.05
15+40 0.3946 1.16
15+45 0.4039 1.35
15+50 0.4147 1.58
15+55 0.4294 2.13


16+ 0 0.4505 3.06
16+ 5 0.5055 8.00
16+10 0.5469 6.01
16+15 0.5579 1.60
16+20 0.5659 1.15
16+25 0.5727 0.99
16+30 0.5788 0.89
16+35 0.5843 0.80
16+40 0.5893 0.73
16+45 0.5939 0.67
16+50 0.5982 0.63
16+55 0.6023 0.59
17+ 0 0.6061 0.56
17+ 5 0.6097 0.53
17+10 0.6132 0.50
17+15 0.6165 0.48
17+20 0.6197 0.46
17+25 0.6228 0.45
17+30 0.6258 0.43
17+35 0.6286 0.42
17+40 0.6314 0.40
17+45 0.6341 0.39
17+50 0.6367 0.38
17+55 0.6393 0.37
18+ 0 0.6418 0.36
18+ 5 0.6443 0.36
18+10 0.6467 0.35
18+15 0.6491 0.34
18+20 0.6514 0.34
18+25 0.6537 0.33
18+30 0.6559 0.32
18+35 0.6581 0.32
18+40 0.6602 0.31
18+45 0.6623 0.31
18+50 0.6644 0.30
18+55 0.6664 0.30
19+ 0 0.6684 0.29
19+ 5 0.6704 0.29
19+10 0.6724 0.28
19+15 0.6743 0.28
19+20 0.6762 0.27
19+25 0.6780 0.27
19+30 0.6799 0.27
19+35 0.6817 0.26
19+40 0.6834 0.26
19+45 0.6852 0.26
19+50 0.6870 0.25
19+55 0.6887 0.25
20+ 0 0.6904 0.25
20+ 5 0.6920 0.24
20+10 0.6937 0.24
20+15 0.6953 0.24
20+20 0.6970 0.24
20+25 0.6986 0.23
20+30 0.7002 0.23
20+35 0.7017 0.23
20+40 0.7033 0.23
20+45 0.7048 0.22
20+50 0.7063 0.22
20+55 0.7078 0.22

```
   21+ 0       0.7093      0.22  Q         |         |         |      V  |
   21+ 5       0.7108      0.21  Q         |         |         |      V  |
   21+10       0.7123      0.21  Q         |         |         |      V  |
   21+15       0.7137      0.21  Q         |         |         |      V  |
   21+20       0.7152      0.21  Q         |         |         |      V  |
   21+25       0.7166      0.21  Q         |         |         |      V  |
   21+30       0.7180      0.21  Q         |         |         |      V  |
   21+35       0.7194      0.20  Q         |         |         |       V |
   21+40       0.7208      0.20  Q         |         |         |       V |
   21+45       0.7222      0.20  Q         |         |         |       V |
   21+50       0.7236      0.20  Q         |         |         |       V |
   21+55       0.7249      0.20  Q         |         |         |       V |
   22+ 0       0.7263      0.20  Q         |         |         |       V |
   22+ 5       0.7276      0.19  Q         |         |         |       V |
   22+10       0.7289      0.19  Q         |         |         |       V |
   22+15       0.7302      0.19  Q         |         |         |       V |
   22+20       0.7315      0.19  Q         |         |         |       V |
   22+25       0.7328      0.19  Q         |         |         |       V |
   22+30       0.7341      0.19  Q         |         |         |       V |
   22+35       0.7354      0.19  Q         |         |         |       V |
   22+40       0.7367      0.18  Q         |         |         |       V |
   22+45       0.7379      0.18  Q         |         |         |        V|
   22+50       0.7392      0.18  Q         |         |         |        V|
   22+55       0.7404      0.18  Q         |         |         |        V|
   23+ 0       0.7417      0.18  Q         |         |         |        V|
   23+ 5       0.7429      0.18  Q         |         |         |        V|
   23+10       0.7441      0.18  Q         |         |         |        V|
   23+15       0.7453      0.18  Q         |         |         |        V|
   23+20       0.7465      0.17  Q         |         |         |        V|
   23+25       0.7477      0.17  Q         |         |         |        V|
   23+30       0.7489      0.17  Q         |         |         |        V|
   23+35       0.7501      0.17  Q         |         |         |        V|
   23+40       0.7512      0.17  Q         |         |         |        V|
   23+45       0.7524      0.17  Q         |         |         |        V|
   23+50       0.7535      0.17  Q         |         |         |        V|
   23+55       0.7547      0.17  Q         |         |         |        V|
   24+ 0       0.7558      0.17  Q         |         |         |        V|
   24+ 5       0.7563      0.07  Q         |         |         |         V
-----------------------------------------------------------------------
```

APPENDIX A.8: UNIT HYDROGRAPH, AREA "8"

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0

Study date 06/20/19

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

Program License Serial Number 6279

BNSF
EXISTING HYDROLOGY
AREA 8

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
2.80	1	1.58
Rainfall data for year 100		
2.80	6	3.42
Rainfall data for year 100		
2.80	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
73.3	89.6	2.80	1.000	0.199	0.840	0.167

Area-averaged adjusted loss rate Fm (In/Hr) = 0.167

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
2.35	0.840	73.3	89.6	1.16	0.809
0.45	0.160	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.833
Area-averaged low loss fraction, Yb = 0.167
++
Watercourse length = 690.00(Ft.)
Length from concentration point to centroid = 205.00(Ft.)
Elevation difference along watercourse = 5.00(Ft.)
Mannings friction factor along watercourse = 0.025
Watershed area = 2.80(Ac.)
Catchment Lag time = 0.040 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 206.7110
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.167(In/Hr)
Average low loss rate fraction (Yb) = 0.167 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 2.80(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.585(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.580(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 33.86 (CFS))		
1	49.800	16.864
2	100.000	8.432

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5847	0.5847
2	0.7715	0.1868
3	0.9074	0.1358
4	1.0180	0.1107
5	1.1131	0.0950

6	1.1973	0.0842
7	1.2734	0.0761
8	1.3433	0.0699
9	1.4081	0.0648
10	1.4687	0.0606
11	1.5258	0.0571
12	1.5798	0.0540
13	1.6353	0.0555
14	1.6883	0.0531
15	1.7393	0.0510
16	1.7884	0.0491
17	1.8357	0.0474
18	1.8815	0.0458
19	1.9259	0.0444
20	1.9690	0.0431
21	2.0108	0.0419
22	2.0515	0.0407
23	2.0912	0.0397
24	2.1300	0.0387
25	2.1678	0.0378
26	2.2047	0.0370
27	2.2409	0.0362
28	2.2763	0.0354
29	2.3110	0.0347
30	2.3450	0.0340
31	2.3784	0.0334
32	2.4112	0.0328
33	2.4434	0.0322
34	2.4750	0.0316
35	2.5061	0.0311
36	2.5368	0.0306
37	2.5669	0.0301
38	2.5966	0.0297
39	2.6258	0.0292
40	2.6546	0.0288
41	2.6830	0.0284
42	2.7110	0.0280
43	2.7387	0.0276
44	2.7659	0.0273
45	2.7929	0.0269
46	2.8194	0.0266
47	2.8457	0.0263
48	2.8716	0.0259
49	2.8973	0.0256
50	2.9226	0.0253
51	2.9476	0.0251
52	2.9724	0.0248
53	2.9969	0.0245
54	3.0212	0.0242
55	3.0452	0.0240
56	3.0689	0.0237
57	3.0924	0.0235
58	3.1157	0.0233
59	3.1387	0.0230
60	3.1615	0.0228
61	3.1841	0.0226
62	3.2065	0.0224
63	3.2287	0.0222
64	3.2507	0.0220

65	3.2725	0.0218
66	3.2941	0.0216
67	3.3155	0.0214
68	3.3367	0.0212
69	3.3578	0.0211
70	3.3787	0.0209
71	3.3994	0.0207
72	3.4200	0.0206
73	3.4408	0.0208
74	3.4614	0.0206
75	3.4819	0.0205
76	3.5022	0.0203
77	3.5224	0.0202
78	3.5424	0.0200
79	3.5623	0.0199
80	3.5821	0.0197
81	3.6017	0.0196
82	3.6212	0.0195
83	3.6405	0.0193
84	3.6597	0.0192
85	3.6788	0.0191
86	3.6978	0.0190
87	3.7166	0.0188
88	3.7353	0.0187
89	3.7539	0.0186
90	3.7724	0.0185
91	3.7908	0.0184
92	3.8090	0.0183
93	3.8272	0.0181
94	3.8452	0.0180
95	3.8631	0.0179
96	3.8809	0.0178
97	3.8987	0.0177
98	3.9163	0.0176
99	3.9338	0.0175
100	3.9512	0.0174
101	3.9685	0.0173
102	3.9857	0.0172
103	4.0029	0.0171
104	4.0199	0.0170
105	4.0369	0.0169
106	4.0537	0.0169
107	4.0705	0.0168
108	4.0872	0.0167
109	4.1037	0.0166
110	4.1202	0.0165
111	4.1367	0.0164
112	4.1530	0.0163
113	4.1693	0.0163
114	4.1854	0.0162
115	4.2015	0.0161
116	4.2176	0.0160
117	4.2335	0.0159
118	4.2494	0.0159
119	4.2652	0.0158
120	4.2809	0.0157
121	4.2965	0.0156
122	4.3121	0.0156
123	4.3276	0.0155

124	4.3430	0.0154
125	4.3584	0.0154
126	4.3737	0.0153
127	4.3889	0.0152
128	4.4041	0.0152
129	4.4191	0.0151
130	4.4342	0.0150
131	4.4491	0.0150
132	4.4640	0.0149
133	4.4789	0.0148
134	4.4936	0.0148
135	4.5083	0.0147
136	4.5230	0.0146
137	4.5376	0.0146
138	4.5521	0.0145
139	4.5666	0.0145
140	4.5810	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6239	0.0142
144	4.6381	0.0142
145	4.6522	0.0141
146	4.6663	0.0141
147	4.6803	0.0140
148	4.6942	0.0140
149	4.7082	0.0139
150	4.7220	0.0139
151	4.7358	0.0138
152	4.7496	0.0138
153	4.7633	0.0137
154	4.7770	0.0137
155	4.7906	0.0136
156	4.8041	0.0136
157	4.8176	0.0135
158	4.8311	0.0135
159	4.8445	0.0134
160	4.8579	0.0134
161	4.8712	0.0133
162	4.8845	0.0133
163	4.8977	0.0132
164	4.9109	0.0132
165	4.9240	0.0131
166	4.9371	0.0131
167	4.9502	0.0131
168	4.9632	0.0130
169	4.9762	0.0130
170	4.9891	0.0129
171	5.0020	0.0129
172	5.0148	0.0128
173	5.0276	0.0128
174	5.0403	0.0128
175	5.0531	0.0127
176	5.0657	0.0127
177	5.0784	0.0126
178	5.0909	0.0126
179	5.1035	0.0126
180	5.1160	0.0125
181	5.1285	0.0125
182	5.1409	0.0124

183	5.1533	0.0124
184	5.1657	0.0124
185	5.1780	0.0123
186	5.1903	0.0123
187	5.2025	0.0122
188	5.2147	0.0122
189	5.2269	0.0122
190	5.2390	0.0121
191	5.2511	0.0121
192	5.2632	0.0121
193	5.2752	0.0120
194	5.2872	0.0120
195	5.2992	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3349	0.0119
199	5.3467	0.0118
200	5.3585	0.0118
201	5.3703	0.0118
202	5.3820	0.0117
203	5.3937	0.0117
204	5.4053	0.0117
205	5.4170	0.0116
206	5.4286	0.0116
207	5.4401	0.0116
208	5.4517	0.0115
209	5.4632	0.0115
210	5.4747	0.0115
211	5.4861	0.0114
212	5.4975	0.0114
213	5.5089	0.0114
214	5.5202	0.0114
215	5.5316	0.0113
216	5.5429	0.0113
217	5.5541	0.0113
218	5.5654	0.0112
219	5.5766	0.0112
220	5.5877	0.0112
221	5.5989	0.0111
222	5.6100	0.0111
223	5.6211	0.0111
224	5.6322	0.0111
225	5.6432	0.0110
226	5.6542	0.0110
227	5.6652	0.0110
228	5.6762	0.0110
229	5.6871	0.0109
230	5.6980	0.0109
231	5.7089	0.0109
232	5.7197	0.0108
233	5.7305	0.0108
234	5.7413	0.0108
235	5.7521	0.0108
236	5.7629	0.0107
237	5.7736	0.0107
238	5.7843	0.0107
239	5.7949	0.0107
240	5.8056	0.0106
241	5.8162	0.0106

242	5.8268	0.0106	
243	5.8374	0.0106	
244	5.8479	0.0105	
245	5.8584	0.0105	
246	5.8689	0.0105	
247	5.8794	0.0105	
248	5.8899	0.0105	
249	5.9003	0.0104	
250	5.9107	0.0104	
251	5.9211	0.0104	
252	5.9314	0.0104	
253	5.9418	0.0103	
254	5.9521	0.0103	
255	5.9624	0.0103	
256	5.9726	0.0103	
257	5.9829	0.0102	
258	5.9931	0.0102	
259	6.0033	0.0102	
260	6.0135	0.0102	
261	6.0236	0.0102	
262	6.0338	0.0101	
263	6.0439	0.0101	
264	6.0540	0.0101	
265	6.0640	0.0101	
266	6.0741	0.0100	
267	6.0841	0.0100	
268	6.0941	0.0100	
269	6.1041	0.0100	
270	6.1141	0.0100	
271	6.1240	0.0099	
272	6.1339	0.0099	
273	6.1438	0.0099	
274	6.1537	0.0099	
275	6.1636	0.0099	
276	6.1734	0.0098	
277	6.1832	0.0098	
278	6.1930	0.0098	
279	6.2028	0.0098	
280	6.2126	0.0098	
281	6.2223	0.0097	
282	6.2320	0.0097	
283	6.2417	0.0097	
284	6.2514	0.0097	
285	6.2611	0.0097	
286	6.2707	0.0096	
287	6.2804	0.0096	
288	6.2900	0.0096	

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0016	0.0080
2	0.0096	0.0016	0.0080
3	0.0097	0.0016	0.0081
4	0.0097	0.0016	0.0081
5	0.0097	0.0016	0.0081
6	0.0097	0.0016	0.0081
7	0.0098	0.0016	0.0082
8	0.0098	0.0016	0.0082
9	0.0098	0.0016	0.0082
10	0.0099	0.0016	0.0082
11	0.0099	0.0016	0.0083
12	0.0099	0.0017	0.0083
13	0.0100	0.0017	0.0083
14	0.0100	0.0017	0.0083
15	0.0100	0.0017	0.0084
16	0.0100	0.0017	0.0084
17	0.0101	0.0017	0.0084
18	0.0101	0.0017	0.0084
19	0.0102	0.0017	0.0085
20	0.0102	0.0017	0.0085
21	0.0102	0.0017	0.0085
22	0.0102	0.0017	0.0085
23	0.0103	0.0017	0.0086
24	0.0103	0.0017	0.0086
25	0.0104	0.0017	0.0086
26	0.0104	0.0017	0.0087
27	0.0104	0.0017	0.0087
28	0.0105	0.0017	0.0087
29	0.0105	0.0017	0.0087
30	0.0105	0.0018	0.0088
31	0.0106	0.0018	0.0088
32	0.0106	0.0018	0.0088
33	0.0106	0.0018	0.0089
34	0.0107	0.0018	0.0089
35	0.0107	0.0018	0.0089
36	0.0107	0.0018	0.0090
37	0.0108	0.0018	0.0090
38	0.0108	0.0018	0.0090
39	0.0109	0.0018	0.0091
40	0.0109	0.0018	0.0091
41	0.0110	0.0018	0.0091
42	0.0110	0.0018	0.0092
43	0.0110	0.0018	0.0092
44	0.0111	0.0018	0.0092
45	0.0111	0.0019	0.0093
46	0.0111	0.0019	0.0093
47	0.0112	0.0019	0.0093
48	0.0112	0.0019	0.0094
49	0.0113	0.0019	0.0094
50	0.0113	0.0019	0.0094
51	0.0114	0.0019	0.0095
52	0.0114	0.0019	0.0095
53	0.0115	0.0019	0.0096
54	0.0115	0.0019	0.0096
55	0.0116	0.0019	0.0096
56	0.0116	0.0019	0.0097
57	0.0117	0.0019	0.0097
58	0.0117	0.0019	0.0097
59	0.0118	0.0020	0.0098
60	0.0118	0.0020	0.0098
61	0.0119	0.0020	0.0099
62	0.0119	0.0020	0.0099
63	0.0120	0.0020	0.0100
64	0.0120	0.0020	0.0100
65	0.0121	0.0020	0.0101
66	0.0121	0.0020	0.0101

67	0.0122	0.0020	0.0101
68	0.0122	0.0020	0.0102
69	0.0123	0.0020	0.0102
70	0.0123	0.0021	0.0103
71	0.0124	0.0021	0.0103
72	0.0124	0.0021	0.0104
73	0.0125	0.0021	0.0104
74	0.0126	0.0021	0.0105
75	0.0126	0.0021	0.0105
76	0.0127	0.0021	0.0106
77	0.0128	0.0021	0.0106
78	0.0128	0.0021	0.0107
79	0.0129	0.0021	0.0107
80	0.0129	0.0022	0.0108
81	0.0130	0.0022	0.0108
82	0.0131	0.0022	0.0109
83	0.0131	0.0022	0.0110
84	0.0132	0.0022	0.0110
85	0.0133	0.0022	0.0111
86	0.0133	0.0022	0.0111
87	0.0134	0.0022	0.0112
88	0.0135	0.0022	0.0112
89	0.0136	0.0023	0.0113
90	0.0136	0.0023	0.0113
91	0.0137	0.0023	0.0114
92	0.0138	0.0023	0.0115
93	0.0139	0.0023	0.0116
94	0.0139	0.0023	0.0116
95	0.0140	0.0023	0.0117
96	0.0141	0.0023	0.0117
97	0.0142	0.0024	0.0118
98	0.0142	0.0024	0.0119
99	0.0144	0.0024	0.0120
100	0.0144	0.0024	0.0120
101	0.0145	0.0024	0.0121
102	0.0146	0.0024	0.0122
103	0.0147	0.0024	0.0123
104	0.0148	0.0025	0.0123
105	0.0149	0.0025	0.0124
106	0.0150	0.0025	0.0125
107	0.0151	0.0025	0.0126
108	0.0152	0.0025	0.0126
109	0.0153	0.0025	0.0127
110	0.0154	0.0026	0.0128
111	0.0155	0.0026	0.0129
112	0.0156	0.0026	0.0130
113	0.0157	0.0026	0.0131
114	0.0158	0.0026	0.0132
115	0.0159	0.0027	0.0133
116	0.0160	0.0027	0.0134
117	0.0162	0.0027	0.0135
118	0.0163	0.0027	0.0135
119	0.0164	0.0027	0.0137
120	0.0165	0.0027	0.0138
121	0.0167	0.0028	0.0139
122	0.0168	0.0028	0.0140
123	0.0169	0.0028	0.0141
124	0.0170	0.0028	0.0142
125	0.0172	0.0029	0.0144

126	0.0173	0.0029	0.0144
127	0.0175	0.0029	0.0146
128	0.0176	0.0029	0.0147
129	0.0178	0.0030	0.0149
130	0.0179	0.0030	0.0149
131	0.0181	0.0030	0.0151
132	0.0183	0.0030	0.0152
133	0.0185	0.0031	0.0154
134	0.0186	0.0031	0.0155
135	0.0188	0.0031	0.0157
136	0.0190	0.0032	0.0158
137	0.0192	0.0032	0.0160
138	0.0193	0.0032	0.0161
139	0.0196	0.0033	0.0163
140	0.0197	0.0033	0.0165
141	0.0200	0.0033	0.0167
142	0.0202	0.0034	0.0168
143	0.0205	0.0034	0.0171
144	0.0206	0.0034	0.0172
145	0.0206	0.0034	0.0171
146	0.0207	0.0035	0.0173
147	0.0211	0.0035	0.0176
148	0.0212	0.0035	0.0177
149	0.0216	0.0036	0.0180
150	0.0218	0.0036	0.0182
151	0.0222	0.0037	0.0185
152	0.0224	0.0037	0.0187
153	0.0228	0.0038	0.0190
154	0.0230	0.0038	0.0192
155	0.0235	0.0039	0.0196
156	0.0237	0.0040	0.0198
157	0.0242	0.0040	0.0202
158	0.0245	0.0041	0.0204
159	0.0251	0.0042	0.0209
160	0.0253	0.0042	0.0211
161	0.0259	0.0043	0.0216
162	0.0263	0.0044	0.0219
163	0.0269	0.0045	0.0224
164	0.0273	0.0045	0.0227
165	0.0280	0.0047	0.0233
166	0.0284	0.0047	0.0237
167	0.0292	0.0049	0.0244
168	0.0297	0.0049	0.0247
169	0.0306	0.0051	0.0255
170	0.0311	0.0052	0.0259
171	0.0322	0.0054	0.0268
172	0.0328	0.0055	0.0273
173	0.0340	0.0057	0.0284
174	0.0347	0.0058	0.0289
175	0.0362	0.0060	0.0301
176	0.0370	0.0062	0.0308
177	0.0387	0.0064	0.0323
178	0.0397	0.0066	0.0331
179	0.0419	0.0070	0.0349
180	0.0431	0.0072	0.0359
181	0.0458	0.0076	0.0382
182	0.0474	0.0079	0.0395
183	0.0510	0.0085	0.0425
184	0.0531	0.0088	0.0442

185	0.0540	0.0090	0.0450
186	0.0571	0.0095	0.0476
187	0.0648	0.0108	0.0540
188	0.0699	0.0116	0.0582
189	0.0842	0.0139	0.0703
190	0.0950	0.0139	0.0811
191	0.1358	0.0139	0.1219
192	0.1868	0.0139	0.1729
193	0.5847	0.0139	0.5708
194	0.1107	0.0139	0.0967
195	0.0761	0.0127	0.0635
196	0.0606	0.0101	0.0505
197	0.0555	0.0092	0.0462
198	0.0491	0.0082	0.0409
199	0.0444	0.0074	0.0370
200	0.0407	0.0068	0.0339
201	0.0378	0.0063	0.0315
202	0.0354	0.0059	0.0295
203	0.0334	0.0056	0.0278
204	0.0316	0.0053	0.0264
205	0.0301	0.0050	0.0251
206	0.0288	0.0048	0.0240
207	0.0276	0.0046	0.0230
208	0.0266	0.0044	0.0222
209	0.0256	0.0043	0.0214
210	0.0248	0.0041	0.0206
211	0.0240	0.0040	0.0200
212	0.0233	0.0039	0.0194
213	0.0226	0.0038	0.0188
214	0.0220	0.0037	0.0183
215	0.0214	0.0036	0.0179
216	0.0209	0.0035	0.0174
217	0.0208	0.0035	0.0173
218	0.0203	0.0034	0.0169
219	0.0199	0.0033	0.0166
220	0.0195	0.0032	0.0162
221	0.0191	0.0032	0.0159
222	0.0187	0.0031	0.0156
223	0.0184	0.0031	0.0153
224	0.0180	0.0030	0.0150
225	0.0177	0.0030	0.0148
226	0.0174	0.0029	0.0145
227	0.0171	0.0029	0.0143
228	0.0169	0.0028	0.0140
229	0.0166	0.0028	0.0138
230	0.0163	0.0027	0.0136
231	0.0161	0.0027	0.0134
232	0.0159	0.0026	0.0132
233	0.0156	0.0026	0.0130
234	0.0154	0.0026	0.0129
235	0.0152	0.0025	0.0127
236	0.0150	0.0025	0.0125
237	0.0148	0.0025	0.0124
238	0.0146	0.0024	0.0122
239	0.0145	0.0024	0.0121
240	0.0143	0.0024	0.0119
241	0.0141	0.0024	0.0118
242	0.0140	0.0023	0.0116
243	0.0138	0.0023	0.0115

244	0.0137	0.0023	0.0114
245	0.0135	0.0023	0.0113
246	0.0134	0.0022	0.0111
247	0.0132	0.0022	0.0110
248	0.0131	0.0022	0.0109
249	0.0130	0.0022	0.0108
250	0.0128	0.0021	0.0107
251	0.0127	0.0021	0.0106
252	0.0126	0.0021	0.0105
253	0.0125	0.0021	0.0104
254	0.0124	0.0021	0.0103
255	0.0122	0.0020	0.0102
256	0.0121	0.0020	0.0101
257	0.0120	0.0020	0.0100
258	0.0119	0.0020	0.0099
259	0.0118	0.0020	0.0099
260	0.0117	0.0020	0.0098
261	0.0116	0.0019	0.0097
262	0.0115	0.0019	0.0096
263	0.0114	0.0019	0.0095
264	0.0114	0.0019	0.0095
265	0.0113	0.0019	0.0094
266	0.0112	0.0019	0.0093
267	0.0111	0.0018	0.0092
268	0.0110	0.0018	0.0092
269	0.0109	0.0018	0.0091
270	0.0108	0.0018	0.0090
271	0.0108	0.0018	0.0090
272	0.0107	0.0018	0.0089
273	0.0106	0.0018	0.0089
274	0.0105	0.0018	0.0088
275	0.0105	0.0017	0.0087
276	0.0104	0.0017	0.0087
277	0.0103	0.0017	0.0086
278	0.0103	0.0017	0.0086
279	0.0102	0.0017	0.0085
280	0.0101	0.0017	0.0084
281	0.0101	0.0017	0.0084
282	0.0100	0.0017	0.0083
283	0.0099	0.0017	0.0083
284	0.0099	0.0016	0.0082
285	0.0098	0.0016	0.0082
286	0.0098	0.0016	0.0081
287	0.0097	0.0016	0.0081
288	0.0096	0.0016	0.0080

Total soil rain loss = 0.93(In)
Total effective rainfall = 5.36(In)
Peak flow rate in flood hydrograph = 11.08(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	5.0	10.0	15.0	20.0

0+ 5	0.0009	0.14	Q				
0+10	0.0023	0.20	Q				
0+15	0.0037	0.20	Q				
0+20	0.0051	0.20	Q				
0+25	0.0065	0.20	Q				
0+30	0.0080	0.21	Q				
0+35	0.0094	0.21	Q				
0+40	0.0108	0.21	Q				
0+45	0.0122	0.21	Q				
0+50	0.0137	0.21	Q				
0+55	0.0151	0.21	Q				
1+ 0	0.0165	0.21	Q				
1+ 5	0.0180	0.21	Q				
1+10	0.0194	0.21	Q				
1+15	0.0209	0.21	Q				
1+20	0.0223	0.21	Q				
1+25	0.0238	0.21	QV				
1+30	0.0253	0.21	QV				
1+35	0.0267	0.21	QV				
1+40	0.0282	0.21	QV				
1+45	0.0297	0.22	QV				
1+50	0.0312	0.22	QV				
1+55	0.0327	0.22	QV				
2+ 0	0.0342	0.22	QV				
2+ 5	0.0357	0.22	QV				
2+10	0.0372	0.22	QV				
2+15	0.0387	0.22	QV				
2+20	0.0402	0.22	QV				
2+25	0.0417	0.22	QV				
2+30	0.0433	0.22	QV				
2+35	0.0448	0.22	QV				
2+40	0.0463	0.22	QV				
2+45	0.0479	0.22	Q V				
2+50	0.0494	0.22	Q V				
2+55	0.0510	0.23	Q V				
3+ 0	0.0525	0.23	Q V				
3+ 5	0.0541	0.23	Q V				
3+10	0.0557	0.23	Q V				
3+15	0.0572	0.23	Q V				
3+20	0.0588	0.23	Q V				
3+25	0.0604	0.23	Q V				
3+30	0.0620	0.23	Q V				
3+35	0.0636	0.23	Q V				
3+40	0.0652	0.23	Q V				
3+45	0.0668	0.23	Q V				
3+50	0.0684	0.23	Q V				
3+55	0.0701	0.24	Q V				
4+ 0	0.0717	0.24	Q V				
4+ 5	0.0733	0.24	Q V				
4+10	0.0750	0.24	Q V				
4+15	0.0766	0.24	Q V				
4+20	0.0783	0.24	Q V				
4+25	0.0799	0.24	Q V				
4+30	0.0816	0.24	Q V				
4+35	0.0833	0.24	Q V				
4+40	0.0850	0.24	Q V				
4+45	0.0867	0.25	Q V				
4+50	0.0884	0.25	Q V				

4+55	0.0901	0.25	Q V				
5+ 0	0.0918	0.25	Q V				
5+ 5	0.0935	0.25	Q V				
5+10	0.0952	0.25	Q V				
5+15	0.0969	0.25	Q V				
5+20	0.0987	0.25	Q V				
5+25	0.1004	0.25	Q V				
5+30	0.1022	0.25	Q V				
5+35	0.1040	0.26	Q V				
5+40	0.1057	0.26	Q V				
5+45	0.1075	0.26	Q V				
5+50	0.1093	0.26	Q V				
5+55	0.1111	0.26	Q V				
6+ 0	0.1129	0.26	Q V				
6+ 5	0.1147	0.26	Q V				
6+10	0.1165	0.26	Q V				
6+15	0.1184	0.27	Q V				
6+20	0.1202	0.27	Q V				
6+25	0.1220	0.27	Q V				
6+30	0.1239	0.27	Q V				
6+35	0.1258	0.27	Q V				
6+40	0.1276	0.27	Q V				
6+45	0.1295	0.27	Q V				
6+50	0.1314	0.27	Q V				
6+55	0.1333	0.28	Q V				
7+ 0	0.1352	0.28	Q V				
7+ 5	0.1372	0.28	Q V				
7+10	0.1391	0.28	Q V				
7+15	0.1410	0.28	Q V				
7+20	0.1430	0.28	Q V				
7+25	0.1449	0.29	Q V				
7+30	0.1469	0.29	Q V				
7+35	0.1489	0.29	Q V				
7+40	0.1509	0.29	Q V				
7+45	0.1529	0.29	Q V				
7+50	0.1549	0.29	Q V				
7+55	0.1570	0.29	Q V				
8+ 0	0.1590	0.30	Q V				
8+ 5	0.1611	0.30	Q V				
8+10	0.1631	0.30	Q V				
8+15	0.1652	0.30	Q V				
8+20	0.1673	0.30	Q V				
8+25	0.1694	0.31	Q V				
8+30	0.1715	0.31	Q V				
8+35	0.1736	0.31	Q V				
8+40	0.1758	0.31	Q V				
8+45	0.1779	0.31	Q V				
8+50	0.1801	0.31	Q V				
8+55	0.1823	0.32	Q V				
9+ 0	0.1845	0.32	Q V				
9+ 5	0.1867	0.32	Q V				
9+10	0.1889	0.32	Q V				
9+15	0.1912	0.33	Q V				
9+20	0.1934	0.33	Q V				
9+25	0.1957	0.33	Q V				
9+30	0.1980	0.33	Q V				
9+35	0.2003	0.34	Q V				
9+40	0.2026	0.34	Q V				
9+45	0.2050	0.34	Q V				

9+50	0.2073	0.34	Q	V			
9+55	0.2097	0.35	Q	V			
10+ 0	0.2121	0.35	Q	V			
10+ 5	0.2145	0.35	Q	V			
10+10	0.2169	0.35	Q	V			
10+15	0.2194	0.36	Q	V			
10+20	0.2219	0.36	Q	V			
10+25	0.2243	0.36	Q	V			
10+30	0.2269	0.36	Q	V			
10+35	0.2294	0.37	Q	V			
10+40	0.2319	0.37	Q	V			
10+45	0.2345	0.37	Q	V			
10+50	0.2371	0.38	Q	V			
10+55	0.2397	0.38	Q	V			
11+ 0	0.2424	0.38	Q	V			
11+ 5	0.2451	0.39	Q	V			
11+10	0.2478	0.39	Q	V			
11+15	0.2505	0.40	Q	V			
11+20	0.2532	0.40	Q	V			
11+25	0.2560	0.40	Q	V			
11+30	0.2588	0.41	Q	V			
11+35	0.2616	0.41	Q	V			
11+40	0.2645	0.42	Q	V			
11+45	0.2674	0.42	Q	V			
11+50	0.2703	0.42	Q	V			
11+55	0.2733	0.43	Q	V			
12+ 0	0.2763	0.43	Q	V			
12+ 5	0.2793	0.43	Q	V			
12+10	0.2823	0.44	Q	V			
12+15	0.2853	0.44	Q	V			
12+20	0.2884	0.45	Q	V			
12+25	0.2915	0.45	Q	V			
12+30	0.2946	0.46	Q	V			
12+35	0.2978	0.47	Q	V			
12+40	0.3011	0.47	Q	V			
12+45	0.3044	0.48	Q	V			
12+50	0.3077	0.48	Q	V			
12+55	0.3111	0.49	Q	V			
13+ 0	0.3145	0.50	Q	V			
13+ 5	0.3180	0.51	Q	V			
13+10	0.3216	0.51	Q	V			
13+15	0.3252	0.52	Q	V			
13+20	0.3289	0.53	Q	V			
13+25	0.3326	0.54	Q	V			
13+30	0.3364	0.55	Q	V			
13+35	0.3403	0.56	Q	V			
13+40	0.3442	0.57	Q	V			
13+45	0.3482	0.59	Q	V			
13+50	0.3523	0.60	Q	V			
13+55	0.3565	0.61	Q	V			
14+ 0	0.3608	0.62	Q	V			
14+ 5	0.3652	0.64	Q	V			
14+10	0.3697	0.65	Q	V			
14+15	0.3744	0.67	Q	V			
14+20	0.3791	0.69	Q	V			
14+25	0.3840	0.71	Q	V			
14+30	0.3890	0.73	Q	V			
14+35	0.3941	0.75	Q	V			
14+40	0.3995	0.77	Q	V			

14+45	0.4050	0.80	Q	V			
14+50	0.4107	0.83	Q	V			
14+55	0.4167	0.87	Q	V			
15+ 0	0.4229	0.90	Q	V			
15+ 5	0.4294	0.95	Q	V			
15+10	0.4362	0.99	Q	V			
15+15	0.4434	1.05	Q	V			
15+20	0.4510	1.10	Q	V			
15+25	0.4588	1.13	Q	V			
15+30	0.4670	1.18	Q	V			
15+35	0.4760	1.31	Q	V			
15+40	0.4859	1.44	Q	V			
15+45	0.4975	1.68	Q	V			
15+50	0.5110	1.96	Q	V			
15+55	0.5298	2.74	Q	V			
16+ 0	0.5570	3.94	Q	V			
16+ 5	0.6333	11.08	Q	V			
16+10	0.6777	6.44	Q	V			
16+15	0.6907	1.89	Q	V			
16+20	0.7002	1.39	Q	V			
16+25	0.7085	1.21	Q	V			
16+30	0.7160	1.08	Q	V			
16+35	0.7226	0.97	Q	V			
16+40	0.7287	0.88	Q	V			
16+45	0.7344	0.82	Q	V			
16+50	0.7396	0.76	Q	V			
16+55	0.7446	0.72	Q	V			
17+ 0	0.7492	0.68	Q	V			
17+ 5	0.7537	0.65	Q	V			
17+10	0.7579	0.62	Q	V			
17+15	0.7620	0.59	Q	V			
17+20	0.7659	0.57	Q	V			
17+25	0.7697	0.55	Q	V			
17+30	0.7733	0.53	Q	V			
17+35	0.7769	0.51	Q	V			
17+40	0.7803	0.50	Q	V			
17+45	0.7836	0.48	Q	V			
17+50	0.7868	0.47	Q	V			
17+55	0.7899	0.46	Q	V			
18+ 0	0.7930	0.44	Q	V			
18+ 5	0.7960	0.44	Q	V			
18+10	0.7990	0.43	Q	V			
18+15	0.8019	0.42	Q	V			
18+20	0.8048	0.41	Q	V			
18+25	0.8075	0.41	Q	V			
18+30	0.8103	0.40	Q	V			
18+35	0.8130	0.39	Q	V			
18+40	0.8156	0.38	Q	V			
18+45	0.8182	0.38	Q	V			
18+50	0.8207	0.37	Q	V			
18+55	0.8232	0.36	Q	V			
19+ 0	0.8257	0.36	Q	V			
19+ 5	0.8281	0.35	Q	V			
19+10	0.8305	0.35	Q	V			
19+15	0.8328	0.34	Q	V			
19+20	0.8352	0.34	Q	V			
19+25	0.8374	0.33	Q	V			
19+30	0.8397	0.33	Q	V			
19+35	0.8419	0.32	Q	V			

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   19+40       0.8441      0.32  Q          |          |          |     V    |
   19+45       0.8463      0.31  Q          |          |          |     V    |
   19+50       0.8484      0.31  Q          |          |          |     V    |
   19+55       0.8505      0.31  Q          |          |          |     V    |
   20+ 0       0.8526      0.30  Q          |          |          |     V    |
   20+ 5       0.8547      0.30  Q          |          |          |     V    |
   20+10       0.8567      0.30  Q          |          |          |     V    |
   20+15       0.8587      0.29  Q          |          |          |     V    |
   20+20       0.8607      0.29  Q          |          |          |     V    |
   20+25       0.8627      0.29  Q          |          |          |     V    |
   20+30       0.8646      0.28  Q          |          |          |      V   |
   20+35       0.8665      0.28  Q          |          |          |      V   |
   20+40       0.8684      0.28  Q          |          |          |      V   |
   20+45       0.8703      0.27  Q          |          |          |      V   |
   20+50       0.8722      0.27  Q          |          |          |      V   |
   20+55       0.8741      0.27  Q          |          |          |      V   |
   21+ 0       0.8759      0.27  Q          |          |          |      V   |
   21+ 5       0.8777      0.26  Q          |          |          |      V   |
   21+10       0.8795      0.26  Q          |          |          |      V   |
   21+15       0.8813      0.26  Q          |          |          |      V   |
   21+20       0.8831      0.26  Q          |          |          |      V   |
   21+25       0.8848      0.25  Q          |          |          |      V   |
   21+30       0.8865      0.25  Q          |          |          |      V   |
   21+35       0.8883      0.25  Q          |          |          |       V  |
   21+40       0.8900      0.25  Q          |          |          |       V  |
   21+45       0.8917      0.25  Q          |          |          |       V  |
   21+50       0.8934      0.24  Q          |          |          |       V  |
   21+55       0.8950      0.24  Q          |          |          |       V  |
   22+ 0       0.8967      0.24  Q          |          |          |       V  |
   22+ 5       0.8983      0.24  Q          |          |          |       V  |
   22+10       0.8999      0.24  Q          |          |          |       V  |
   22+15       0.9016      0.23  Q          |          |          |       V  |
   22+20       0.9032      0.23  Q          |          |          |       V  |
   22+25       0.9047      0.23  Q          |          |          |       V  |
   22+30       0.9063      0.23  Q          |          |          |       V  |
   22+35       0.9079      0.23  Q          |          |          |       V  |
   22+40       0.9094      0.23  Q          |          |          |       V  |
   22+45       0.9110      0.22  Q          |          |          |        V |
   22+50       0.9125      0.22  Q          |          |          |        V |
   22+55       0.9141      0.22  Q          |          |          |        V |
   23+ 0       0.9156      0.22  Q          |          |          |        V |
   23+ 5       0.9171      0.22  Q          |          |          |        V |
   23+10       0.9186      0.22  Q          |          |          |        V |
   23+15       0.9200      0.22  Q          |          |          |        V |
   23+20       0.9215      0.21  Q          |          |          |        V |
   23+25       0.9230      0.21  Q          |          |          |        V |
   23+30       0.9244      0.21  Q          |          |          |        V |
   23+35       0.9259      0.21  Q          |          |          |        V |
   23+40       0.9273      0.21  Q          |          |          |        V |
   23+45       0.9288      0.21  Q          |          |          |        V |
   23+50       0.9302      0.21  Q          |          |          |        V |
   23+55       0.9316      0.20  Q          |          |          |        V |
   24+ 0       0.9330      0.20  Q          |          |          |        V |
   24+ 5       0.9335      0.07  Q          |          |          |         V
-------------------------------------------------------------------------------
```

APPENDIX A.9: UNIT HYDROGRAPH, AREA "9"

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0

Study date 06/20/19

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

Program License Serial Number 6279

BNSF
EXISTING HYDROLOGY
AREA 9

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
3.86	1	1.58
Rainfall data for year 100		
3.86	6	3.42
Rainfall data for year 100		
3.86	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
81.6	95.0	3.86	1.000	0.099	0.980	0.097

Area-averaged adjusted loss rate Fm (In/Hr) = 0.097

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
3.78	0.980	81.6	95.0	0.53	0.905
0.08	0.020	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.907
Area-averaged low loss fraction, Yb = 0.093
++
Watercourse length = 1280.00(Ft.)
Length from concentration point to centroid = 745.00(Ft.)
Elevation difference along watercourse = 10.00(Ft.)
Mannings friction factor along watercourse = 0.025
Watershed area = 3.86(Ac.)
Catchment Lag time = 0.082 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 101.5408
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.097(In/Hr)
Average low loss rate fraction (Yb) = 0.093 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 3.86(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.585(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.580(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 46.68 (CFS))		
1	17.696	8.261
2	80.275	29.213
3	98.033	8.290
4	100.000	0.918

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5847	0.5847
2	0.7715	0.1868
3	0.9073	0.1358

4	1.0180	0.1107
5	1.1130	0.0950
6	1.1972	0.0842
7	1.2733	0.0761
8	1.3432	0.0699
9	1.4080	0.0648
10	1.4686	0.0606
11	1.5257	0.0571
12	1.5797	0.0540
13	1.6352	0.0555
14	1.6883	0.0531
15	1.7392	0.0510
16	1.7883	0.0491
17	1.8357	0.0474
18	1.8815	0.0458
19	1.9258	0.0444
20	1.9689	0.0431
21	2.0108	0.0419
22	2.0515	0.0407
23	2.0912	0.0397
24	2.1299	0.0387
25	2.1677	0.0378
26	2.2047	0.0370
27	2.2409	0.0362
28	2.2763	0.0354
29	2.3110	0.0347
30	2.3450	0.0340
31	2.3784	0.0334
32	2.4112	0.0328
33	2.4434	0.0322
34	2.4750	0.0317
35	2.5061	0.0311
36	2.5368	0.0306
37	2.5669	0.0301
38	2.5966	0.0297
39	2.6258	0.0292
40	2.6546	0.0288
41	2.6830	0.0284
42	2.7110	0.0280
43	2.7386	0.0276
44	2.7659	0.0273
45	2.7928	0.0269
46	2.8194	0.0266
47	2.8457	0.0263
48	2.8716	0.0259
49	2.8972	0.0256
50	2.9226	0.0253
51	2.9476	0.0251
52	2.9724	0.0248
53	2.9969	0.0245
54	3.0212	0.0242
55	3.0451	0.0240
56	3.0689	0.0237
57	3.0924	0.0235
58	3.1156	0.0233
59	3.1387	0.0230
60	3.1615	0.0228
61	3.1841	0.0226
62	3.2065	0.0224

63	3.2287	0.0222
64	3.2507	0.0220
65	3.2725	0.0218
66	3.2941	0.0216
67	3.3155	0.0214
68	3.3367	0.0212
69	3.3578	0.0211
70	3.3787	0.0209
71	3.3994	0.0207
72	3.4200	0.0206
73	3.4408	0.0208
74	3.4614	0.0206
75	3.4819	0.0205
76	3.5022	0.0203
77	3.5224	0.0202
78	3.5424	0.0200
79	3.5623	0.0199
80	3.5821	0.0197
81	3.6017	0.0196
82	3.6212	0.0195
83	3.6405	0.0193
84	3.6597	0.0192
85	3.6788	0.0191
86	3.6978	0.0190
87	3.7166	0.0188
88	3.7353	0.0187
89	3.7539	0.0186
90	3.7724	0.0185
91	3.7908	0.0184
92	3.8090	0.0183
93	3.8272	0.0181
94	3.8452	0.0180
95	3.8631	0.0179
96	3.8809	0.0178
97	3.8986	0.0177
98	3.9163	0.0176
99	3.9338	0.0175
100	3.9512	0.0174
101	3.9685	0.0173
102	3.9857	0.0172
103	4.0029	0.0171
104	4.0199	0.0170
105	4.0368	0.0169
106	4.0537	0.0169
107	4.0705	0.0168
108	4.0871	0.0167
109	4.1037	0.0166
110	4.1202	0.0165
111	4.1367	0.0164
112	4.1530	0.0163
113	4.1693	0.0163
114	4.1854	0.0162
115	4.2015	0.0161
116	4.2175	0.0160
117	4.2335	0.0159
118	4.2494	0.0159
119	4.2651	0.0158
120	4.2809	0.0157
121	4.2965	0.0156

122	4.3121	0.0156
123	4.3276	0.0155
124	4.3430	0.0154
125	4.3584	0.0154
126	4.3737	0.0153
127	4.3889	0.0152
128	4.4040	0.0152
129	4.4191	0.0151
130	4.4342	0.0150
131	4.4491	0.0150
132	4.4640	0.0149
133	4.4788	0.0148
134	4.4936	0.0148
135	4.5083	0.0147
136	4.5230	0.0146
137	4.5376	0.0146
138	4.5521	0.0145
139	4.5666	0.0145
140	4.5810	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6239	0.0142
144	4.6380	0.0142
145	4.6522	0.0141
146	4.6662	0.0141
147	4.6803	0.0140
148	4.6942	0.0140
149	4.7082	0.0139
150	4.7220	0.0139
151	4.7358	0.0138
152	4.7496	0.0138
153	4.7633	0.0137
154	4.7770	0.0137
155	4.7906	0.0136
156	4.8041	0.0136
157	4.8176	0.0135
158	4.8311	0.0135
159	4.8445	0.0134
160	4.8579	0.0134
161	4.8712	0.0133
162	4.8845	0.0133
163	4.8977	0.0132
164	4.9109	0.0132
165	4.9240	0.0131
166	4.9371	0.0131
167	4.9502	0.0131
168	4.9632	0.0130
169	4.9761	0.0130
170	4.9891	0.0129
171	5.0019	0.0129
172	5.0148	0.0128
173	5.0276	0.0128
174	5.0403	0.0128
175	5.0530	0.0127
176	5.0657	0.0127
177	5.0783	0.0126
178	5.0909	0.0126
179	5.1035	0.0126
180	5.1160	0.0125

181	5.1285	0.0125
182	5.1409	0.0124
183	5.1533	0.0124
184	5.1657	0.0124
185	5.1780	0.0123
186	5.1903	0.0123
187	5.2025	0.0122
188	5.2147	0.0122
189	5.2269	0.0122
190	5.2390	0.0121
191	5.2511	0.0121
192	5.2632	0.0121
193	5.2752	0.0120
194	5.2872	0.0120
195	5.2992	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3349	0.0119
199	5.3467	0.0118
200	5.3585	0.0118
201	5.3702	0.0118
202	5.3820	0.0117
203	5.3937	0.0117
204	5.4053	0.0117
205	5.4170	0.0116
206	5.4286	0.0116
207	5.4401	0.0116
208	5.4517	0.0115
209	5.4632	0.0115
210	5.4746	0.0115
211	5.4861	0.0114
212	5.4975	0.0114
213	5.5089	0.0114
214	5.5202	0.0114
215	5.5316	0.0113
216	5.5429	0.0113
217	5.5541	0.0113
218	5.5654	0.0112
219	5.5766	0.0112
220	5.5877	0.0112
221	5.5989	0.0111
222	5.6100	0.0111
223	5.6211	0.0111
224	5.6322	0.0111
225	5.6432	0.0110
226	5.6542	0.0110
227	5.6652	0.0110
228	5.6762	0.0110
229	5.6871	0.0109
230	5.6980	0.0109
231	5.7089	0.0109
232	5.7197	0.0108
233	5.7305	0.0108
234	5.7413	0.0108
235	5.7521	0.0108
236	5.7628	0.0107
237	5.7736	0.0107
238	5.7843	0.0107
239	5.7949	0.0107

240	5.8056	0.0106
241	5.8162	0.0106
242	5.8268	0.0106
243	5.8374	0.0106
244	5.8479	0.0105
245	5.8584	0.0105
246	5.8689	0.0105
247	5.8794	0.0105
248	5.8899	0.0105
249	5.9003	0.0104
250	5.9107	0.0104
251	5.9211	0.0104
252	5.9314	0.0104
253	5.9418	0.0103
254	5.9521	0.0103
255	5.9624	0.0103
256	5.9726	0.0103
257	5.9829	0.0102
258	5.9931	0.0102
259	6.0033	0.0102
260	6.0135	0.0102
261	6.0236	0.0102
262	6.0338	0.0101
263	6.0439	0.0101
264	6.0540	0.0101
265	6.0640	0.0101
266	6.0741	0.0100
267	6.0841	0.0100
268	6.0941	0.0100
269	6.1041	0.0100
270	6.1140	0.0100
271	6.1240	0.0099
272	6.1339	0.0099
273	6.1438	0.0099
274	6.1537	0.0099
275	6.1636	0.0099
276	6.1734	0.0098
277	6.1832	0.0098
278	6.1930	0.0098
279	6.2028	0.0098
280	6.2126	0.0098
281	6.2223	0.0097
282	6.2320	0.0097
283	6.2417	0.0097
284	6.2514	0.0097
285	6.2611	0.0097
286	6.2707	0.0096
287	6.2804	0.0096
288	6.2900	0.0096

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0009	0.0087
2	0.0096	0.0009	0.0087
3	0.0097	0.0009	0.0088
4	0.0097	0.0009	0.0088
5	0.0097	0.0009	0.0088
6	0.0097	0.0009	0.0088
7	0.0098	0.0009	0.0089
8	0.0098	0.0009	0.0089
9	0.0098	0.0009	0.0089
10	0.0099	0.0009	0.0089
11	0.0099	0.0009	0.0090
12	0.0099	0.0009	0.0090
13	0.0100	0.0009	0.0090
14	0.0100	0.0009	0.0091
15	0.0100	0.0009	0.0091
16	0.0100	0.0009	0.0091
17	0.0101	0.0009	0.0091
18	0.0101	0.0009	0.0092
19	0.0102	0.0009	0.0092
20	0.0102	0.0010	0.0092
21	0.0102	0.0010	0.0093
22	0.0102	0.0010	0.0093
23	0.0103	0.0010	0.0093
24	0.0103	0.0010	0.0093
25	0.0104	0.0010	0.0094
26	0.0104	0.0010	0.0094
27	0.0104	0.0010	0.0095
28	0.0105	0.0010	0.0095
29	0.0105	0.0010	0.0095
30	0.0105	0.0010	0.0095
31	0.0106	0.0010	0.0096
32	0.0106	0.0010	0.0096
33	0.0106	0.0010	0.0097
34	0.0107	0.0010	0.0097
35	0.0107	0.0010	0.0097
36	0.0107	0.0010	0.0097
37	0.0108	0.0010	0.0098
38	0.0108	0.0010	0.0098
39	0.0109	0.0010	0.0099
40	0.0109	0.0010	0.0099
41	0.0110	0.0010	0.0099
42	0.0110	0.0010	0.0100
43	0.0110	0.0010	0.0100
44	0.0111	0.0010	0.0100
45	0.0111	0.0010	0.0101
46	0.0111	0.0010	0.0101
47	0.0112	0.0010	0.0102
48	0.0112	0.0010	0.0102
49	0.0113	0.0011	0.0102
50	0.0113	0.0011	0.0103
51	0.0114	0.0011	0.0103
52	0.0114	0.0011	0.0103
53	0.0115	0.0011	0.0104
54	0.0115	0.0011	0.0104
55	0.0116	0.0011	0.0105
56	0.0116	0.0011	0.0105
57	0.0117	0.0011	0.0106
58	0.0117	0.0011	0.0106
59	0.0118	0.0011	0.0107
60	0.0118	0.0011	0.0107
61	0.0119	0.0011	0.0108
62	0.0119	0.0011	0.0108
63	0.0120	0.0011	0.0108
64	0.0120	0.0011	0.0109

65	0.0121	0.0011	0.0109
66	0.0121	0.0011	0.0110
67	0.0122	0.0011	0.0110
68	0.0122	0.0011	0.0111
69	0.0123	0.0011	0.0111
70	0.0123	0.0012	0.0112
71	0.0124	0.0012	0.0112
72	0.0124	0.0012	0.0113
73	0.0125	0.0012	0.0113
74	0.0126	0.0012	0.0114
75	0.0126	0.0012	0.0115
76	0.0127	0.0012	0.0115
77	0.0128	0.0012	0.0116
78	0.0128	0.0012	0.0116
79	0.0129	0.0012	0.0117
80	0.0129	0.0012	0.0117
81	0.0130	0.0012	0.0118
82	0.0131	0.0012	0.0118
83	0.0131	0.0012	0.0119
84	0.0132	0.0012	0.0120
85	0.0133	0.0012	0.0120
86	0.0133	0.0012	0.0121
87	0.0134	0.0013	0.0122
88	0.0135	0.0013	0.0122
89	0.0136	0.0013	0.0123
90	0.0136	0.0013	0.0123
91	0.0137	0.0013	0.0124
92	0.0138	0.0013	0.0125
93	0.0139	0.0013	0.0126
94	0.0139	0.0013	0.0126
95	0.0140	0.0013	0.0127
96	0.0141	0.0013	0.0128
97	0.0142	0.0013	0.0129
98	0.0142	0.0013	0.0129
99	0.0144	0.0013	0.0130
100	0.0144	0.0013	0.0131
101	0.0145	0.0014	0.0132
102	0.0146	0.0014	0.0132
103	0.0147	0.0014	0.0133
104	0.0148	0.0014	0.0134
105	0.0149	0.0014	0.0135
106	0.0150	0.0014	0.0136
107	0.0151	0.0014	0.0137
108	0.0152	0.0014	0.0137
109	0.0153	0.0014	0.0139
110	0.0154	0.0014	0.0139
111	0.0155	0.0014	0.0141
112	0.0156	0.0015	0.0141
113	0.0157	0.0015	0.0142
114	0.0158	0.0015	0.0143
115	0.0159	0.0015	0.0145
116	0.0160	0.0015	0.0145
117	0.0162	0.0015	0.0147
118	0.0163	0.0015	0.0147
119	0.0164	0.0015	0.0149
120	0.0165	0.0015	0.0150
121	0.0167	0.0016	0.0151
122	0.0168	0.0016	0.0152
123	0.0169	0.0016	0.0154

124	0.0170	0.0016	0.0154
125	0.0172	0.0016	0.0156
126	0.0173	0.0016	0.0157
127	0.0175	0.0016	0.0159
128	0.0176	0.0016	0.0160
129	0.0178	0.0017	0.0162
130	0.0179	0.0017	0.0163
131	0.0181	0.0017	0.0164
132	0.0183	0.0017	0.0165
133	0.0185	0.0017	0.0168
134	0.0186	0.0017	0.0169
135	0.0188	0.0018	0.0171
136	0.0190	0.0018	0.0172
137	0.0192	0.0018	0.0174
138	0.0193	0.0018	0.0175
139	0.0196	0.0018	0.0178
140	0.0197	0.0018	0.0179
141	0.0200	0.0019	0.0182
142	0.0202	0.0019	0.0183
143	0.0205	0.0019	0.0186
144	0.0206	0.0019	0.0187
145	0.0206	0.0019	0.0186
146	0.0207	0.0019	0.0188
147	0.0211	0.0020	0.0191
148	0.0212	0.0020	0.0193
149	0.0216	0.0020	0.0196
150	0.0218	0.0020	0.0198
151	0.0222	0.0021	0.0201
152	0.0224	0.0021	0.0203
153	0.0228	0.0021	0.0207
154	0.0230	0.0022	0.0209
155	0.0235	0.0022	0.0213
156	0.0237	0.0022	0.0215
157	0.0242	0.0023	0.0220
158	0.0245	0.0023	0.0222
159	0.0251	0.0023	0.0227
160	0.0253	0.0024	0.0230
161	0.0259	0.0024	0.0235
162	0.0263	0.0025	0.0238
163	0.0269	0.0025	0.0244
164	0.0273	0.0025	0.0247
165	0.0280	0.0026	0.0254
166	0.0284	0.0027	0.0257
167	0.0292	0.0027	0.0265
168	0.0297	0.0028	0.0269
169	0.0306	0.0029	0.0278
170	0.0311	0.0029	0.0282
171	0.0322	0.0030	0.0292
172	0.0328	0.0031	0.0297
173	0.0340	0.0032	0.0308
174	0.0347	0.0032	0.0315
175	0.0362	0.0034	0.0328
176	0.0370	0.0035	0.0335
177	0.0387	0.0036	0.0351
178	0.0397	0.0037	0.0360
179	0.0419	0.0039	0.0379
180	0.0431	0.0040	0.0390
181	0.0458	0.0043	0.0415
182	0.0474	0.0044	0.0429

183	0.0510	0.0048	0.0462
184	0.0531	0.0050	0.0481
185	0.0540	0.0050	0.0490
186	0.0571	0.0053	0.0517
187	0.0648	0.0061	0.0587
188	0.0699	0.0065	0.0633
189	0.0842	0.0079	0.0763
190	0.0950	0.0081	0.0870
191	0.1358	0.0081	0.1278
192	0.1868	0.0081	0.1787
193	0.5847	0.0081	0.5766
194	0.1107	0.0081	0.1026
195	0.0761	0.0071	0.0690
196	0.0606	0.0057	0.0549
197	0.0555	0.0052	0.0503
198	0.0491	0.0046	0.0445
199	0.0444	0.0041	0.0402
200	0.0407	0.0038	0.0369
201	0.0378	0.0035	0.0343
202	0.0354	0.0033	0.0321
203	0.0334	0.0031	0.0303
204	0.0317	0.0030	0.0287
205	0.0301	0.0028	0.0273
206	0.0288	0.0027	0.0261
207	0.0276	0.0026	0.0251
208	0.0266	0.0025	0.0241
209	0.0256	0.0024	0.0232
210	0.0248	0.0023	0.0225
211	0.0240	0.0022	0.0217
212	0.0233	0.0022	0.0211
213	0.0226	0.0021	0.0205
214	0.0220	0.0021	0.0199
215	0.0214	0.0020	0.0194
216	0.0209	0.0020	0.0189
217	0.0208	0.0019	0.0189
218	0.0203	0.0019	0.0184
219	0.0199	0.0019	0.0180
220	0.0195	0.0018	0.0177
221	0.0191	0.0018	0.0173
222	0.0187	0.0017	0.0170
223	0.0184	0.0017	0.0166
224	0.0180	0.0017	0.0163
225	0.0177	0.0017	0.0161
226	0.0174	0.0016	0.0158
227	0.0171	0.0016	0.0155
228	0.0169	0.0016	0.0153
229	0.0166	0.0016	0.0150
230	0.0163	0.0015	0.0148
231	0.0161	0.0015	0.0146
232	0.0159	0.0015	0.0144
233	0.0156	0.0015	0.0142
234	0.0154	0.0014	0.0140
235	0.0152	0.0014	0.0138
236	0.0150	0.0014	0.0136
237	0.0148	0.0014	0.0134
238	0.0146	0.0014	0.0133
239	0.0145	0.0014	0.0131
240	0.0143	0.0013	0.0130
241	0.0141	0.0013	0.0128

242	0.0140	0.0013	0.0127
243	0.0138	0.0013	0.0125
244	0.0137	0.0013	0.0124
245	0.0135	0.0013	0.0122
246	0.0134	0.0012	0.0121
247	0.0132	0.0012	0.0120
248	0.0131	0.0012	0.0119
249	0.0130	0.0012	0.0118
250	0.0128	0.0012	0.0116
251	0.0127	0.0012	0.0115
252	0.0126	0.0012	0.0114
253	0.0125	0.0012	0.0113
254	0.0124	0.0012	0.0112
255	0.0122	0.0011	0.0111
256	0.0121	0.0011	0.0110
257	0.0120	0.0011	0.0109
258	0.0119	0.0011	0.0108
259	0.0118	0.0011	0.0107
260	0.0117	0.0011	0.0106
261	0.0116	0.0011	0.0105
262	0.0115	0.0011	0.0105
263	0.0114	0.0011	0.0104
264	0.0114	0.0011	0.0103
265	0.0113	0.0011	0.0102
266	0.0112	0.0010	0.0101
267	0.0111	0.0010	0.0101
268	0.0110	0.0010	0.0100
269	0.0109	0.0010	0.0099
270	0.0108	0.0010	0.0098
271	0.0108	0.0010	0.0098
272	0.0107	0.0010	0.0097
273	0.0106	0.0010	0.0096
274	0.0105	0.0010	0.0096
275	0.0105	0.0010	0.0095
276	0.0104	0.0010	0.0094
277	0.0103	0.0010	0.0094
278	0.0103	0.0010	0.0093
279	0.0102	0.0010	0.0092
280	0.0101	0.0009	0.0092
281	0.0101	0.0009	0.0091
282	0.0100	0.0009	0.0091
283	0.0099	0.0009	0.0090
284	0.0099	0.0009	0.0090
285	0.0098	0.0009	0.0089
286	0.0098	0.0009	0.0088
287	0.0097	0.0009	0.0088
288	0.0096	0.0009	0.0087

Total soil rain loss = 0.52(In)
Total effective rainfall = 5.77(In)
Peak flow rate in flood hydrograph = 19.29(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	5.0	10.0	15.0	20.0
0+ 5	0.0005	0.07	Q				
0+10	0.0027	0.33	Q				
0+15	0.0055	0.40	Q				
0+20	0.0083	0.41	Q				
0+25	0.0111	0.41	Q				
0+30	0.0140	0.41	Q				
0+35	0.0168	0.41	Q				
0+40	0.0197	0.41	Q				
0+45	0.0225	0.41	Q				
0+50	0.0254	0.42	Q				
0+55	0.0283	0.42	Q				
1+ 0	0.0311	0.42	Q				
1+ 5	0.0340	0.42	Q				
1+10	0.0369	0.42	Q				
1+15	0.0398	0.42	Q				
1+20	0.0428	0.42	Q				
1+25	0.0457	0.43	Q				
1+30	0.0486	0.43	QV				
1+35	0.0516	0.43	QV				
1+40	0.0545	0.43	QV				
1+45	0.0575	0.43	QV				
1+50	0.0605	0.43	QV				
1+55	0.0635	0.43	QV				
2+ 0	0.0665	0.44	QV				
2+ 5	0.0695	0.44	QV				
2+10	0.0725	0.44	QV				
2+15	0.0755	0.44	QV				
2+20	0.0786	0.44	QV				
2+25	0.0816	0.44	QV				
2+30	0.0847	0.44	QV				
2+35	0.0877	0.45	QV				
2+40	0.0908	0.45	QV				
2+45	0.0939	0.45	Q V				
2+50	0.0970	0.45	Q V				
2+55	0.1001	0.45	Q V				
3+ 0	0.1032	0.45	Q V				
3+ 5	0.1064	0.45	Q V				
3+10	0.1095	0.46	Q V				
3+15	0.1127	0.46	Q V				
3+20	0.1158	0.46	Q V				
3+25	0.1190	0.46	Q V				
3+30	0.1222	0.46	Q V				
3+35	0.1254	0.46	Q V				
3+40	0.1286	0.47	Q V				
3+45	0.1318	0.47	Q V				
3+50	0.1351	0.47	Q V				
3+55	0.1383	0.47	Q V				
4+ 0	0.1416	0.47	Q V				
4+ 5	0.1449	0.48	Q V				
4+10	0.1482	0.48	Q V				
4+15	0.1515	0.48	Q V				
4+20	0.1548	0.48	Q V				
4+25	0.1581	0.48	Q V				
4+30	0.1615	0.49	Q V				
4+35	0.1648	0.49	Q V				
4+40	0.1682	0.49	Q V				

4+45	0.1716	0.49	Q V				
4+50	0.1750	0.49	Q V				
4+55	0.1784	0.50	Q V				
5+ 0	0.1818	0.50	Q V				
5+ 5	0.1852	0.50	Q V				
5+10	0.1887	0.50	Q V				
5+15	0.1921	0.50	Q V				
5+20	0.1956	0.51	Q V				
5+25	0.1991	0.51	Q V				
5+30	0.2026	0.51	Q V				
5+35	0.2062	0.51	Q V				
5+40	0.2097	0.51	Q V				
5+45	0.2133	0.52	Q V				
5+50	0.2169	0.52	Q V				
5+55	0.2204	0.52	Q V				
6+ 0	0.2241	0.52	Q V				
6+ 5	0.2277	0.53	Q V				
6+10	0.2313	0.53	Q V				
6+15	0.2350	0.53	Q V				
6+20	0.2387	0.53	Q V				
6+25	0.2424	0.54	Q V				
6+30	0.2461	0.54	Q V				
6+35	0.2498	0.54	Q V				
6+40	0.2536	0.54	Q V				
6+45	0.2573	0.55	Q V				
6+50	0.2611	0.55	Q V				
6+55	0.2649	0.55	Q V				
7+ 0	0.2687	0.56	Q V				
7+ 5	0.2726	0.56	Q V				
7+10	0.2765	0.56	Q V				
7+15	0.2803	0.56	Q V				
7+20	0.2842	0.57	Q V				
7+25	0.2882	0.57	Q V				
7+30	0.2921	0.57	Q V				
7+35	0.2961	0.58	Q V				
7+40	0.3001	0.58	Q V				
7+45	0.3041	0.58	Q V				
7+50	0.3081	0.59	Q V				
7+55	0.3122	0.59	Q V				
8+ 0	0.3163	0.59	Q V				
8+ 5	0.3204	0.60	Q V				
8+10	0.3245	0.60	Q V				
8+15	0.3287	0.60	Q V				
8+20	0.3328	0.61	Q V				
8+25	0.3370	0.61	Q V				
8+30	0.3413	0.61	Q V				
8+35	0.3455	0.62	Q V				
8+40	0.3498	0.62	Q V				
8+45	0.3541	0.63	Q V				
8+50	0.3585	0.63	Q V				
8+55	0.3628	0.63	Q V				
9+ 0	0.3672	0.64	Q V				
9+ 5	0.3716	0.64	Q V				
9+10	0.3761	0.65	Q V				
9+15	0.3806	0.65	Q V				
9+20	0.3851	0.66	Q V				
9+25	0.3896	0.66	Q V				
9+30	0.3942	0.66	Q V				
9+35	0.3988	0.67	Q V				

9+40	0.4034	0.67	Q V			
9+45	0.4081	0.68	Q V			
9+50	0.4128	0.68	Q V			
9+55	0.4176	0.69	Q V			
10+ 0	0.4223	0.69	Q V			
10+ 5	0.4272	0.70	Q V			
10+10	0.4320	0.70	Q V			
10+15	0.4369	0.71	Q V			
10+20	0.4418	0.72	Q V			
10+25	0.4468	0.72	Q V			
10+30	0.4518	0.73	Q V			
10+35	0.4569	0.73	Q V			
10+40	0.4620	0.74	Q V			
10+45	0.4671	0.75	Q V			
10+50	0.4723	0.75	Q V			
10+55	0.4775	0.76	Q V			
11+ 0	0.4828	0.77	Q V			
11+ 5	0.4881	0.77	Q V			
11+10	0.4935	0.78	Q V			
11+15	0.4989	0.79	Q V			
11+20	0.5044	0.80	Q V			
11+25	0.5099	0.80	Q V			
11+30	0.5155	0.81	Q V			
11+35	0.5212	0.82	Q V			
11+40	0.5269	0.83	Q V			
11+45	0.5326	0.84	Q V			
11+50	0.5385	0.85	Q V			
11+55	0.5444	0.85	Q V			
12+ 0	0.5503	0.87	Q V			
12+ 5	0.5563	0.87	Q V			
12+10	0.5623	0.87	Q V			
12+15	0.5684	0.88	Q V			
12+20	0.5745	0.89	Q V			
12+25	0.5807	0.90	Q V			
12+30	0.5870	0.91	Q V			
12+35	0.5933	0.92	Q V			
12+40	0.5998	0.94	Q V			
12+45	0.6063	0.95	Q V			
12+50	0.6130	0.96	Q V			
12+55	0.6197	0.98	Q V			
13+ 0	0.6265	0.99	Q V			
13+ 5	0.6334	1.01	Q V			
13+10	0.6405	1.02	Q V			
13+15	0.6476	1.04	Q V			
13+20	0.6549	1.06	Q V			
13+25	0.6623	1.07	Q V			
13+30	0.6699	1.09	Q V			
13+35	0.6775	1.11	Q V			
13+40	0.6853	1.14	Q V			
13+45	0.6933	1.16	Q V			
13+50	0.7015	1.18	Q V			
13+55	0.7097	1.20	Q V			
14+ 0	0.7182	1.23	Q V			
14+ 5	0.7269	1.26	Q V			
14+10	0.7358	1.29	Q V			
14+15	0.7449	1.32	Q V			
14+20	0.7542	1.36	Q V			
14+25	0.7638	1.39	Q V			
14+30	0.7737	1.43	Q V			

14+35	0.7838	1.47	Q V			
14+40	0.7943	1.52	Q V			
14+45	0.8051	1.57	Q V			
14+50	0.8164	1.63	Q V			
14+55	0.8280	1.69	Q V			
15+ 0	0.8401	1.76	Q V			
15+ 5	0.8527	1.83	Q V			
15+10	0.8660	1.93	Q V			
15+15	0.8799	2.02	Q V			
15+20	0.8946	2.14	Q V			
15+25	0.9100	2.23	Q V			
15+30	0.9258	2.30	Q V			
15+35	0.9427	2.45	Q V			
15+40	0.9614	2.71	Q V			
15+45	0.9821	3.02	Q V			
15+50	1.0064	3.53	Q V			
15+55	1.0360	4.29	Q V			
16+ 0	1.0773	6.00	Q V			
16+ 5	1.1539	11.12	Q V			
16+10	1.2867	19.29	V		Q	
16+15	1.3454	8.51	Q V			
16+20	1.3719	3.85	Q V			
16+25	1.3904	2.69	Q V			
16+30	1.4066	2.36	Q V			
16+35	1.4211	2.10	Q V			
16+40	1.4341	1.90	Q V			
16+45	1.4461	1.74	Q V			
16+50	1.4572	1.61	Q V			
16+55	1.4675	1.51	Q V			
17+ 0	1.4773	1.42	Q V			
17+ 5	1.4866	1.34	Q V			
17+10	1.4954	1.28	Q V			
17+15	1.5038	1.22	Q V			
17+20	1.5119	1.17	Q V			
17+25	1.5196	1.13	Q V			
17+30	1.5271	1.09	Q V			
17+35	1.5344	1.05	Q V			
17+40	1.5414	1.02	Q V			
17+45	1.5481	0.99	Q V			
17+50	1.5547	0.96	Q V			
17+55	1.5612	0.93	Q V			
18+ 0	1.5674	0.91	Q V			
18+ 5	1.5735	0.89	Q V			
18+10	1.5796	0.88	Q V			
18+15	1.5855	0.86	Q V			
18+20	1.5913	0.84	Q V			
18+25	1.5970	0.83	Q V			
18+30	1.6026	0.81	Q V			
18+35	1.6080	0.79	Q V			
18+40	1.6134	0.78	Q V			
18+45	1.6186	0.76	Q V			
18+50	1.6238	0.75	Q V			
18+55	1.6289	0.74	Q V			
19+ 0	1.6339	0.73	Q V			
19+ 5	1.6388	0.71	Q V			
19+10	1.6436	0.70	Q V			
19+15	1.6484	0.69	Q V			
19+20	1.6531	0.68	Q V			
19+25	1.6577	0.67	Q V			

```
   19+30       1.6623      0.66  |Q        |         |         |    V    |
   19+35       1.6668      0.65  |Q        |         |         |    V    |
   19+40       1.6712      0.64  |Q        |         |         |     V   |
   19+45       1.6756      0.64  |Q        |         |         |     V   |
   19+50       1.6799      0.63  |Q        |         |         |     V   |
   19+55       1.6842      0.62  |Q        |         |         |     V   |
   20+ 0       1.6884      0.61  |Q        |         |         |     V   |
   20+ 5       1.6926      0.61  |Q        |         |         |     V   |
   20+10       1.6967      0.60  |Q        |         |         |     V   |
   20+15       1.7008      0.59  |Q        |         |         |     V   |
   20+20       1.7048      0.58  |Q        |         |         |     V   |
   20+25       1.7088      0.58  |Q        |         |         |     V   |
   20+30       1.7127      0.57  |Q        |         |         |     V   |
   20+35       1.7166      0.57  |Q        |         |         |      V  |
   20+40       1.7205      0.56  |Q        |         |         |      V  |
   20+45       1.7243      0.55  |Q        |         |         |      V  |
   20+50       1.7281      0.55  |Q        |         |         |      V  |
   20+55       1.7318      0.54  |Q        |         |         |      V  |
   21+ 0       1.7356      0.54  |Q        |         |         |      V  |
   21+ 5       1.7392      0.53  |Q        |         |         |      V  |
   21+10       1.7429      0.53  |Q        |         |         |      V  |
   21+15       1.7465      0.52  |Q        |         |         |      V  |
   21+20       1.7500      0.52  |Q        |         |         |      V  |
   21+25       1.7536      0.51  |Q        |         |         |      V  |
   21+30       1.7571      0.51  |Q        |         |         |      V  |
   21+35       1.7606      0.50  |Q        |         |         |      V  |
   21+40       1.7640      0.50  |Q        |         |         |       V |
   21+45       1.7674      0.50  Q        |         |         |       V |
   21+50       1.7708      0.49  Q        |         |         |       V |
   21+55       1.7742      0.49  Q        |         |         |       V |
   22+ 0       1.7775      0.48  Q        |         |         |       V |
   22+ 5       1.7808      0.48  Q        |         |         |       V |
   22+10       1.7841      0.48  Q        |         |         |       V |
   22+15       1.7874      0.47  Q        |         |         |       V |
   22+20       1.7906      0.47  Q        |         |         |       V |
   22+25       1.7938      0.47  Q        |         |         |       V |
   22+30       1.7970      0.46  Q        |         |         |       V |
   22+35       1.8002      0.46  Q        |         |         |       V |
   22+40       1.8033      0.46  Q        |         |         |       V |
   22+45       1.8064      0.45  Q        |         |         |       V |
   22+50       1.8095      0.45  Q        |         |         |        V|
   22+55       1.8126      0.45  Q        |         |         |        V|
   23+ 0       1.8156      0.44  Q        |         |         |        V|
   23+ 5       1.8187      0.44  Q        |         |         |        V|
   23+10       1.8217      0.44  Q        |         |         |        V|
   23+15       1.8247      0.43  Q        |         |         |        V|
   23+20       1.8277      0.43  Q        |         |         |        V|
   23+25       1.8306      0.43  Q        |         |         |        V|
   23+30       1.8335      0.43  Q        |         |         |        V|
   23+35       1.8365      0.42  Q        |         |         |        V|
   23+40       1.8394      0.42  Q        |         |         |        V|
   23+45       1.8422      0.42  Q        |         |         |        V|
   23+50       1.8451      0.42  Q        |         |         |        V|
   23+55       1.8480      0.41  Q        |         |         |        V|
   24+ 0       1.8508      0.41  Q        |         |         |        V|
   24+ 5       1.8531      0.34  Q        |         |         |        V|
   24+10       1.8537      0.08  Q        |         |         |        V|
   24+15       1.8537      0.01  Q        |         |         |         V
-------------------------------------------------------------------------
```

APPENDIX B: PRE-PROJECT UNIT HYDROGRAPH METHOD HYDROLOGY

APPENDIX B.1: UNIT HYDROGRAPH, AREA "1"

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/20/19

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

Program License Serial Number 6279

BNSF
POST PROJECT HYDROLOGY
AREA 1

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
3.26	1	1.58
Rainfall data for year 100		
3.26	6	3.42
Rainfall data for year 100		
3.26	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
86.0	97.2	3.26	1.000	0.055	0.750	0.042

Area-averaged adjusted loss rate Fm (In/Hr) = 0.042

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
2.44	0.750	86.0	97.2	0.29	0.947
0.81	0.250	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.951
Area-averaged low loss fraction, Yb = 0.049
++
Watercourse length = 1136.00(Ft.)
Length from concentration point to centroid = 569.00(Ft.)
Elevation difference along watercourse = 22.00(Ft.)
Mannings friction factor along watercourse = 0.020
Watershed area = 3.26(Ac.)
Catchment Lag time = 0.048 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 174.8364
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.042(In/Hr)
Average low loss rate fraction (Yb) = 0.049 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 3.26(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.585(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.580(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 39.43 (CFS))		
1	41.890	16.515
2	97.628	21.975
3	100.000	0.935

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5847	0.5847
2	0.7715	0.1868
3	0.9073	0.1358
4	1.0180	0.1107

5	1.1130	0.0950
6	1.1972	0.0842
7	1.2734	0.0761
8	1.3432	0.0699
9	1.4080	0.0648
10	1.4686	0.0606
11	1.5257	0.0571
12	1.5798	0.0540
13	1.6352	0.0555
14	1.6883	0.0531
15	1.7393	0.0510
16	1.7883	0.0491
17	1.8357	0.0474
18	1.8815	0.0458
19	1.9259	0.0444
20	1.9689	0.0431
21	2.0108	0.0419
22	2.0515	0.0407
23	2.0912	0.0397
24	2.1299	0.0387
25	2.1677	0.0378
26	2.2047	0.0370
27	2.2409	0.0362
28	2.2763	0.0354
29	2.3110	0.0347
30	2.3450	0.0340
31	2.3784	0.0334
32	2.4112	0.0328
33	2.4434	0.0322
34	2.4750	0.0316
35	2.5061	0.0311
36	2.5368	0.0306
37	2.5669	0.0301
38	2.5966	0.0297
39	2.6258	0.0292
40	2.6546	0.0288
41	2.6830	0.0284
42	2.7110	0.0280
43	2.7387	0.0276
44	2.7659	0.0273
45	2.7928	0.0269
46	2.8194	0.0266
47	2.8457	0.0263
48	2.8716	0.0259
49	2.8973	0.0256
50	2.9226	0.0253
51	2.9476	0.0251
52	2.9724	0.0248
53	2.9969	0.0245
54	3.0212	0.0242
55	3.0451	0.0240
56	3.0689	0.0237
57	3.0924	0.0235
58	3.1157	0.0233
59	3.1387	0.0230
60	3.1615	0.0228
61	3.1841	0.0226
62	3.2065	0.0224
63	3.2287	0.0222

64	3.2507	0.0220
65	3.2725	0.0218
66	3.2941	0.0216
67	3.3155	0.0214
68	3.3367	0.0212
69	3.3578	0.0211
70	3.3787	0.0209
71	3.3994	0.0207
72	3.4200	0.0206
73	3.4408	0.0208
74	3.4614	0.0206
75	3.4819	0.0205
76	3.5022	0.0203
77	3.5224	0.0202
78	3.5424	0.0200
79	3.5623	0.0199
80	3.5821	0.0197
81	3.6017	0.0196
82	3.6212	0.0195
83	3.6405	0.0193
84	3.6597	0.0192
85	3.6788	0.0191
86	3.6978	0.0190
87	3.7166	0.0188
88	3.7353	0.0187
89	3.7539	0.0186
90	3.7724	0.0185
91	3.7908	0.0184
92	3.8090	0.0183
93	3.8272	0.0181
94	3.8452	0.0180
95	3.8631	0.0179
96	3.8809	0.0178
97	3.8987	0.0177
98	3.9163	0.0176
99	3.9338	0.0175
100	3.9512	0.0174
101	3.9685	0.0173
102	3.9857	0.0172
103	4.0029	0.0171
104	4.0199	0.0170
105	4.0369	0.0169
106	4.0537	0.0169
107	4.0705	0.0168
108	4.0871	0.0167
109	4.1037	0.0166
110	4.1202	0.0165
111	4.1367	0.0164
112	4.1530	0.0163
113	4.1693	0.0163
114	4.1854	0.0162
115	4.2015	0.0161
116	4.2176	0.0160
117	4.2335	0.0159
118	4.2494	0.0159
119	4.2652	0.0158
120	4.2809	0.0157
121	4.2965	0.0156
122	4.3121	0.0156

123	4.3276	0.0155
124	4.3430	0.0154
125	4.3584	0.0154
126	4.3737	0.0153
127	4.3889	0.0152
128	4.4040	0.0152
129	4.4191	0.0151
130	4.4342	0.0150
131	4.4491	0.0150
132	4.4640	0.0149
133	4.4788	0.0148
134	4.4936	0.0148
135	4.5083	0.0147
136	4.5230	0.0146
137	4.5376	0.0146
138	4.5521	0.0145
139	4.5666	0.0145
140	4.5810	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6239	0.0142
144	4.6380	0.0142
145	4.6522	0.0141
146	4.6663	0.0141
147	4.6803	0.0140
148	4.6942	0.0140
149	4.7082	0.0139
150	4.7220	0.0139
151	4.7358	0.0138
152	4.7496	0.0138
153	4.7633	0.0137
154	4.7770	0.0137
155	4.7906	0.0136
156	4.8041	0.0136
157	4.8176	0.0135
158	4.8311	0.0135
159	4.8445	0.0134
160	4.8579	0.0134
161	4.8712	0.0133
162	4.8845	0.0133
163	4.8977	0.0132
164	4.9109	0.0132
165	4.9240	0.0131
166	4.9371	0.0131
167	4.9502	0.0131
168	4.9632	0.0130
169	4.9762	0.0130
170	4.9891	0.0129
171	5.0020	0.0129
172	5.0148	0.0128
173	5.0276	0.0128
174	5.0403	0.0128
175	5.0530	0.0127
176	5.0657	0.0127
177	5.0783	0.0126
178	5.0909	0.0126
179	5.1035	0.0126
180	5.1160	0.0125
181	5.1285	0.0125

182	5.1409	0.0124
183	5.1533	0.0124
184	5.1657	0.0124
185	5.1780	0.0123
186	5.1903	0.0123
187	5.2025	0.0122
188	5.2147	0.0122
189	5.2269	0.0122
190	5.2390	0.0121
191	5.2511	0.0121
192	5.2632	0.0121
193	5.2752	0.0120
194	5.2872	0.0120
195	5.2992	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3349	0.0119
199	5.3467	0.0118
200	5.3585	0.0118
201	5.3703	0.0118
202	5.3820	0.0117
203	5.3937	0.0117
204	5.4053	0.0117
205	5.4170	0.0116
206	5.4286	0.0116
207	5.4401	0.0116
208	5.4517	0.0115
209	5.4632	0.0115
210	5.4746	0.0115
211	5.4861	0.0114
212	5.4975	0.0114
213	5.5089	0.0114
214	5.5202	0.0114
215	5.5316	0.0113
216	5.5429	0.0113
217	5.5541	0.0113
218	5.5654	0.0112
219	5.5766	0.0112
220	5.5877	0.0112
221	5.5989	0.0111
222	5.6100	0.0111
223	5.6211	0.0111
224	5.6322	0.0111
225	5.6432	0.0110
226	5.6542	0.0110
227	5.6652	0.0110
228	5.6762	0.0110
229	5.6871	0.0109
230	5.6980	0.0109
231	5.7089	0.0109
232	5.7197	0.0108
233	5.7305	0.0108
234	5.7413	0.0108
235	5.7521	0.0108
236	5.7629	0.0107
237	5.7736	0.0107
238	5.7843	0.0107
239	5.7949	0.0107
240	5.8056	0.0106

241	5.8162	0.0106
242	5.8268	0.0106
243	5.8374	0.0106
244	5.8479	0.0105
245	5.8584	0.0105
246	5.8689	0.0105
247	5.8794	0.0105
248	5.8899	0.0105
249	5.9003	0.0104
250	5.9107	0.0104
251	5.9211	0.0104
252	5.9314	0.0104
253	5.9418	0.0103
254	5.9521	0.0103
255	5.9624	0.0103
256	5.9726	0.0103
257	5.9829	0.0102
258	5.9931	0.0102
259	6.0033	0.0102
260	6.0135	0.0102
261	6.0236	0.0102
262	6.0338	0.0101
263	6.0439	0.0101
264	6.0540	0.0101
265	6.0640	0.0101
266	6.0741	0.0100
267	6.0841	0.0100
268	6.0941	0.0100
269	6.1041	0.0100
270	6.1141	0.0100
271	6.1240	0.0099
272	6.1339	0.0099
273	6.1438	0.0099
274	6.1537	0.0099
275	6.1636	0.0099
276	6.1734	0.0098
277	6.1832	0.0098
278	6.1930	0.0098
279	6.2028	0.0098
280	6.2126	0.0098
281	6.2223	0.0097
282	6.2320	0.0097
283	6.2417	0.0097
284	6.2514	0.0097
285	6.2611	0.0097
286	6.2707	0.0096
287	6.2804	0.0096
288	6.2900	0.0096

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0005	0.0091
2	0.0096	0.0005	0.0092
3	0.0097	0.0005	0.0092
4	0.0097	0.0005	0.0092
5	0.0097	0.0005	0.0092
6	0.0097	0.0005	0.0093
7	0.0098	0.0005	0.0093
8	0.0098	0.0005	0.0093
9	0.0098	0.0005	0.0094
10	0.0099	0.0005	0.0094
11	0.0099	0.0005	0.0094
12	0.0099	0.0005	0.0094
13	0.0100	0.0005	0.0095
14	0.0100	0.0005	0.0095
15	0.0100	0.0005	0.0095
16	0.0100	0.0005	0.0096
17	0.0101	0.0005	0.0096
18	0.0101	0.0005	0.0096
19	0.0102	0.0005	0.0097
20	0.0102	0.0005	0.0097
21	0.0102	0.0005	0.0097
22	0.0102	0.0005	0.0097
23	0.0103	0.0005	0.0098
24	0.0103	0.0005	0.0098
25	0.0104	0.0005	0.0098
26	0.0104	0.0005	0.0099
27	0.0104	0.0005	0.0099
28	0.0105	0.0005	0.0099
29	0.0105	0.0005	0.0100
30	0.0105	0.0005	0.0100
31	0.0106	0.0005	0.0101
32	0.0106	0.0005	0.0101
33	0.0106	0.0005	0.0101
34	0.0107	0.0005	0.0101
35	0.0107	0.0005	0.0102
36	0.0107	0.0005	0.0102
37	0.0108	0.0005	0.0103
38	0.0108	0.0005	0.0103
39	0.0109	0.0005	0.0103
40	0.0109	0.0005	0.0104
41	0.0110	0.0005	0.0104
42	0.0110	0.0005	0.0104
43	0.0110	0.0005	0.0105
44	0.0111	0.0005	0.0105
45	0.0111	0.0005	0.0106
46	0.0111	0.0005	0.0106
47	0.0112	0.0006	0.0107
48	0.0112	0.0006	0.0107
49	0.0113	0.0006	0.0107
50	0.0113	0.0006	0.0108
51	0.0114	0.0006	0.0108
52	0.0114	0.0006	0.0109
53	0.0115	0.0006	0.0109
54	0.0115	0.0006	0.0109
55	0.0116	0.0006	0.0110
56	0.0116	0.0006	0.0110
57	0.0117	0.0006	0.0111
58	0.0117	0.0006	0.0111
59	0.0118	0.0006	0.0112
60	0.0118	0.0006	0.0112
61	0.0119	0.0006	0.0113
62	0.0119	0.0006	0.0113
63	0.0120	0.0006	0.0114
64	0.0120	0.0006	0.0114
65	0.0121	0.0006	0.0115

66	0.0121	0.0006	0.0115
67	0.0122	0.0006	0.0116
68	0.0122	0.0006	0.0116
69	0.0123	0.0006	0.0117
70	0.0123	0.0006	0.0117
71	0.0124	0.0006	0.0118
72	0.0124	0.0006	0.0118
73	0.0125	0.0006	0.0119
74	0.0126	0.0006	0.0119
75	0.0126	0.0006	0.0120
76	0.0127	0.0006	0.0120
77	0.0128	0.0006	0.0121
78	0.0128	0.0006	0.0122
79	0.0129	0.0006	0.0122
80	0.0129	0.0006	0.0123
81	0.0130	0.0006	0.0124
82	0.0131	0.0006	0.0124
83	0.0131	0.0006	0.0125
84	0.0132	0.0006	0.0125
85	0.0133	0.0007	0.0126
86	0.0133	0.0007	0.0127
87	0.0134	0.0007	0.0128
88	0.0135	0.0007	0.0128
89	0.0136	0.0007	0.0129
90	0.0136	0.0007	0.0129
91	0.0137	0.0007	0.0130
92	0.0138	0.0007	0.0131
93	0.0139	0.0007	0.0132
94	0.0139	0.0007	0.0132
95	0.0140	0.0007	0.0133
96	0.0141	0.0007	0.0134
97	0.0142	0.0007	0.0135
98	0.0142	0.0007	0.0135
99	0.0144	0.0007	0.0136
100	0.0144	0.0007	0.0137
101	0.0145	0.0007	0.0138
102	0.0146	0.0007	0.0139
103	0.0147	0.0007	0.0140
104	0.0148	0.0007	0.0140
105	0.0149	0.0007	0.0142
106	0.0150	0.0007	0.0142
107	0.0151	0.0007	0.0143
108	0.0152	0.0007	0.0144
109	0.0153	0.0008	0.0145
110	0.0154	0.0008	0.0146
111	0.0155	0.0008	0.0147
112	0.0156	0.0008	0.0148
113	0.0157	0.0008	0.0149
114	0.0158	0.0008	0.0150
115	0.0159	0.0008	0.0152
116	0.0160	0.0008	0.0152
117	0.0162	0.0008	0.0154
118	0.0163	0.0008	0.0155
119	0.0164	0.0008	0.0156
120	0.0165	0.0008	0.0157
121	0.0167	0.0008	0.0159
122	0.0168	0.0008	0.0159
123	0.0169	0.0008	0.0161
124	0.0170	0.0008	0.0162

125	0.0172	0.0008	0.0164
126	0.0173	0.0009	0.0165
127	0.0175	0.0009	0.0167
128	0.0176	0.0009	0.0167
129	0.0178	0.0009	0.0169
130	0.0179	0.0009	0.0170
131	0.0181	0.0009	0.0173
132	0.0183	0.0009	0.0174
133	0.0185	0.0009	0.0176
134	0.0186	0.0009	0.0177
135	0.0188	0.0009	0.0179
136	0.0190	0.0009	0.0180
137	0.0192	0.0009	0.0183
138	0.0193	0.0010	0.0184
139	0.0196	0.0010	0.0186
140	0.0197	0.0010	0.0188
141	0.0200	0.0010	0.0190
142	0.0202	0.0010	0.0192
143	0.0205	0.0010	0.0195
144	0.0206	0.0010	0.0196
145	0.0206	0.0010	0.0195
146	0.0207	0.0010	0.0197
147	0.0211	0.0010	0.0200
148	0.0212	0.0010	0.0202
149	0.0216	0.0011	0.0205
150	0.0218	0.0011	0.0207
151	0.0222	0.0011	0.0211
152	0.0224	0.0011	0.0213
153	0.0228	0.0011	0.0217
154	0.0230	0.0011	0.0219
155	0.0235	0.0012	0.0223
156	0.0237	0.0012	0.0226
157	0.0242	0.0012	0.0230
158	0.0245	0.0012	0.0233
159	0.0251	0.0012	0.0238
160	0.0253	0.0012	0.0241
161	0.0259	0.0013	0.0247
162	0.0263	0.0013	0.0250
163	0.0269	0.0013	0.0256
164	0.0273	0.0013	0.0259
165	0.0280	0.0014	0.0266
166	0.0284	0.0014	0.0270
167	0.0292	0.0014	0.0278
168	0.0297	0.0015	0.0282
169	0.0306	0.0015	0.0291
170	0.0311	0.0015	0.0296
171	0.0322	0.0016	0.0306
172	0.0328	0.0016	0.0312
173	0.0340	0.0017	0.0324
174	0.0347	0.0017	0.0330
175	0.0362	0.0018	0.0344
176	0.0370	0.0018	0.0351
177	0.0387	0.0019	0.0368
178	0.0397	0.0020	0.0377
179	0.0419	0.0021	0.0398
180	0.0431	0.0021	0.0409
181	0.0458	0.0023	0.0435
182	0.0474	0.0023	0.0450
183	0.0510	0.0025	0.0485

184	0.0531	0.0026	0.0505
185	0.0540	0.0027	0.0514
186	0.0571	0.0028	0.0543
187	0.0648	0.0032	0.0616
188	0.0699	0.0034	0.0664
189	0.0842	0.0035	0.0807
190	0.0950	0.0035	0.0916
191	0.1358	0.0035	0.1324
192	0.1868	0.0035	0.1833
193	0.5847	0.0035	0.5812
194	0.1107	0.0035	0.1072
195	0.0761	0.0035	0.0727
196	0.0606	0.0030	0.0576
197	0.0555	0.0027	0.0527
198	0.0491	0.0024	0.0467
199	0.0444	0.0022	0.0422
200	0.0407	0.0020	0.0387
201	0.0378	0.0019	0.0360
202	0.0354	0.0017	0.0337
203	0.0334	0.0016	0.0317
204	0.0316	0.0016	0.0301
205	0.0301	0.0015	0.0287
206	0.0288	0.0014	0.0274
207	0.0276	0.0014	0.0263
208	0.0266	0.0013	0.0253
209	0.0256	0.0013	0.0244
210	0.0248	0.0012	0.0236
211	0.0240	0.0012	0.0228
212	0.0233	0.0011	0.0221
213	0.0226	0.0011	0.0215
214	0.0220	0.0011	0.0209
215	0.0214	0.0011	0.0204
216	0.0209	0.0010	0.0199
217	0.0208	0.0010	0.0198
218	0.0203	0.0010	0.0193
219	0.0199	0.0010	0.0189
220	0.0195	0.0010	0.0185
221	0.0191	0.0009	0.0181
222	0.0187	0.0009	0.0178
223	0.0184	0.0009	0.0175
224	0.0180	0.0009	0.0171
225	0.0177	0.0009	0.0168
226	0.0174	0.0009	0.0166
227	0.0171	0.0008	0.0163
228	0.0169	0.0008	0.0160
229	0.0166	0.0008	0.0158
230	0.0163	0.0008	0.0155
231	0.0161	0.0008	0.0153
232	0.0159	0.0008	0.0151
233	0.0156	0.0008	0.0149
234	0.0154	0.0008	0.0147
235	0.0152	0.0007	0.0145
236	0.0150	0.0007	0.0143
237	0.0148	0.0007	0.0141
238	0.0146	0.0007	0.0139
239	0.0145	0.0007	0.0138
240	0.0143	0.0007	0.0136
241	0.0141	0.0007	0.0134
242	0.0140	0.0007	0.0133

243	0.0138	0.0007	0.0131
244	0.0137	0.0007	0.0130
245	0.0135	0.0007	0.0128
246	0.0134	0.0007	0.0127
247	0.0132	0.0007	0.0126
248	0.0131	0.0006	0.0125
249	0.0130	0.0006	0.0123
250	0.0128	0.0006	0.0122
251	0.0127	0.0006	0.0121
252	0.0126	0.0006	0.0120
253	0.0125	0.0006	0.0119
254	0.0124	0.0006	0.0118
255	0.0122	0.0006	0.0116
256	0.0121	0.0006	0.0115
257	0.0120	0.0006	0.0114
258	0.0119	0.0006	0.0113
259	0.0118	0.0006	0.0112
260	0.0117	0.0006	0.0112
261	0.0116	0.0006	0.0111
262	0.0115	0.0006	0.0110
263	0.0114	0.0006	0.0109
264	0.0114	0.0006	0.0108
265	0.0113	0.0006	0.0107
266	0.0112	0.0005	0.0106
267	0.0111	0.0005	0.0105
268	0.0110	0.0005	0.0105
269	0.0109	0.0005	0.0104
270	0.0108	0.0005	0.0103
271	0.0108	0.0005	0.0102
272	0.0107	0.0005	0.0102
273	0.0106	0.0005	0.0101
274	0.0105	0.0005	0.0100
275	0.0105	0.0005	0.0100
276	0.0104	0.0005	0.0099
277	0.0103	0.0005	0.0098
278	0.0103	0.0005	0.0098
279	0.0102	0.0005	0.0097
280	0.0101	0.0005	0.0096
281	0.0101	0.0005	0.0096
282	0.0100	0.0005	0.0095
283	0.0099	0.0005	0.0095
284	0.0099	0.0005	0.0094
285	0.0098	0.0005	0.0093
286	0.0098	0.0005	0.0093
287	0.0097	0.0005	0.0092
288	0.0096	0.0005	0.0092

Total soil rain loss = 0.27(In)
Total effective rainfall = 6.02(In)
Peak flow rate in flood hydrograph = 14.71(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	0.0010	0.15	Q				
0+10	0.0035	0.35	Q				
0+15	0.0060	0.36	Q				
0+20	0.0084	0.36	Q				
0+25	0.0110	0.36	Q				
0+30	0.0135	0.36	Q				
0+35	0.0160	0.37	Q				
0+40	0.0185	0.37	Q				
0+45	0.0210	0.37	Q				
0+50	0.0236	0.37	Q				
0+55	0.0261	0.37	Q				
1+ 0	0.0287	0.37	Q				
1+ 5	0.0313	0.37	Q				
1+10	0.0338	0.37	Q				
1+15	0.0364	0.37	Q				
1+20	0.0390	0.38	Q				
1+25	0.0416	0.38	QV				
1+30	0.0442	0.38	QV				
1+35	0.0468	0.38	QV				
1+40	0.0495	0.38	QV				
1+45	0.0521	0.38	QV				
1+50	0.0547	0.38	QV				
1+55	0.0574	0.38	QV				
2+ 0	0.0600	0.39	QV				
2+ 5	0.0627	0.39	QV				
2+10	0.0654	0.39	QV				
2+15	0.0681	0.39	QV				
2+20	0.0708	0.39	QV				
2+25	0.0735	0.39	QV				
2+30	0.0762	0.39	QV				
2+35	0.0789	0.40	QV				
2+40	0.0816	0.40	QV				
2+45	0.0844	0.40	Q V				
2+50	0.0871	0.40	Q V				
2+55	0.0899	0.40	Q V				
3+ 0	0.0926	0.40	Q V				
3+ 5	0.0954	0.40	Q V				
3+10	0.0982	0.41	Q V				
3+15	0.1010	0.41	Q V				
3+20	0.1038	0.41	Q V				
3+25	0.1066	0.41	Q V				
3+30	0.1095	0.41	Q V				
3+35	0.1123	0.41	Q V				
3+40	0.1152	0.41	Q V				
3+45	0.1180	0.42	Q V				
3+50	0.1209	0.42	Q V				
3+55	0.1238	0.42	Q V				
4+ 0	0.1267	0.42	Q V				
4+ 5	0.1296	0.42	Q V				
4+10	0.1325	0.42	Q V				
4+15	0.1354	0.43	Q V				
4+20	0.1384	0.43	Q V				
4+25	0.1413	0.43	Q V				
4+30	0.1443	0.43	Q V				
4+35	0.1473	0.43	Q V				
4+40	0.1503	0.43	Q V				
4+45	0.1533	0.44	Q V				

4+50	0.1563	0.44	Q V				
4+55	0.1593	0.44	Q V				
5+ 0	0.1624	0.44	Q V				
5+ 5	0.1654	0.44	Q V				
5+10	0.1685	0.45	Q V				
5+15	0.1715	0.45	Q V				
5+20	0.1746	0.45	Q V				
5+25	0.1777	0.45	Q V				
5+30	0.1809	0.45	Q V				
5+35	0.1840	0.45	Q V				
5+40	0.1871	0.46	Q V				
5+45	0.1903	0.46	Q V				
5+50	0.1935	0.46	Q V				
5+55	0.1967	0.46	Q V				
6+ 0	0.1999	0.47	Q V				
6+ 5	0.2031	0.47	Q V				
6+10	0.2063	0.47	Q V				
6+15	0.2096	0.47	Q V				
6+20	0.2128	0.47	Q V				
6+25	0.2161	0.48	Q V				
6+30	0.2194	0.48	Q V				
6+35	0.2227	0.48	Q V				
6+40	0.2261	0.48	Q V				
6+45	0.2294	0.49	Q V				
6+50	0.2328	0.49	Q V				
6+55	0.2361	0.49	Q V				
7+ 0	0.2395	0.49	Q V				
7+ 5	0.2429	0.50	Q V				
7+10	0.2464	0.50	Q V				
7+15	0.2498	0.50	IQ V				
7+20	0.2533	0.50	IQ V				
7+25	0.2568	0.51	IQ V				
7+30	0.2603	0.51	IQ V				
7+35	0.2638	0.51	IQ V				
7+40	0.2674	0.51	IQ V				
7+45	0.2709	0.52	IQ V				
7+50	0.2745	0.52	IQ V				
7+55	0.2781	0.52	IQ V				
8+ 0	0.2817	0.53	IQ V				
8+ 5	0.2854	0.53	IQ V				
8+10	0.2890	0.53	IQ V				
8+15	0.2927	0.54	IQ V				
8+20	0.2964	0.54	IQ V				
8+25	0.3002	0.54	IQ V				
8+30	0.3039	0.55	IQ V				
8+35	0.3077	0.55	IQ V				
8+40	0.3115	0.55	IQ V				
8+45	0.3153	0.56	IQ V				
8+50	0.3192	0.56	IQ V				
8+55	0.3231	0.56	IQ V				
9+ 0	0.3270	0.57	IQ V				
9+ 5	0.3309	0.57	IQ V				
9+10	0.3349	0.57	IQ V				
9+15	0.3388	0.58	IQ V				
9+20	0.3428	0.58	IQ V				
9+25	0.3469	0.59	IQ V				
9+30	0.3509	0.59	IQ V				
9+35	0.3550	0.59	IQ V				
9+40	0.3592	0.60	IQ V				

9+45	0.3633	0.60	|Q V |	|	|	|
9+50	0.3675	0.61	|Q V |	|	|	|
9+55	0.3717	0.61	|Q V|	|	|	|
10+ 0	0.3760	0.62	|Q V|	|	|	|
10+ 5	0.3802	0.62	|Q V|	|	|	|
10+10	0.3846	0.63	|Q V|	|	|	|
10+15	0.3889	0.63	|Q V|	|	|	|
10+20	0.3933	0.64	|Q V|	|	|	|
10+25	0.3977	0.64	|Q V|	|	|	|
10+30	0.4022	0.65	|Q V|	|	|	|
10+35	0.4066	0.65	|Q V|	|	|	|
10+40	0.4112	0.66	|Q V |	|	|	|
10+45	0.4157	0.66	|Q V |	|	|	|
10+50	0.4204	0.67	|Q V |	|	|	|
10+55	0.4250	0.68	|Q V |	|	|	|
11+ 0	0.4297	0.68	|Q V |	|	|	|
11+ 5	0.4344	0.69	|Q V |	|	|	|
11+10	0.4392	0.69	|Q V |	|	|	|
11+15	0.4441	0.70	|Q V |	|	|	|
11+20	0.4489	0.71	|Q V |	|	|	|
11+25	0.4538	0.71	|Q |V |	|	|	|
11+30	0.4588	0.72	|Q |V |	|	|	|
11+35	0.4638	0.73	|Q |V |	|	|	|
11+40	0.4689	0.74	|Q |V |	|	|	|
11+45	0.4740	0.74	|Q |V |	|	|	|
11+50	0.4792	0.75	|Q |V |	|	|	|
11+55	0.4845	0.76	|Q |V |	|	|	|
12+ 0	0.4898	0.77	|Q |V |	|	|	|
12+ 5	0.4951	0.77	|Q | V |	|	|	|
12+10	0.5004	0.77	|Q | V |	|	|	|
12+15	0.5058	0.78	|Q | V |	|	|	|
12+20	0.5113	0.79	|Q | V |	|	|	|
12+25	0.5168	0.80	|Q | V |	|	|	|
12+30	0.5224	0.81	|Q | V |	|	|	|
12+35	0.5280	0.82	|Q | V |	|	|	|
12+40	0.5338	0.83	|Q | V |	|	|	|
12+45	0.5396	0.85	|Q | V |	|	|	|
12+50	0.5455	0.86	|Q | V |	|	|	|
12+55	0.5515	0.87	|Q | V |	|	|	|
13+ 0	0.5576	0.88	|Q | V |	|	|	|
13+ 5	0.5638	0.90	|Q | V |	|	|	|
13+10	0.5701	0.91	|Q | V |	|	|	|
13+15	0.5765	0.93	|Q | V |	|	|	|
13+20	0.5830	0.94	|Q | V |	|	|	|
13+25	0.5896	0.96	|Q | V |	|	|	|
13+30	0.5963	0.98	|Q | V |	|	|	|
13+35	0.6031	0.99	|Q | V |	|	|	|
13+40	0.6101	1.01	| Q | V |	|	|	|
13+45	0.6172	1.03	| Q | V |	|	|	|
13+50	0.6245	1.06	| Q | V |	|	|	|
13+55	0.6319	1.08	| Q | V |	|	|	|
14+ 0	0.6395	1.10	| Q | V |	|	|	|
14+ 5	0.6473	1.13	| Q | V |	|	|	|
14+10	0.6552	1.15	| Q | V |	|	|	|
14+15	0.6634	1.18	| Q | V |	|	|	|
14+20	0.6718	1.22	| Q | V |	|	|	|
14+25	0.6804	1.25	| Q | V |	|	|	|
14+30	0.6892	1.28	| Q | V |	|	|	|
14+35	0.6983	1.32	| Q | V |	|	|	|

14+40	0.7077	1.37	| Q | V |	|	|	|
14+45	0.7175	1.41	| Q | V |	|	|	|
14+50	0.7275	1.47	| Q | V |	|	|	|
14+55	0.7380	1.52	| Q | V |	|	|	|
15+ 0	0.7489	1.59	| Q | V |	|	|	|
15+ 5	0.7604	1.66	| Q | V |	|	|	|
15+10	0.7723	1.74	| Q | V |	|	|	|
15+15	0.7849	1.83	| Q | V|	|	|	|
15+20	0.7983	1.94	| Q | V|	|	|	|
15+25	0.8121	2.00	| Q | V|	|	|	|
15+30	0.8264	2.07	| Q | V |	|	|	|
15+35	0.8419	2.26	| Q | V |	|	|	|
15+40	0.8591	2.50	| Q |V |	|	|	|
15+45	0.8788	2.85	| Q |V |	|	|	|
15+50	0.9018	3.35	| Q | V |	|	|	|
15+55	0.9313	4.27	| Q | V |	|	|	|
16+ 0	0.9728	6.02	| Q | V |	|	|	|
16+ 5	1.0675	13.75	| Q | VQ |	|	|	|
16+10	1.1688	14.71	| Q | VQ|	|	|	|
16+15	1.1970	4.10	| Q | V|	|	|	|
16+20	1.2153	2.65	| Q | V|	|	|	|
16+25	1.2305	2.21	| Q | V |	|	|	|
16+30	1.2441	1.98	| Q | V |	|	|	|
16+35	1.2563	1.77	| Q | V |	|	|	|
16+40	1.2674	1.61	| Q | V |	|	|	|
16+45	1.2777	1.48	| Q | V |	|	|	|
16+50	1.2872	1.38	| Q | V |	|	|	|
16+55	1.2961	1.30	| Q | V |	|	|	|
17+ 0	1.3046	1.23	| Q | V |	|	|	|
17+ 5	1.3126	1.16	| Q | V |	|	|	|
17+10	1.3202	1.11	| Q | V |	|	|	|
17+15	1.3275	1.06	| Q | V |	|	|	|
17+20	1.3346	1.02	| Q | V |	|	|	|
17+25	1.3413	0.98	|Q | V |	|	|	|
17+30	1.3479	0.95	|Q | V |	|	|	|
17+35	1.3542	0.92	|Q | V |	|	|	|
17+40	1.3603	0.89	|Q | V |	|	|	|
17+45	1.3662	0.86	|Q | V |	|	|	|
17+50	1.3720	0.84	|Q | V |	|	|	|
17+55	1.3776	0.82	|Q | V |	|	|	|
18+ 0	1.3831	0.80	|Q | V |	|	|	|
18+ 5	1.3885	0.78	|Q | V |	|	|	|
18+10	1.3938	0.77	|Q | V |	|	|	|
18+15	1.3990	0.76	|Q | V |	|	|	|
18+20	1.4041	0.74	|Q | V |	|	|	|
18+25	1.4091	0.72	|Q | V |	|	|	|
18+30	1.4140	0.71	|Q | V |	|	|	|
18+35	1.4188	0.70	|Q | V |	|	|	|
18+40	1.4235	0.68	|Q | V |	|	|	|
18+45	1.4281	0.67	|Q | V |	|	|	|
18+50	1.4327	0.66	|Q | V |	|	|	|
18+55	1.4371	0.65	|Q | V |	|	|	|
19+ 0	1.4415	0.64	|Q | V |	|	|	|
19+ 5	1.4458	0.63	|Q | V |	|	|	|
19+10	1.4501	0.62	|Q | V |	|	|	|
19+15	1.4543	0.61	|Q | V |	|	|	|
19+20	1.4584	0.60	|Q | V |	|	|	|
19+25	1.4625	0.59	|Q | V |	|	|	|
19+30	1.4665	0.58	|Q | V |	|	|	|

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  19+35      1.4705      0.58  |Q        |         |         |    V    |
  19+40      1.4744      0.57  |Q        |         |         |     V   |
  19+45      1.4782      0.56  |Q        |         |         |     V   |
  19+50      1.4821      0.55  |Q        |         |         |     V   |
  19+55      1.4858      0.55  |Q        |         |         |     V   |
  20+ 0      1.4895      0.54  |Q        |         |         |     V   |
  20+ 5      1.4932      0.53  |Q        |         |         |     V   |
  20+10      1.4968      0.53  |Q        |         |         |     V   |
  20+15      1.5004      0.52  |Q        |         |         |     V   |
  20+20      1.5040      0.52  |Q        |         |         |     V   |
  20+25      1.5075      0.51  |Q        |         |         |     V   |
  20+30      1.5110      0.50  |Q        |         |         |     V   |
  20+35      1.5144      0.50  Q         |         |         |      V  |
  20+40      1.5178      0.49  Q         |         |         |      V  |
  20+45      1.5212      0.49  Q         |         |         |      V  |
  20+50      1.5245      0.48  Q         |         |         |      V  |
  20+55      1.5278      0.48  Q         |         |         |      V  |
  21+ 0      1.5311      0.47  Q         |         |         |      V  |
  21+ 5      1.5343      0.47  Q         |         |         |      V  |
  21+10      1.5375      0.47  Q         |         |         |      V  |
  21+15      1.5407      0.46  Q         |         |         |      V  |
  21+20      1.5439      0.46  Q         |         |         |      V  |
  21+25      1.5470      0.45  Q         |         |         |      V  |
  21+30      1.5501      0.45  Q         |         |         |      V  |
  21+35      1.5531      0.45  Q         |         |         |       V |
  21+40      1.5562      0.44  Q         |         |         |       V |
  21+45      1.5592      0.44  Q         |         |         |       V |
  21+50      1.5622      0.43  Q         |         |         |       V |
  21+55      1.5652      0.43  Q         |         |         |       V |
  22+ 0      1.5681      0.43  Q         |         |         |       V |
  22+ 5      1.5710      0.42  Q         |         |         |       V |
  22+10      1.5739      0.42  Q         |         |         |       V |
  22+15      1.5768      0.42  Q         |         |         |       V |
  22+20      1.5797      0.41  Q         |         |         |       V |
  22+25      1.5825      0.41  Q         |         |         |       V |
  22+30      1.5853      0.41  Q         |         |         |       V |
  22+35      1.5881      0.41  Q         |         |         |       V |
  22+40      1.5909      0.40  Q         |         |         |       V |
  22+45      1.5936      0.40  Q         |         |         |        V|
  22+50      1.5964      0.40  Q         |         |         |        V|
  22+55      1.5991      0.39  Q         |         |         |        V|
  23+ 0      1.6018      0.39  Q         |         |         |        V|
  23+ 5      1.6045      0.39  Q         |         |         |        V|
  23+10      1.6071      0.39  Q         |         |         |        V|
  23+15      1.6098      0.38  Q         |         |         |        V|
  23+20      1.6124      0.38  Q         |         |         |        V|
  23+25      1.6150      0.38  Q         |         |         |        V|
  23+30      1.6176      0.38  Q         |         |         |        V|
  23+35      1.6202      0.37  Q         |         |         |        V|
  23+40      1.6227      0.37  Q         |         |         |        V|
  23+45      1.6253      0.37  Q         |         |         |        V|
  23+50      1.6278      0.37  Q         |         |         |        V|
  23+55      1.6303      0.37  Q         |         |         |        V|
  24+ 0      1.6328      0.36  Q         |         |         |        V|
  24+ 5      1.6343      0.21  Q         |         |         |        V|
  24+10      1.6343      0.01  Q         |         |         |        V|
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APPENDIX B.2: UNIT HYDROGRAPH, AREA "2"

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0

Study date 06/20/19

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

Program License Serial Number 6279

BNSF
POST PROJECT HYDROLOGY HYDROLOGY
AREA 2

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
8.23	1	1.58
Rainfall data for year 100		
8.23	6	3.42
Rainfall data for year 100		
8.23	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
86.0	97.2	8.23	1.000	0.055	1.000	0.055

Area-averaged adjusted loss rate Fm (In/Hr) = 0.055

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
8.23	1.000	86.0	97.2	0.29	0.947

Area-averaged catchment yield fraction, Y = 0.947
Area-averaged low loss fraction, Yb = 0.053
++
Watercourse length = 3738.00(Ft.)
Length from concentration point to centroid = 1881.00(Ft.)
Elevation difference along watercourse = 70.00(Ft.)
Mannings friction factor along watercourse = 0.020
Watershed area = 8.23(Ac.)
Catchment Lag time = 0.119 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 70.1417
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.055(In/Hr)
Average low loss rate fraction (Yb) = 0.053 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 8.23(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.585(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.579(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 99.53 (CFS))		
1	8.811	8.769
2	53.627	44.606
3	89.400	35.605
4	97.932	8.493
5	100.000	2.058

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5845	0.5845
2	0.7713	0.1868
3	0.9071	0.1358

4	1.0177	0.1106
5	1.1128	0.0950
6	1.1970	0.0842
7	1.2731	0.0761
8	1.3429	0.0698
9	1.4077	0.0648
10	1.4683	0.0606
11	1.5254	0.0571
12	1.5794	0.0540
13	1.6349	0.0555
14	1.6880	0.0531
15	1.7389	0.0510
16	1.7880	0.0491
17	1.8354	0.0474
18	1.8812	0.0458
19	1.9256	0.0444
20	1.9687	0.0431
21	2.0105	0.0419
22	2.0513	0.0407
23	2.0910	0.0397
24	2.1297	0.0387
25	2.1675	0.0378
26	2.2045	0.0370
27	2.2407	0.0362
28	2.2761	0.0354
29	2.3108	0.0347
30	2.3449	0.0340
31	2.3783	0.0334
32	2.4110	0.0328
33	2.4433	0.0322
34	2.4749	0.0317
35	2.5061	0.0311
36	2.5367	0.0306
37	2.5668	0.0301
38	2.5965	0.0297
39	2.6257	0.0292
40	2.6545	0.0288
41	2.6829	0.0284
42	2.7110	0.0280
43	2.7386	0.0276
44	2.7659	0.0273
45	2.7928	0.0269
46	2.8194	0.0266
47	2.8456	0.0263
48	2.8716	0.0259
49	2.8972	0.0256
50	2.9225	0.0253
51	2.9476	0.0251
52	2.9723	0.0248
53	2.9969	0.0245
54	3.0211	0.0242
55	3.0451	0.0240
56	3.0688	0.0237
57	3.0923	0.0235
58	3.1156	0.0233
59	3.1386	0.0230
60	3.1615	0.0228
61	3.1841	0.0226
62	3.2064	0.0224

63	3.2286	0.0222
64	3.2506	0.0220
65	3.2724	0.0218
66	3.2940	0.0216
67	3.3154	0.0214
68	3.3367	0.0212
69	3.3577	0.0211
70	3.3786	0.0209
71	3.3994	0.0207
72	3.4199	0.0206
73	3.4407	0.0208
74	3.4613	0.0206
75	3.4818	0.0205
76	3.5022	0.0203
77	3.5223	0.0202
78	3.5424	0.0200
79	3.5623	0.0199
80	3.5820	0.0198
81	3.6016	0.0196
82	3.6211	0.0195
83	3.6404	0.0193
84	3.6597	0.0192
85	3.6787	0.0191
86	3.6977	0.0190
87	3.7165	0.0188
88	3.7353	0.0187
89	3.7539	0.0186
90	3.7723	0.0185
91	3.7907	0.0184
92	3.8090	0.0183
93	3.8271	0.0181
94	3.8451	0.0180
95	3.8631	0.0179
96	3.8809	0.0178
97	3.8986	0.0177
98	3.9162	0.0176
99	3.9337	0.0175
100	3.9511	0.0174
101	3.9685	0.0173
102	3.9857	0.0172
103	4.0028	0.0171
104	4.0199	0.0170
105	4.0368	0.0169
106	4.0537	0.0169
107	4.0704	0.0168
108	4.0871	0.0167
109	4.1037	0.0166
110	4.1202	0.0165
111	4.1366	0.0164
112	4.1530	0.0163
113	4.1692	0.0163
114	4.1854	0.0162
115	4.2015	0.0161
116	4.2175	0.0160
117	4.2334	0.0159
118	4.2493	0.0159
119	4.2651	0.0158
120	4.2808	0.0157
121	4.2965	0.0156

122	4.3120	0.0156
123	4.3275	0.0155
124	4.3430	0.0154
125	4.3583	0.0154
126	4.3736	0.0153
127	4.3888	0.0152
128	4.4040	0.0152
129	4.4191	0.0151
130	4.4341	0.0150
131	4.4491	0.0150
132	4.4640	0.0149
133	4.4788	0.0148
134	4.4936	0.0148
135	4.5083	0.0147
136	4.5229	0.0146
137	4.5375	0.0146
138	4.5520	0.0145
139	4.5665	0.0145
140	4.5809	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6238	0.0142
144	4.6380	0.0142
145	4.6521	0.0141
146	4.6662	0.0141
147	4.6802	0.0140
148	4.6942	0.0140
149	4.7081	0.0139
150	4.7220	0.0139
151	4.7358	0.0138
152	4.7495	0.0138
153	4.7632	0.0137
154	4.7769	0.0137
155	4.7905	0.0136
156	4.8041	0.0136
157	4.8176	0.0135
158	4.8311	0.0135
159	4.8445	0.0134
160	4.8578	0.0134
161	4.8712	0.0133
162	4.8844	0.0133
163	4.8977	0.0132
164	4.9108	0.0132
165	4.9240	0.0131
166	4.9371	0.0131
167	4.9501	0.0131
168	4.9631	0.0130
169	4.9761	0.0130
170	4.9890	0.0129
171	5.0019	0.0129
172	5.0147	0.0128
173	5.0275	0.0128
174	5.0403	0.0128
175	5.0530	0.0127
176	5.0657	0.0127
177	5.0783	0.0126
178	5.0909	0.0126
179	5.1034	0.0126
180	5.1160	0.0125

181	5.1284	0.0125
182	5.1409	0.0124
183	5.1533	0.0124
184	5.1656	0.0124
185	5.1779	0.0123
186	5.1902	0.0123
187	5.2025	0.0122
188	5.2147	0.0122
189	5.2269	0.0122
190	5.2390	0.0121
191	5.2511	0.0121
192	5.2632	0.0121
193	5.2752	0.0120
194	5.2872	0.0120
195	5.2991	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3348	0.0119
199	5.3467	0.0118
200	5.3584	0.0118
201	5.3702	0.0118
202	5.3819	0.0117
203	5.3936	0.0117
204	5.4053	0.0117
205	5.4169	0.0116
206	5.4285	0.0116
207	5.4401	0.0116
208	5.4516	0.0115
209	5.4631	0.0115
210	5.4746	0.0115
211	5.4860	0.0114
212	5.4975	0.0114
213	5.5088	0.0114
214	5.5202	0.0114
215	5.5315	0.0113
216	5.5428	0.0113
217	5.5541	0.0113
218	5.5653	0.0112
219	5.5765	0.0112
220	5.5877	0.0112
221	5.5988	0.0111
222	5.6100	0.0111
223	5.6211	0.0111
224	5.6321	0.0111
225	5.6432	0.0110
226	5.6542	0.0110
227	5.6652	0.0110
228	5.6761	0.0110
229	5.6870	0.0109
230	5.6979	0.0109
231	5.7088	0.0109
232	5.7197	0.0108
233	5.7305	0.0108
234	5.7413	0.0108
235	5.7521	0.0108
236	5.7628	0.0107
237	5.7735	0.0107
238	5.7842	0.0107
239	5.7949	0.0107

240	5.8055	0.0106
241	5.8162	0.0106
242	5.8268	0.0106
243	5.8373	0.0106
244	5.8479	0.0105
245	5.8584	0.0105
246	5.8689	0.0105
247	5.8794	0.0105
248	5.8898	0.0105
249	5.9002	0.0104
250	5.9106	0.0104
251	5.9210	0.0104
252	5.9314	0.0104
253	5.9417	0.0103
254	5.9520	0.0103
255	5.9623	0.0103
256	5.9726	0.0103
257	5.9828	0.0102
258	5.9931	0.0102
259	6.0033	0.0102
260	6.0134	0.0102
261	6.0236	0.0102
262	6.0337	0.0101
263	6.0438	0.0101
264	6.0539	0.0101
265	6.0640	0.0101
266	6.0740	0.0100
267	6.0841	0.0100
268	6.0941	0.0100
269	6.1040	0.0100
270	6.1140	0.0100
271	6.1240	0.0099
272	6.1339	0.0099
273	6.1438	0.0099
274	6.1537	0.0099
275	6.1635	0.0099
276	6.1734	0.0098
277	6.1832	0.0098
278	6.1930	0.0098
279	6.2028	0.0098
280	6.2125	0.0098
281	6.2223	0.0097
282	6.2320	0.0097
283	6.2417	0.0097
284	6.2514	0.0097
285	6.2611	0.0097
286	6.2707	0.0096
287	6.2803	0.0096
288	6.2899	0.0096

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0005	0.0091
2	0.0096	0.0005	0.0091
3	0.0097	0.0005	0.0092
4	0.0097	0.0005	0.0092
5	0.0097	0.0005	0.0092
6	0.0097	0.0005	0.0092
7	0.0098	0.0005	0.0093
8	0.0098	0.0005	0.0093
9	0.0098	0.0005	0.0093
10	0.0099	0.0005	0.0093
11	0.0099	0.0005	0.0094
12	0.0099	0.0005	0.0094
13	0.0100	0.0005	0.0094
14	0.0100	0.0005	0.0095
15	0.0100	0.0005	0.0095
16	0.0100	0.0005	0.0095
17	0.0101	0.0005	0.0096
18	0.0101	0.0005	0.0096
19	0.0102	0.0005	0.0096
20	0.0102	0.0005	0.0096
21	0.0102	0.0005	0.0097
22	0.0102	0.0005	0.0097
23	0.0103	0.0005	0.0097
24	0.0103	0.0005	0.0098
25	0.0104	0.0005	0.0098
26	0.0104	0.0005	0.0098
27	0.0104	0.0006	0.0099
28	0.0105	0.0006	0.0099
29	0.0105	0.0006	0.0099
30	0.0105	0.0006	0.0100
31	0.0106	0.0006	0.0100
32	0.0106	0.0006	0.0100
33	0.0106	0.0006	0.0101
34	0.0107	0.0006	0.0101
35	0.0107	0.0006	0.0102
36	0.0107	0.0006	0.0102
37	0.0108	0.0006	0.0102
38	0.0108	0.0006	0.0103
39	0.0109	0.0006	0.0103
40	0.0109	0.0006	0.0103
41	0.0110	0.0006	0.0104
42	0.0110	0.0006	0.0104
43	0.0110	0.0006	0.0105
44	0.0111	0.0006	0.0105
45	0.0111	0.0006	0.0105
46	0.0111	0.0006	0.0106
47	0.0112	0.0006	0.0106
48	0.0112	0.0006	0.0106
49	0.0113	0.0006	0.0107
50	0.0113	0.0006	0.0107
51	0.0114	0.0006	0.0108
52	0.0114	0.0006	0.0108
53	0.0115	0.0006	0.0109
54	0.0115	0.0006	0.0109
55	0.0116	0.0006	0.0110
56	0.0116	0.0006	0.0110
57	0.0117	0.0006	0.0110
58	0.0117	0.0006	0.0111
59	0.0118	0.0006	0.0111
60	0.0118	0.0006	0.0112
61	0.0119	0.0006	0.0112
62	0.0119	0.0006	0.0113
63	0.0120	0.0006	0.0113
64	0.0120	0.0006	0.0114

65	0.0121	0.0006	0.0114
66	0.0121	0.0006	0.0115
67	0.0122	0.0006	0.0115
68	0.0122	0.0006	0.0116
69	0.0123	0.0007	0.0116
70	0.0123	0.0007	0.0117
71	0.0124	0.0007	0.0117
72	0.0124	0.0007	0.0118
73	0.0125	0.0007	0.0118
74	0.0126	0.0007	0.0119
75	0.0126	0.0007	0.0120
76	0.0127	0.0007	0.0120
77	0.0128	0.0007	0.0121
78	0.0128	0.0007	0.0121
79	0.0129	0.0007	0.0122
80	0.0129	0.0007	0.0122
81	0.0130	0.0007	0.0123
82	0.0131	0.0007	0.0124
83	0.0131	0.0007	0.0124
84	0.0132	0.0007	0.0125
85	0.0133	0.0007	0.0126
86	0.0133	0.0007	0.0126
87	0.0134	0.0007	0.0127
88	0.0135	0.0007	0.0128
89	0.0136	0.0007	0.0128
90	0.0136	0.0007	0.0129
91	0.0137	0.0007	0.0130
92	0.0138	0.0007	0.0130
93	0.0139	0.0007	0.0131
94	0.0139	0.0007	0.0132
95	0.0140	0.0007	0.0133
96	0.0141	0.0007	0.0133
97	0.0142	0.0008	0.0134
98	0.0142	0.0008	0.0135
99	0.0144	0.0008	0.0136
100	0.0144	0.0008	0.0136
101	0.0145	0.0008	0.0138
102	0.0146	0.0008	0.0138
103	0.0147	0.0008	0.0139
104	0.0148	0.0008	0.0140
105	0.0149	0.0008	0.0141
106	0.0150	0.0008	0.0142
107	0.0151	0.0008	0.0143
108	0.0152	0.0008	0.0144
109	0.0153	0.0008	0.0145
110	0.0154	0.0008	0.0145
111	0.0155	0.0008	0.0147
112	0.0156	0.0008	0.0147
113	0.0157	0.0008	0.0149
114	0.0158	0.0008	0.0150
115	0.0159	0.0008	0.0151
116	0.0160	0.0008	0.0152
117	0.0162	0.0009	0.0153
118	0.0163	0.0009	0.0154
119	0.0164	0.0009	0.0156
120	0.0165	0.0009	0.0156
121	0.0167	0.0009	0.0158
122	0.0168	0.0009	0.0159
123	0.0169	0.0009	0.0160

124	0.0170	0.0009	0.0161
125	0.0172	0.0009	0.0163
126	0.0173	0.0009	0.0164
127	0.0175	0.0009	0.0166
128	0.0176	0.0009	0.0167
129	0.0178	0.0009	0.0169
130	0.0179	0.0009	0.0170
131	0.0181	0.0010	0.0172
132	0.0183	0.0010	0.0173
133	0.0185	0.0010	0.0175
134	0.0186	0.0010	0.0176
135	0.0188	0.0010	0.0178
136	0.0190	0.0010	0.0180
137	0.0192	0.0010	0.0182
138	0.0193	0.0010	0.0183
139	0.0196	0.0010	0.0186
140	0.0198	0.0010	0.0187
141	0.0200	0.0011	0.0190
142	0.0202	0.0011	0.0191
143	0.0205	0.0011	0.0194
144	0.0206	0.0011	0.0195
145	0.0206	0.0011	0.0195
146	0.0207	0.0011	0.0196
147	0.0211	0.0011	0.0199
148	0.0212	0.0011	0.0201
149	0.0216	0.0011	0.0205
150	0.0218	0.0012	0.0206
151	0.0222	0.0012	0.0210
152	0.0224	0.0012	0.0212
153	0.0228	0.0012	0.0216
154	0.0230	0.0012	0.0218
155	0.0235	0.0012	0.0223
156	0.0237	0.0013	0.0225
157	0.0242	0.0013	0.0230
158	0.0245	0.0013	0.0232
159	0.0251	0.0013	0.0237
160	0.0253	0.0013	0.0240
161	0.0259	0.0014	0.0246
162	0.0263	0.0014	0.0249
163	0.0269	0.0014	0.0255
164	0.0273	0.0014	0.0258
165	0.0280	0.0015	0.0265
166	0.0284	0.0015	0.0269
167	0.0292	0.0015	0.0277
168	0.0297	0.0016	0.0281
169	0.0306	0.0016	0.0290
170	0.0311	0.0016	0.0295
171	0.0322	0.0017	0.0305
172	0.0328	0.0017	0.0311
173	0.0340	0.0018	0.0322
174	0.0347	0.0018	0.0329
175	0.0362	0.0019	0.0343
176	0.0370	0.0020	0.0350
177	0.0387	0.0021	0.0367
178	0.0397	0.0021	0.0376
179	0.0419	0.0022	0.0396
180	0.0431	0.0023	0.0408
181	0.0458	0.0024	0.0434
182	0.0474	0.0025	0.0449

183	0.0510	0.0027	0.0483
184	0.0531	0.0028	0.0503
185	0.0540	0.0029	0.0512
186	0.0571	0.0030	0.0540
187	0.0648	0.0034	0.0614
188	0.0698	0.0037	0.0662
189	0.0842	0.0045	0.0797
190	0.0950	0.0046	0.0904
191	0.1358	0.0046	0.1312
192	0.1868	0.0046	0.1822
193	0.5845	0.0046	0.5799
194	0.1106	0.0046	0.1060
195	0.0761	0.0040	0.0721
196	0.0606	0.0032	0.0574
197	0.0555	0.0029	0.0525
198	0.0491	0.0026	0.0465
199	0.0444	0.0023	0.0420
200	0.0407	0.0022	0.0386
201	0.0378	0.0020	0.0358
202	0.0354	0.0019	0.0335
203	0.0334	0.0018	0.0316
204	0.0317	0.0017	0.0300
205	0.0301	0.0016	0.0285
206	0.0288	0.0015	0.0273
207	0.0276	0.0015	0.0262
208	0.0266	0.0014	0.0252
209	0.0256	0.0014	0.0243
210	0.0248	0.0013	0.0235
211	0.0240	0.0013	0.0227
212	0.0233	0.0012	0.0220
213	0.0226	0.0012	0.0214
214	0.0220	0.0012	0.0208
215	0.0214	0.0011	0.0203
216	0.0209	0.0011	0.0198
217	0.0208	0.0011	0.0197
218	0.0203	0.0011	0.0193
219	0.0199	0.0011	0.0188
220	0.0195	0.0010	0.0184
221	0.0191	0.0010	0.0181
222	0.0187	0.0010	0.0177
223	0.0184	0.0010	0.0174
224	0.0180	0.0010	0.0171
225	0.0177	0.0009	0.0168
226	0.0174	0.0009	0.0165
227	0.0171	0.0009	0.0162
228	0.0169	0.0009	0.0160
229	0.0166	0.0009	0.0157
230	0.0163	0.0009	0.0155
231	0.0161	0.0009	0.0152
232	0.0159	0.0008	0.0150
233	0.0156	0.0008	0.0148
234	0.0154	0.0008	0.0146
235	0.0152	0.0008	0.0144
236	0.0150	0.0008	0.0142
237	0.0148	0.0008	0.0140
238	0.0146	0.0008	0.0139
239	0.0145	0.0008	0.0137
240	0.0143	0.0008	0.0135
241	0.0141	0.0007	0.0134

242	0.0140	0.0007	0.0132
243	0.0138	0.0007	0.0131
244	0.0137	0.0007	0.0129
245	0.0135	0.0007	0.0128
246	0.0134	0.0007	0.0127
247	0.0132	0.0007	0.0125
248	0.0131	0.0007	0.0124
249	0.0130	0.0007	0.0123
250	0.0128	0.0007	0.0122
251	0.0127	0.0007	0.0120
252	0.0126	0.0007	0.0119
253	0.0125	0.0007	0.0118
254	0.0124	0.0007	0.0117
255	0.0122	0.0006	0.0116
256	0.0121	0.0006	0.0115
257	0.0120	0.0006	0.0114
258	0.0119	0.0006	0.0113
259	0.0118	0.0006	0.0112
260	0.0117	0.0006	0.0111
261	0.0116	0.0006	0.0110
262	0.0115	0.0006	0.0109
263	0.0114	0.0006	0.0108
264	0.0114	0.0006	0.0108
265	0.0113	0.0006	0.0107
266	0.0112	0.0006	0.0106
267	0.0111	0.0006	0.0105
268	0.0110	0.0006	0.0104
269	0.0109	0.0006	0.0104
270	0.0108	0.0006	0.0103
271	0.0108	0.0006	0.0102
272	0.0107	0.0006	0.0101
273	0.0106	0.0006	0.0101
274	0.0105	0.0006	0.0100
275	0.0105	0.0006	0.0099
276	0.0104	0.0006	0.0099
277	0.0103	0.0005	0.0098
278	0.0103	0.0005	0.0097
279	0.0102	0.0005	0.0097
280	0.0101	0.0005	0.0096
281	0.0101	0.0005	0.0095
282	0.0100	0.0005	0.0095
283	0.0099	0.0005	0.0094
284	0.0099	0.0005	0.0094
285	0.0098	0.0005	0.0093
286	0.0098	0.0005	0.0092
287	0.0097	0.0005	0.0092
288	0.0096	0.0005	0.0091

Total soil rain loss = 0.30(In)
Total effective rainfall = 5.99(In)
Peak flow rate in flood hydrograph = 34.58(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	10.0	20.0	30.0	40.0
0+ 5	0.0005	0.08	Q				
0+10	0.0039	0.49	Q				
0+15	0.0095	0.81	Q				
0+20	0.0156	0.89	Q				
0+25	0.0219	0.91	Q				
0+30	0.0282	0.91	Q				
0+35	0.0345	0.92	Q				
0+40	0.0409	0.92	Q				
0+45	0.0472	0.92	Q				
0+50	0.0536	0.93	Q				
0+55	0.0600	0.93	Q				
1+ 0	0.0664	0.93	Q				
1+ 5	0.0728	0.93	Q				
1+10	0.0793	0.94	Q				
1+15	0.0858	0.94	Q				
1+20	0.0923	0.94	Q				
1+25	0.0988	0.95	Q				
1+30	0.1053	0.95	QV				
1+35	0.1119	0.95	QV				
1+40	0.1184	0.96	QV				
1+45	0.1250	0.96	QV				
1+50	0.1317	0.96	QV				
1+55	0.1383	0.96	QV				
2+ 0	0.1450	0.97	QV				
2+ 5	0.1517	0.97	QV				
2+10	0.1584	0.97	QV				
2+15	0.1651	0.98	QV				
2+20	0.1719	0.98	QV				
2+25	0.1786	0.98	QV				
2+30	0.1854	0.99	QV				
2+35	0.1923	0.99	QV				
2+40	0.1991	0.99	QV				
2+45	0.2060	1.00	Q V				
2+50	0.2129	1.00	|QV				
2+55	0.2198	1.00	|QV				
3+ 0	0.2267	1.01	|QV				
3+ 5	0.2337	1.01	|QV				
3+10	0.2407	1.02	|QV				
3+15	0.2477	1.02	|QV				
3+20	0.2547	1.02	|QV				
3+25	0.2618	1.03	|QV				
3+30	0.2689	1.03	|QV				
3+35	0.2760	1.03	|QV				
3+40	0.2832	1.04	|QV				
3+45	0.2904	1.04	|QV				
3+50	0.2976	1.05	|QV				
3+55	0.3048	1.05	|QV				
4+ 0	0.3120	1.05	|Q V				
4+ 5	0.3193	1.06	|Q V				
4+10	0.3266	1.06	|Q V				
4+15	0.3340	1.07	|Q V				
4+20	0.3414	1.07	|Q V				
4+25	0.3488	1.07	|Q V				
4+30	0.3562	1.08	|Q V				
4+35	0.3636	1.08	|Q V				
4+40	0.3711	1.09	|Q V				

4+45	0.3787	1.09	|Q V				
4+50	0.3862	1.10	|Q V				
4+55	0.3938	1.10	|Q V				
5+ 0	0.4014	1.11	|Q V				
5+ 5	0.4090	1.11	|Q V				
5+10	0.4167	1.11	|Q V				
5+15	0.4244	1.12	|Q V				
5+20	0.4322	1.12	|Q V				
5+25	0.4399	1.13	|Q V				
5+30	0.4478	1.13	|Q V				
5+35	0.4556	1.14	|Q V				
5+40	0.4635	1.14	|Q V				
5+45	0.4714	1.15	|Q V				
5+50	0.4794	1.15	|Q V				
5+55	0.4873	1.16	|Q V				
6+ 0	0.4954	1.17	|Q V				
6+ 5	0.5034	1.17	|Q V				
6+10	0.5115	1.18	|Q V				
6+15	0.5197	1.18	|Q V				
6+20	0.5278	1.19	|Q V				
6+25	0.5360	1.19	|Q V				
6+30	0.5443	1.20	|Q V				
6+35	0.5526	1.20	|Q V				
6+40	0.5609	1.21	|Q V				
6+45	0.5693	1.22	|Q V				
6+50	0.5777	1.22	|Q V				
6+55	0.5862	1.23	|Q V				
7+ 0	0.5947	1.23	|Q V				
7+ 5	0.6032	1.24	|Q V				
7+10	0.6118	1.25	|Q V				
7+15	0.6204	1.25	|Q V				
7+20	0.6291	1.26	|Q V				
7+25	0.6378	1.27	|Q V				
7+30	0.6466	1.27	|Q V				
7+35	0.6554	1.28	|Q V				
7+40	0.6643	1.29	|Q V				
7+45	0.6732	1.29	|Q V				
7+50	0.6822	1.30	|Q V				
7+55	0.6912	1.31	|Q V				
8+ 0	0.7003	1.32	|Q V				
8+ 5	0.7094	1.32	|Q V				
8+10	0.7186	1.33	|Q V				
8+15	0.7278	1.34	|Q V				
8+20	0.7371	1.35	|Q V				
8+25	0.7464	1.36	|Q V				
8+30	0.7558	1.36	|Q V				
8+35	0.7653	1.37	|Q V				
8+40	0.7748	1.38	|Q V				
8+45	0.7843	1.39	|Q V				
8+50	0.7940	1.40	|Q V				
8+55	0.8037	1.41	|Q V				
9+ 0	0.8134	1.42	|Q V				
9+ 5	0.8232	1.43	|Q V				
9+10	0.8331	1.44	|Q V				
9+15	0.8431	1.44	|Q V				
9+20	0.8531	1.45	|Q V				
9+25	0.8632	1.46	|Q V				
9+30	0.8733	1.47	|Q V				
9+35	0.8835	1.48	|Q V				

9+40	0.8938	1.50	Q V			
9+45	0.9042	1.51	Q V			
9+50	0.9147	1.52	Q V			
9+55	0.9252	1.53	Q V			
10+ 0	0.9358	1.54	Q V			
10+ 5	0.9465	1.55	Q V			
10+10	0.9573	1.56	Q V			
10+15	0.9681	1.58	Q V			
10+20	0.9791	1.59	Q V			
10+25	0.9901	1.60	Q V			
10+30	1.0012	1.61	Q V			
10+35	1.0124	1.63	Q V			
10+40	1.0237	1.64	Q V			
10+45	1.0351	1.66	Q V			
10+50	1.0466	1.67	Q V			
10+55	1.0582	1.68	Q V			
11+ 0	1.0700	1.70	Q V			
11+ 5	1.0818	1.72	Q V			
11+10	1.0937	1.73	Q V			
11+15	1.1057	1.75	Q V			
11+20	1.1179	1.76	Q V			
11+25	1.1301	1.78	Q V			
11+30	1.1425	1.80	Q V			
11+35	1.1551	1.82	Q V			
11+40	1.1677	1.84	Q V			
11+45	1.1805	1.86	Q V			
11+50	1.1934	1.88	Q V			
11+55	1.2064	1.90	Q V			
12+ 0	1.2196	1.92	Q V			
12+ 5	1.2330	1.93	Q V			
12+10	1.2463	1.94	Q V			
12+15	1.2598	1.95	Q V			
12+20	1.2733	1.97	Q V			
12+25	1.2871	1.99	Q V			
12+30	1.3010	2.02	Q V			
12+35	1.3151	2.05	Q V			
12+40	1.3293	2.07	Q V			
12+45	1.3438	2.10	Q V			
12+50	1.3585	2.13	Q V			
12+55	1.3734	2.16	Q V			
13+ 0	1.3885	2.19	Q V			
13+ 5	1.4038	2.23	Q V			
13+10	1.4194	2.26	Q V			
13+15	1.4352	2.30	Q V			
13+20	1.4513	2.34	Q V			
13+25	1.4677	2.37	Q V			
13+30	1.4843	2.42	Q V			
13+35	1.5013	2.46	Q V			
13+40	1.5185	2.51	Q V			
13+45	1.5361	2.55	Q V			
13+50	1.5541	2.61	Q V			
13+55	1.5724	2.66	Q V			
14+ 0	1.5911	2.72	Q V			
14+ 5	1.6102	2.78	Q V			
14+10	1.6298	2.84	Q V			
14+15	1.6499	2.91	Q V			
14+20	1.6704	2.99	Q V			
14+25	1.6915	3.06	Q V			
14+30	1.7132	3.15	Q V			

14+35	1.7356	3.24	Q V			
14+40	1.7586	3.34	Q V			
14+45	1.7823	3.45	Q V			
14+50	1.8069	3.57	Q V			
14+55	1.8324	3.70	Q V			
15+ 0	1.8589	3.85	Q V			
15+ 5	1.8865	4.01	Q V			
15+10	1.9154	4.20	Q V			
15+15	1.9457	4.40	Q V			
15+20	1.9777	4.64	Q V			
15+25	2.0113	4.88	Q V			
15+30	2.0461	5.05	Q V			
15+35	2.0825	5.30	Q V			
15+40	2.1223	5.78	Q V			
15+45	2.1664	6.40	Q V			
15+50	2.2169	7.34	Q V			
15+55	2.2769	8.71	Q V			
16+ 0	2.3560	11.48	Q V			
16+ 5	2.4856	18.81	Q V			
16+10	2.7238	34.58	V Q			
16+15	2.9154	27.83	QV			
16+20	3.0035	12.79	Q V			
16+25	3.0564	7.68	Q V			
16+30	3.0951	5.62	Q V			
16+35	3.1292	4.95	Q V			
16+40	3.1598	4.43	Q V			
16+45	3.1875	4.03	Q V			
16+50	3.2132	3.72	Q V			
16+55	3.2370	3.46	Q V			
17+ 0	3.2594	3.25	Q V			
17+ 5	3.2806	3.07	Q V			
17+10	3.3007	2.92	Q V			
17+15	3.3198	2.78	Q V			
17+20	3.3382	2.66	Q V			
17+25	3.3558	2.56	Q V			
17+30	3.3728	2.46	Q V			
17+35	3.3891	2.38	Q V			
17+40	3.4050	2.30	Q V			
17+45	3.4203	2.23	Q V			
17+50	3.4352	2.16	Q V			
17+55	3.4497	2.10	Q V			
18+ 0	3.4638	2.05	Q V			
18+ 5	3.4776	2.00	Q V			
18+10	3.4911	1.97	Q V			
18+15	3.5044	1.94	Q V			
18+20	3.5175	1.90	Q V			
18+25	3.5303	1.86	Q V			
18+30	3.5428	1.82	Q V			
18+35	3.5551	1.78	Q V			
18+40	3.5671	1.75	Q V			
18+45	3.5789	1.72	Q V			
18+50	3.5905	1.69	Q V			
18+55	3.6019	1.66	Q V			
19+ 0	3.6132	1.63	Q V			
19+ 5	3.6242	1.60	Q V			
19+10	3.6351	1.58	Q V			
19+15	3.6457	1.55	Q V			
19+20	3.6563	1.53	Q V			
19+25	3.6666	1.51	Q V			

19+30	3.6769	1.49	|Q	|	|	|	V |
19+35	3.6870	1.46	|Q	|	|	|	V |
19+40	3.6969	1.44	|Q	|	|	|	V |
19+45	3.7067	1.43	|Q	|	|	|	V |
19+50	3.7164	1.41	|Q	|	|	|	V |
19+55	3.7260	1.39	|Q	|	|	|	V |
20+ 0	3.7355	1.37	|Q	|	|	|	V |
20+ 5	3.7448	1.36	|Q	|	|	|	V |
20+10	3.7540	1.34	|Q	|	|	|	V |
20+15	3.7631	1.32	|Q	|	|	|	V |
20+20	3.7722	1.31	|Q	|	|	|	V |
20+25	3.7811	1.29	|Q	|	|	|	V |
20+30	3.7899	1.28	|Q	|	|	|	V |
20+35	3.7986	1.27	|Q	|	|	|	V |
20+40	3.8073	1.25	|Q	|	|	|	V |
20+45	3.8158	1.24	|Q	|	|	|	V |
20+50	3.8243	1.23	|Q	|	|	|	V |
20+55	3.8326	1.22	|Q	|	|	|	V |
21+ 0	3.8409	1.20	|Q	|	|	|	V |
21+ 5	3.8491	1.19	|Q	|	|	|	V |
21+10	3.8573	1.18	|Q	|	|	|	V |
21+15	3.8653	1.17	|Q	|	|	|	V |
21+20	3.8733	1.16	|Q	|	|	|	V |
21+25	3.8812	1.15	|Q	|	|	|	V |
21+30	3.8891	1.14	|Q	|	|	|	V |
21+35	3.8969	1.13	|Q	|	|	|	V |
21+40	3.9046	1.12	|Q	|	|	|	V |
21+45	3.9122	1.11	|Q	|	|	|	V |
21+50	3.9198	1.10	|Q	|	|	|	V |
21+55	3.9273	1.09	|Q	|	|	|	V |
22+ 0	3.9348	1.08	|Q	|	|	|	V |
22+ 5	3.9422	1.07	|Q	|	|	|	V |
22+10	3.9495	1.07	|Q	|	|	|	V |
22+15	3.9568	1.06	|Q	|	|	|	V |
22+20	3.9640	1.05	|Q	|	|	|	V |
22+25	3.9712	1.04	|Q	|	|	|	V |
22+30	3.9783	1.03	|Q	|	|	|	V |
22+35	3.9854	1.03	|Q	|	|	|	V |
22+40	3.9924	1.02	|Q	|	|	|	V |
22+45	3.9994	1.01	|Q	|	|	|	V |
22+50	4.0063	1.00	|Q	|	|	|	V|
22+55	4.0132	1.00	Q	|	|	|	V|
23+ 0	4.0200	0.99	Q	|	|	|	V|
23+ 5	4.0268	0.98	Q	|	|	|	V|
23+10	4.0335	0.98	Q	|	|	|	V|
23+15	4.0402	0.97	Q	|	|	|	V|
23+20	4.0469	0.96	Q	|	|	|	V|
23+25	4.0535	0.96	Q	|	|	|	V|
23+30	4.0600	0.95	Q	|	|	|	V|
23+35	4.0665	0.95	Q	|	|	|	V|
23+40	4.0730	0.94	Q	|	|	|	V|
23+45	4.0794	0.93	Q	|	|	|	V|
23+50	4.0858	0.93	Q	|	|	|	V|
23+55	4.0922	0.92	Q	|	|	|	V|
24+ 0	4.0985	0.92	Q	|	|	|	V|
24+ 5	4.1042	0.83	Q	|	|	|	V|
24+10	4.1072	0.42	Q	|	|	|	V|
24+15	4.1078	0.10	Q	|	|	|	V|
24+20	4.1079	0.02	Q	|	|	|	V

APPENDIX B.3: UNIT HYDROGRAPH, AREA "3"

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/20/19

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

Program License Serial Number 6279

BNSF
POST PROJECT HYDROLOGY
AREA 3

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
6.39	1	1.58
Rainfall data for year 100		
6.39	6	3.42
Rainfall data for year 100		
6.39	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
86.0	97.2	6.39	1.000	0.055	1.000	0.055

Area-averaged adjusted loss rate Fm (In/Hr) = 0.055

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
6.39	1.000	86.0	97.2	0.29	0.947

Area-averaged catchment yield fraction, Y = 0.947
Area-averaged low loss fraction, Yb = 0.053
++
Watercourse length = 2154.00(Ft.)
Length from concentration point to centroid = 1025.00(Ft.)
Elevation difference along watercourse = 30.00(Ft.)
Mannings friction factor along watercourse = 0.020
Watershed area = 6.39(Ac.)
Catchment Lag time = 0.081 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 102.9693
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.055(In/Hr)
Average low loss rate fraction (Yb) = 0.053 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 6.39(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.585(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.580(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 77.28 (CFS))		
1	18.166	14.039
2	81.091	48.628
3	98.160	13.191
4	100.000	1.422

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5846	0.5846
2	0.7714	0.1868
3	0.9072	0.1358
4	1.0178	0.1106

5	1.1129	0.0950
6	1.1971	0.0842
7	1.2732	0.0761
8	1.3430	0.0699
9	1.4078	0.0648
10	1.4684	0.0606
11	1.5255	0.0571
12	1.5795	0.0540
13	1.6350	0.0555
14	1.6881	0.0531
15	1.7391	0.0510
16	1.7881	0.0491
17	1.8355	0.0474
18	1.8813	0.0458
19	1.9257	0.0444
20	1.9688	0.0431
21	2.0106	0.0419
22	2.0514	0.0407
23	2.0911	0.0397
24	2.1298	0.0387
25	2.1676	0.0378
26	2.2046	0.0370
27	2.2408	0.0362
28	2.2762	0.0354
29	2.3109	0.0347
30	2.3449	0.0340
31	2.3783	0.0334
32	2.4111	0.0328
33	2.4433	0.0322
34	2.4750	0.0317
35	2.5061	0.0311
36	2.5367	0.0306
37	2.5668	0.0301
38	2.5965	0.0297
39	2.6258	0.0292
40	2.6546	0.0288
41	2.6830	0.0284
42	2.7110	0.0280
43	2.7386	0.0276
44	2.7659	0.0273
45	2.7928	0.0269
46	2.8194	0.0266
47	2.8456	0.0263
48	2.8716	0.0259
49	2.8972	0.0256
50	2.9226	0.0253
51	2.9476	0.0251
52	2.9724	0.0248
53	2.9969	0.0245
54	3.0211	0.0242
55	3.0451	0.0240
56	3.0688	0.0237
57	3.0923	0.0235
58	3.1156	0.0233
59	3.1387	0.0230
60	3.1615	0.0228
61	3.1841	0.0226
62	3.2065	0.0224
63	3.2287	0.0222

64	3.2507	0.0220
65	3.2724	0.0218
66	3.2941	0.0216
67	3.3155	0.0214
68	3.3367	0.0212
69	3.3578	0.0211
70	3.3787	0.0209
71	3.3994	0.0207
72	3.4199	0.0206
73	3.4407	0.0208
74	3.4614	0.0206
75	3.4818	0.0205
76	3.5022	0.0203
77	3.5224	0.0202
78	3.5424	0.0200
79	3.5623	0.0199
80	3.5820	0.0198
81	3.6016	0.0196
82	3.6211	0.0195
83	3.6405	0.0193
84	3.6597	0.0192
85	3.6788	0.0191
86	3.6977	0.0190
87	3.7166	0.0188
88	3.7353	0.0187
89	3.7539	0.0186
90	3.7724	0.0185
91	3.7907	0.0184
92	3.8090	0.0183
93	3.8271	0.0181
94	3.8452	0.0180
95	3.8631	0.0179
96	3.8809	0.0178
97	3.8986	0.0177
98	3.9162	0.0176
99	3.9338	0.0175
100	3.9512	0.0174
101	3.9685	0.0173
102	3.9857	0.0172
103	4.0028	0.0171
104	4.0199	0.0170
105	4.0368	0.0169
106	4.0537	0.0169
107	4.0704	0.0168
108	4.0871	0.0167
109	4.1037	0.0166
110	4.1202	0.0165
111	4.1366	0.0164
112	4.1530	0.0163
113	4.1692	0.0163
114	4.1854	0.0162
115	4.2015	0.0161
116	4.2175	0.0160
117	4.2335	0.0159
118	4.2493	0.0159
119	4.2651	0.0158
120	4.2808	0.0157
121	4.2965	0.0156
122	4.3121	0.0156

123	4.3276	0.0155
124	4.3430	0.0154
125	4.3583	0.0154
126	4.3736	0.0153
127	4.3889	0.0152
128	4.4040	0.0152
129	4.4191	0.0151
130	4.4341	0.0150
131	4.4491	0.0150
132	4.4640	0.0149
133	4.4788	0.0148
134	4.4936	0.0148
135	4.5083	0.0147
136	4.5229	0.0146
137	4.5375	0.0146
138	4.5521	0.0145
139	4.5665	0.0145
140	4.5809	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6238	0.0142
144	4.6380	0.0142
145	4.6521	0.0141
146	4.6662	0.0141
147	4.6802	0.0140
148	4.6942	0.0140
149	4.7081	0.0139
150	4.7220	0.0139
151	4.7358	0.0138
152	4.7496	0.0138
153	4.7633	0.0137
154	4.7769	0.0137
155	4.7905	0.0136
156	4.8041	0.0136
157	4.8176	0.0135
158	4.8311	0.0135
159	4.8445	0.0134
160	4.8579	0.0134
161	4.8712	0.0133
162	4.8845	0.0133
163	4.8977	0.0132
164	4.9109	0.0132
165	4.9240	0.0131
166	4.9371	0.0131
167	4.9502	0.0131
168	4.9632	0.0130
169	4.9761	0.0130
170	4.9890	0.0129
171	5.0019	0.0129
172	5.0148	0.0128
173	5.0276	0.0128
174	5.0403	0.0128
175	5.0530	0.0127
176	5.0657	0.0127
177	5.0783	0.0126
178	5.0909	0.0126
179	5.1035	0.0126
180	5.1160	0.0125
181	5.1284	0.0125

182	5.1409	0.0124
183	5.1533	0.0124
184	5.1656	0.0124
185	5.1780	0.0123
186	5.1902	0.0123
187	5.2025	0.0122
188	5.2147	0.0122
189	5.2269	0.0122
190	5.2390	0.0121
191	5.2511	0.0121
192	5.2632	0.0121
193	5.2752	0.0120
194	5.2872	0.0120
195	5.2992	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3348	0.0119
199	5.3467	0.0118
200	5.3585	0.0118
201	5.3702	0.0118
202	5.3820	0.0117
203	5.3936	0.0117
204	5.4053	0.0117
205	5.4169	0.0116
206	5.4285	0.0116
207	5.4401	0.0116
208	5.4516	0.0115
209	5.4631	0.0115
210	5.4746	0.0115
211	5.4861	0.0114
212	5.4975	0.0114
213	5.5089	0.0114
214	5.5202	0.0114
215	5.5315	0.0113
216	5.5428	0.0113
217	5.5541	0.0113
218	5.5653	0.0112
219	5.5765	0.0112
220	5.5877	0.0112
221	5.5989	0.0111
222	5.6100	0.0111
223	5.6211	0.0111
224	5.6321	0.0111
225	5.6432	0.0110
226	5.6542	0.0110
227	5.6652	0.0110
228	5.6761	0.0110
229	5.6871	0.0109
230	5.6980	0.0109
231	5.7088	0.0109
232	5.7197	0.0108
233	5.7305	0.0108
234	5.7413	0.0108
235	5.7521	0.0108
236	5.7628	0.0107
237	5.7735	0.0107
238	5.7842	0.0107
239	5.7949	0.0107
240	5.8056	0.0106

241	5.8162	0.0106
242	5.8268	0.0106
243	5.8373	0.0106
244	5.8479	0.0105
245	5.8584	0.0105
246	5.8689	0.0105
247	5.8794	0.0105
248	5.8898	0.0105
249	5.9003	0.0104
250	5.9107	0.0104
251	5.9210	0.0104
252	5.9314	0.0104
253	5.9417	0.0103
254	5.9520	0.0103
255	5.9623	0.0103
256	5.9726	0.0103
257	5.9828	0.0102
258	5.9931	0.0102
259	6.0033	0.0102
260	6.0134	0.0102
261	6.0236	0.0102
262	6.0337	0.0101
263	6.0438	0.0101
264	6.0539	0.0101
265	6.0640	0.0101
266	6.0740	0.0100
267	6.0841	0.0100
268	6.0941	0.0100
269	6.1041	0.0100
270	6.1140	0.0100
271	6.1240	0.0099
272	6.1339	0.0099
273	6.1438	0.0099
274	6.1537	0.0099
275	6.1635	0.0099
276	6.1734	0.0098
277	6.1832	0.0098
278	6.1930	0.0098
279	6.2028	0.0098
280	6.2125	0.0098
281	6.2223	0.0097
282	6.2320	0.0097
283	6.2417	0.0097
284	6.2514	0.0097
285	6.2611	0.0097
286	6.2707	0.0096
287	6.2803	0.0096
288	6.2899	0.0096

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0005	0.0091
2	0.0096	0.0005	0.0091
3	0.0097	0.0005	0.0092
4	0.0097	0.0005	0.0092
5	0.0097	0.0005	0.0092
6	0.0097	0.0005	0.0092
7	0.0098	0.0005	0.0093
8	0.0098	0.0005	0.0093
9	0.0098	0.0005	0.0093
10	0.0099	0.0005	0.0093
11	0.0099	0.0005	0.0094
12	0.0099	0.0005	0.0094
13	0.0100	0.0005	0.0094
14	0.0100	0.0005	0.0095
15	0.0100	0.0005	0.0095
16	0.0100	0.0005	0.0095
17	0.0101	0.0005	0.0096
18	0.0101	0.0005	0.0096
19	0.0102	0.0005	0.0096
20	0.0102	0.0005	0.0096
21	0.0102	0.0005	0.0097
22	0.0102	0.0005	0.0097
23	0.0103	0.0005	0.0097
24	0.0103	0.0005	0.0098
25	0.0104	0.0005	0.0098
26	0.0104	0.0005	0.0098
27	0.0104	0.0006	0.0099
28	0.0105	0.0006	0.0099
29	0.0105	0.0006	0.0099
30	0.0105	0.0006	0.0100
31	0.0106	0.0006	0.0100
32	0.0106	0.0006	0.0100
33	0.0106	0.0006	0.0101
34	0.0107	0.0006	0.0101
35	0.0107	0.0006	0.0102
36	0.0107	0.0006	0.0102
37	0.0108	0.0006	0.0102
38	0.0108	0.0006	0.0103
39	0.0109	0.0006	0.0103
40	0.0109	0.0006	0.0103
41	0.0110	0.0006	0.0104
42	0.0110	0.0006	0.0104
43	0.0110	0.0006	0.0105
44	0.0111	0.0006	0.0105
45	0.0111	0.0006	0.0105
46	0.0111	0.0006	0.0106
47	0.0112	0.0006	0.0106
48	0.0112	0.0006	0.0106
49	0.0113	0.0006	0.0107
50	0.0113	0.0006	0.0107
51	0.0114	0.0006	0.0108
52	0.0114	0.0006	0.0108
53	0.0115	0.0006	0.0109
54	0.0115	0.0006	0.0109
55	0.0116	0.0006	0.0110
56	0.0116	0.0006	0.0110
57	0.0117	0.0006	0.0110
58	0.0117	0.0006	0.0111
59	0.0118	0.0006	0.0111
60	0.0118	0.0006	0.0112
61	0.0119	0.0006	0.0112
62	0.0119	0.0006	0.0113
63	0.0120	0.0006	0.0113
64	0.0120	0.0006	0.0114
65	0.0121	0.0006	0.0114

66	0.0121	0.0006	0.0115
67	0.0122	0.0006	0.0115
68	0.0122	0.0006	0.0116
69	0.0123	0.0007	0.0116
70	0.0123	0.0007	0.0117
71	0.0124	0.0007	0.0117
72	0.0124	0.0007	0.0118
73	0.0125	0.0007	0.0118
74	0.0126	0.0007	0.0119
75	0.0126	0.0007	0.0120
76	0.0127	0.0007	0.0120
77	0.0128	0.0007	0.0121
78	0.0128	0.0007	0.0121
79	0.0129	0.0007	0.0122
80	0.0129	0.0007	0.0122
81	0.0130	0.0007	0.0123
82	0.0131	0.0007	0.0124
83	0.0131	0.0007	0.0124
84	0.0132	0.0007	0.0125
85	0.0133	0.0007	0.0126
86	0.0133	0.0007	0.0126
87	0.0134	0.0007	0.0127
88	0.0135	0.0007	0.0128
89	0.0136	0.0007	0.0128
90	0.0136	0.0007	0.0129
91	0.0137	0.0007	0.0130
92	0.0138	0.0007	0.0130
93	0.0139	0.0007	0.0131
94	0.0139	0.0007	0.0132
95	0.0140	0.0007	0.0133
96	0.0141	0.0007	0.0133
97	0.0142	0.0008	0.0134
98	0.0142	0.0008	0.0135
99	0.0144	0.0008	0.0136
100	0.0144	0.0008	0.0136
101	0.0145	0.0008	0.0138
102	0.0146	0.0008	0.0138
103	0.0147	0.0008	0.0139
104	0.0148	0.0008	0.0140
105	0.0149	0.0008	0.0141
106	0.0150	0.0008	0.0142
107	0.0151	0.0008	0.0143
108	0.0152	0.0008	0.0144
109	0.0153	0.0008	0.0145
110	0.0154	0.0008	0.0145
111	0.0155	0.0008	0.0147
112	0.0156	0.0008	0.0147
113	0.0157	0.0008	0.0149
114	0.0158	0.0008	0.0150
115	0.0159	0.0008	0.0151
116	0.0160	0.0008	0.0152
117	0.0162	0.0009	0.0153
118	0.0163	0.0009	0.0154
119	0.0164	0.0009	0.0156
120	0.0165	0.0009	0.0156
121	0.0167	0.0009	0.0158
122	0.0168	0.0009	0.0159
123	0.0169	0.0009	0.0160
124	0.0170	0.0009	0.0161

125	0.0172	0.0009	0.0163
126	0.0173	0.0009	0.0164
127	0.0175	0.0009	0.0166
128	0.0176	0.0009	0.0167
129	0.0178	0.0009	0.0169
130	0.0179	0.0009	0.0170
131	0.0181	0.0010	0.0172
132	0.0183	0.0010	0.0173
133	0.0185	0.0010	0.0175
134	0.0186	0.0010	0.0176
135	0.0188	0.0010	0.0178
136	0.0190	0.0010	0.0180
137	0.0192	0.0010	0.0182
138	0.0193	0.0010	0.0183
139	0.0196	0.0010	0.0186
140	0.0198	0.0010	0.0187
141	0.0200	0.0011	0.0190
142	0.0202	0.0011	0.0191
143	0.0205	0.0011	0.0194
144	0.0206	0.0011	0.0195
145	0.0206	0.0011	0.0195
146	0.0207	0.0011	0.0196
147	0.0211	0.0011	0.0199
148	0.0212	0.0011	0.0201
149	0.0216	0.0011	0.0205
150	0.0218	0.0012	0.0206
151	0.0222	0.0012	0.0210
152	0.0224	0.0012	0.0212
153	0.0228	0.0012	0.0216
154	0.0230	0.0012	0.0218
155	0.0235	0.0012	0.0223
156	0.0237	0.0013	0.0225
157	0.0242	0.0013	0.0230
158	0.0245	0.0013	0.0232
159	0.0251	0.0013	0.0237
160	0.0253	0.0013	0.0240
161	0.0259	0.0014	0.0246
162	0.0263	0.0014	0.0249
163	0.0269	0.0014	0.0255
164	0.0273	0.0014	0.0258
165	0.0280	0.0015	0.0265
166	0.0284	0.0015	0.0269
167	0.0292	0.0015	0.0277
168	0.0297	0.0016	0.0281
169	0.0306	0.0016	0.0290
170	0.0311	0.0016	0.0295
171	0.0322	0.0017	0.0305
172	0.0328	0.0017	0.0310
173	0.0340	0.0018	0.0322
174	0.0347	0.0018	0.0329
175	0.0362	0.0019	0.0343
176	0.0370	0.0020	0.0350
177	0.0387	0.0021	0.0367
178	0.0397	0.0021	0.0376
179	0.0419	0.0022	0.0396
180	0.0431	0.0023	0.0408
181	0.0458	0.0024	0.0434
182	0.0474	0.0025	0.0449
183	0.0510	0.0027	0.0483

184	0.0531	0.0028	0.0503
185	0.0540	0.0029	0.0512
186	0.0571	0.0030	0.0540
187	0.0648	0.0034	0.0614
188	0.0699	0.0037	0.0662
189	0.0842	0.0045	0.0797
190	0.0950	0.0046	0.0904
191	0.1358	0.0046	0.1312
192	0.1868	0.0046	0.1822
193	0.5846	0.0046	0.5800
194	0.1106	0.0046	0.1060
195	0.0761	0.0040	0.0721
196	0.0606	0.0032	0.0574
197	0.0555	0.0029	0.0525
198	0.0491	0.0026	0.0465
199	0.0444	0.0023	0.0420
200	0.0407	0.0022	0.0386
201	0.0378	0.0020	0.0358
202	0.0354	0.0019	0.0335
203	0.0334	0.0018	0.0316
204	0.0317	0.0017	0.0300
205	0.0301	0.0016	0.0285
206	0.0288	0.0015	0.0273
207	0.0276	0.0015	0.0262
208	0.0266	0.0014	0.0252
209	0.0256	0.0014	0.0243
210	0.0248	0.0013	0.0235
211	0.0240	0.0013	0.0227
212	0.0233	0.0012	0.0220
213	0.0226	0.0012	0.0214
214	0.0220	0.0012	0.0208
215	0.0214	0.0011	0.0203
216	0.0209	0.0011	0.0198
217	0.0208	0.0011	0.0197
218	0.0203	0.0011	0.0193
219	0.0199	0.0011	0.0188
220	0.0195	0.0010	0.0184
221	0.0191	0.0010	0.0181
222	0.0187	0.0010	0.0177
223	0.0184	0.0010	0.0174
224	0.0180	0.0010	0.0171
225	0.0177	0.0009	0.0168
226	0.0174	0.0009	0.0165
227	0.0171	0.0009	0.0162
228	0.0169	0.0009	0.0160
229	0.0166	0.0009	0.0157
230	0.0163	0.0009	0.0155
231	0.0161	0.0009	0.0152
232	0.0159	0.0008	0.0150
233	0.0156	0.0008	0.0148
234	0.0154	0.0008	0.0146
235	0.0152	0.0008	0.0144
236	0.0150	0.0008	0.0142
237	0.0148	0.0008	0.0140
238	0.0146	0.0008	0.0139
239	0.0145	0.0008	0.0137
240	0.0143	0.0008	0.0135
241	0.0141	0.0007	0.0134
242	0.0140	0.0007	0.0132

243	0.0138	0.0007	0.0131
244	0.0137	0.0007	0.0129
245	0.0135	0.0007	0.0128
246	0.0134	0.0007	0.0127
247	0.0132	0.0007	0.0125
248	0.0131	0.0007	0.0124
249	0.0130	0.0007	0.0123
250	0.0128	0.0007	0.0122
251	0.0127	0.0007	0.0120
252	0.0126	0.0007	0.0119
253	0.0125	0.0007	0.0118
254	0.0124	0.0007	0.0117
255	0.0122	0.0006	0.0116
256	0.0121	0.0006	0.0115
257	0.0120	0.0006	0.0114
258	0.0119	0.0006	0.0113
259	0.0118	0.0006	0.0112
260	0.0117	0.0006	0.0111
261	0.0116	0.0006	0.0110
262	0.0115	0.0006	0.0109
263	0.0114	0.0006	0.0108
264	0.0114	0.0006	0.0108
265	0.0113	0.0006	0.0107
266	0.0112	0.0006	0.0106
267	0.0111	0.0006	0.0105
268	0.0110	0.0006	0.0104
269	0.0109	0.0006	0.0104
270	0.0108	0.0006	0.0103
271	0.0108	0.0006	0.0102
272	0.0107	0.0006	0.0101
273	0.0106	0.0006	0.0101
274	0.0105	0.0006	0.0100
275	0.0105	0.0006	0.0099
276	0.0104	0.0006	0.0099
277	0.0103	0.0005	0.0098
278	0.0103	0.0005	0.0097
279	0.0102	0.0005	0.0097
280	0.0101	0.0005	0.0096
281	0.0101	0.0005	0.0095
282	0.0100	0.0005	0.0095
283	0.0099	0.0005	0.0094
284	0.0099	0.0005	0.0094
285	0.0098	0.0005	0.0093
286	0.0098	0.0005	0.0092
287	0.0097	0.0005	0.0092
288	0.0096	0.0005	0.0091

Total soil rain loss = 0.30(In)
Total effective rainfall = 5.99(In)
Peak flow rate in flood hydrograph = 32.28(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	10.0	20.0	30.0	40.0
0+ 5	0.0009	0.13	Q				
0+10	0.0048	0.57	Q				
0+15	0.0096	0.69	Q				
0+20	0.0144	0.71	Q				
0+25	0.0193	0.71	Q				
0+30	0.0242	0.71	Q				
0+35	0.0291	0.71	Q				
0+40	0.0341	0.72	Q				
0+45	0.0390	0.72	Q				
0+50	0.0440	0.72	Q				
0+55	0.0489	0.72	Q				
1+ 0	0.0539	0.72	Q				
1+ 5	0.0589	0.73	Q				
1+10	0.0640	0.73	Q				
1+15	0.0690	0.73	Q				
1+20	0.0740	0.73	Q				
1+25	0.0791	0.74	Q				
1+30	0.0842	0.74	QV				
1+35	0.0893	0.74	QV				
1+40	0.0944	0.74	QV				
1+45	0.0995	0.75	QV				
1+50	0.1047	0.75	QV				
1+55	0.1098	0.75	QV				
2+ 0	0.1150	0.75	QV				
2+ 5	0.1202	0.75	QV				
2+10	0.1254	0.76	QV				
2+15	0.1307	0.76	QV				
2+20	0.1359	0.76	QV				
2+25	0.1412	0.77	QV				
2+30	0.1465	0.77	QV				
2+35	0.1518	0.77	QV				
2+40	0.1571	0.77	QV				
2+45	0.1625	0.78	Q V				
2+50	0.1678	0.78	Q V				
2+55	0.1732	0.78	Q V				
3+ 0	0.1786	0.78	Q V				
3+ 5	0.1840	0.79	Q V				
3+10	0.1895	0.79	Q V				
3+15	0.1949	0.79	Q V				
3+20	0.2004	0.80	Q V				
3+25	0.2059	0.80	Q V				
3+30	0.2114	0.80	Q V				
3+35	0.2170	0.80	Q V				
3+40	0.2225	0.81	Q V				
3+45	0.2281	0.81	Q V				
3+50	0.2337	0.81	Q V				
3+55	0.2393	0.82	Q V				
4+ 0	0.2450	0.82	Q V				
4+ 5	0.2506	0.82	Q V				
4+10	0.2563	0.83	Q V				
4+15	0.2620	0.83	Q V				
4+20	0.2678	0.83	Q V				
4+25	0.2735	0.84	Q V				
4+30	0.2793	0.84	Q V				
4+35	0.2851	0.84	Q V				
4+40	0.2909	0.85	Q V				
4+45	0.2968	0.85	Q V				

4+50	0.3027	0.85	Q V				
4+55	0.3086	0.86	Q V				
5+ 0	0.3145	0.86	Q V				
5+ 5	0.3204	0.86	Q V				
5+10	0.3264	0.87	Q V				
5+15	0.3324	0.87	Q V				
5+20	0.3384	0.87	Q V				
5+25	0.3445	0.88	Q V				
5+30	0.3505	0.88	Q V				
5+35	0.3567	0.89	Q V				
5+40	0.3628	0.89	Q V				
5+45	0.3689	0.89	Q V				
5+50	0.3751	0.90	Q V				
5+55	0.3813	0.90	Q V				
6+ 0	0.3876	0.91	Q V				
6+ 5	0.3939	0.91	Q V				
6+10	0.4002	0.92	Q V				
6+15	0.4065	0.92	Q V				
6+20	0.4129	0.92	Q V				
6+25	0.4192	0.93	Q V				
6+30	0.4257	0.93	Q V				
6+35	0.4321	0.94	Q V				
6+40	0.4386	0.94	Q V				
6+45	0.4451	0.95	Q V				
6+50	0.4517	0.95	Q V				
6+55	0.4583	0.96	Q V				
7+ 0	0.4649	0.96	Q V				
7+ 5	0.4715	0.97	Q V				
7+10	0.4782	0.97	Q V				
7+15	0.4849	0.98	Q V				
7+20	0.4917	0.98	Q V				
7+25	0.4985	0.99	Q V				
7+30	0.5053	0.99	Q V				
7+35	0.5122	1.00	Q V				
7+40	0.5191	1.00	IQ V				
7+45	0.5260	1.01	IQ V				
7+50	0.5330	1.01	IQ V				
7+55	0.5400	1.02	IQ V				
8+ 0	0.5471	1.03	IQ V				
8+ 5	0.5542	1.03	IQ V				
8+10	0.5613	1.04	IQ V				
8+15	0.5685	1.04	IQ V				
8+20	0.5757	1.05	IQ V				
8+25	0.5830	1.06	IQ V				
8+30	0.5903	1.06	IQ V				
8+35	0.5977	1.07	IQ V				
8+40	0.6051	1.08	IQ V				
8+45	0.6125	1.08	IQ V				
8+50	0.6200	1.09	IQ V				
8+55	0.6276	1.10	IQ V				
9+ 0	0.6352	1.10	IQ V				
9+ 5	0.6428	1.11	IQ V				
9+10	0.6505	1.12	IQ V				
9+15	0.6583	1.12	IQ V				
9+20	0.6661	1.13	IQ V				
9+25	0.6739	1.14	IQ V				
9+30	0.6818	1.15	IQ V				
9+35	0.6898	1.16	IQ V				
9+40	0.6978	1.17	IQ V				

9+45	0.7059	1.17	Q V			
9+50	0.7141	1.18	Q V			
9+55	0.7223	1.19	Q V			
10+ 0	0.7305	1.20	Q V			
10+ 5	0.7388	1.21	Q V			
10+10	0.7472	1.22	Q V			
10+15	0.7557	1.23	Q V			
10+20	0.7642	1.24	Q V			
10+25	0.7728	1.25	Q V			
10+30	0.7815	1.26	Q V			
10+35	0.7902	1.27	Q V			
10+40	0.7991	1.28	Q V			
10+45	0.8079	1.29	Q V			
10+50	0.8169	1.30	Q V			
10+55	0.8260	1.31	Q V			
11+ 0	0.8351	1.33	Q V			
11+ 5	0.8443	1.34	Q V			
11+10	0.8536	1.35	Q V			
11+15	0.8630	1.36	Q V			
11+20	0.8725	1.38	Q V			
11+25	0.8820	1.39	Q V			
11+30	0.8917	1.40	Q V			
11+35	0.9015	1.42	Q V			
11+40	0.9113	1.43	Q V			
11+45	0.9213	1.45	Q V			
11+50	0.9314	1.46	Q V			
11+55	0.9416	1.48	Q V			
12+ 0	0.9519	1.50	Q V			
12+ 5	0.9623	1.51	Q V			
12+10	0.9726	1.51	Q V			
12+15	0.9831	1.52	Q V			
12+20	0.9937	1.54	Q V			
12+25	1.0044	1.56	Q V			
12+30	1.0153	1.58	Q V			
12+35	1.0263	1.60	Q V			
12+40	1.0374	1.62	Q V			
12+45	1.0487	1.64	Q V			
12+50	1.0602	1.67	Q V			
12+55	1.0719	1.69	Q V			
13+ 0	1.0837	1.72	Q V			
13+ 5	1.0957	1.74	Q V			
13+10	1.1079	1.77	Q V			
13+15	1.1202	1.80	Q V			
13+20	1.1328	1.83	Q V			
13+25	1.1456	1.86	Q V			
13+30	1.1587	1.89	Q V			
13+35	1.1719	1.93	Q V			
13+40	1.1855	1.97	Q V			
13+45	1.1992	2.00	Q V			
13+50	1.2133	2.04	Q V			
13+55	1.2277	2.08	Q V			
14+ 0	1.2424	2.13	Q V			
14+ 5	1.2574	2.18	Q V			
14+10	1.2727	2.23	Q V			
14+15	1.2885	2.28	Q V			
14+20	1.3047	2.35	Q V			
14+25	1.3212	2.41	Q V			
14+30	1.3383	2.48	Q V			
14+35	1.3559	2.55	Q V			

14+40	1.3740	2.64	Q V			
14+45	1.3927	2.72	Q V			
14+50	1.4122	2.82	Q V			
14+55	1.4323	2.92	Q V			
15+ 0	1.4533	3.05	Q V			
15+ 5	1.4751	3.17	Q V			
15+10	1.4981	3.33	Q V			
15+15	1.5221	3.49	Q V			
15+20	1.5476	3.71	Q V			
15+25	1.5742	3.86	Q V			
15+30	1.6016	3.98	Q V			
15+35	1.6308	4.24	Q V			
15+40	1.6632	4.70	Q V			
15+45	1.6991	5.22	Q V			
15+50	1.7412	6.11	Q V			
15+55	1.7920	7.38	Q V			
16+ 0	1.8626	10.24	Q V			
16+ 5	1.9925	18.86	Q V			
16+10	2.2148	32.28	Q V			
16+15	2.3117	14.08	Q V			
16+20	2.3568	6.54	Q V			
16+25	2.3886	4.63	Q V			
16+30	2.4167	4.07	Q V			
16+35	2.4416	3.62	Q V			
16+40	2.4642	3.27	Q V			
16+45	2.4848	3.00	Q V			
16+50	2.5040	2.78	Q V			
16+55	2.5219	2.60	Q V			
17+ 0	2.5388	2.45	Q V			
17+ 5	2.5548	2.32	Q V			
17+10	2.5700	2.21	Q V			
17+15	2.5846	2.11	Q V			
17+20	2.5985	2.03	Q V			
17+25	2.6119	1.95	Q V			
17+30	2.6249	1.88	Q V			
17+35	2.6374	1.82	Q V			
17+40	2.6495	1.76	Q V			
17+45	2.6612	1.71	Q V			
17+50	2.6727	1.66	Q V			
17+55	2.6838	1.61	Q V			
18+ 0	2.6946	1.57	Q V			
18+ 5	2.7051	1.54	Q V			
18+10	2.7156	1.52	Q V			
18+15	2.7258	1.49	Q V			
18+20	2.7359	1.46	Q V			
18+25	2.7457	1.43	Q V			
18+30	2.7553	1.40	Q V			
18+35	2.7648	1.37	Q V			
18+40	2.7740	1.35	Q V			
18+45	2.7831	1.32	Q V			
18+50	2.7921	1.30	Q V			
18+55	2.8008	1.28	Q V			
19+ 0	2.8095	1.25	Q V			
19+ 5	2.8180	1.23	Q V			
19+10	2.8264	1.21	Q V			
19+15	2.8346	1.20	Q V			
19+20	2.8427	1.18	Q V			
19+25	2.8507	1.16	Q V			
19+30	2.8586	1.15	Q V			

19+35	2.8664	1.13	|Q	|	|	|	V |
19+40	2.8741	1.11	|Q	|	|	|	V |
19+45	2.8816	1.10	|Q	|	|	|	V |
19+50	2.8891	1.09	|Q	|	|	|	V |
19+55	2.8965	1.07	|Q	|	|	|	V |
20+ 0	2.9038	1.06	|Q	|	|	|	V |
20+ 5	2.9110	1.05	|Q	|	|	|	V |
20+10	2.9181	1.03	|Q	|	|	|	V |
20+15	2.9252	1.02	|Q	|	|	|	V |
20+20	2.9321	1.01	|Q	|	|	|	V |
20+25	2.9390	1.00	|Q	|	|	|	V |
20+30	2.9458	0.99	Q	|	|	|	V |
20+35	2.9526	0.98	Q	|	|	|	V |
20+40	2.9593	0.97	Q	|	|	|	V |
20+45	2.9659	0.96	Q	|	|	|	V |
20+50	2.9724	0.95	Q	|	|	|	V |
20+55	2.9789	0.94	Q	|	|	|	V |
21+ 0	2.9853	0.93	Q	|	|	|	V |
21+ 5	2.9916	0.92	Q	|	|	|	V |
21+10	2.9979	0.91	Q	|	|	|	V |
21+15	3.0041	0.90	Q	|	|	|	V |
21+20	3.0103	0.90	Q	|	|	|	V |
21+25	3.0164	0.89	Q	|	|	|	V |
21+30	3.0225	0.88	Q	|	|	|	V |
21+35	3.0285	0.87	Q	|	|	|	V |
21+40	3.0345	0.87	Q	|	|	|	V |
21+45	3.0404	0.86	Q	|	|	|	V |
21+50	3.0463	0.85	Q	|	|	|	V |
21+55	3.0521	0.84	Q	|	|	|	V |
22+ 0	3.0578	0.84	Q	|	|	|	V |
22+ 5	3.0636	0.83	Q	|	|	|	V |
22+10	3.0692	0.82	Q	|	|	|	V |
22+15	3.0749	0.82	Q	|	|	|	V |
22+20	3.0805	0.81	Q	|	|	|	V |
22+25	3.0860	0.81	Q	|	|	|	V |
22+30	3.0915	0.80	Q	|	|	|	V |
22+35	3.0970	0.79	Q	|	|	|	V |
22+40	3.1024	0.79	Q	|	|	|	V |
22+45	3.1078	0.78	Q	|	|	|	V |
22+50	3.1132	0.78	Q	|	|	|	V|
22+55	3.1185	0.77	Q	|	|	|	V|
23+ 0	3.1238	0.77	Q	|	|	|	V|
23+ 5	3.1290	0.76	Q	|	|	|	V|
23+10	3.1342	0.76	Q	|	|	|	V|
23+15	3.1394	0.75	Q	|	|	|	V|
23+20	3.1445	0.75	Q	|	|	|	V|
23+25	3.1497	0.74	Q	|	|	|	V|
23+30	3.1547	0.74	Q	|	|	|	V|
23+35	3.1598	0.73	Q	|	|	|	V|
23+40	3.1648	0.73	Q	|	|	|	V|
23+45	3.1698	0.72	Q	|	|	|	V|
23+50	3.1747	0.72	Q	|	|	|	V|
23+55	3.1796	0.71	Q	|	|	|	V|
24+ 0	3.1845	0.71	Q	|	|	|	V|
24+ 5	3.1885	0.58	Q	|	|	|	V|
24+10	3.1894	0.13	Q	|	|	|	V|
24+15	3.1895	0.01	Q	|	|	|	V|

APPENDIX B.4: UNIT HYDROGRAPH, AREA "4"

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0

Study date 06/20/19

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

Program License Serial Number 6279

BNSF
POST PROJECT HYDROLOGY
AREA 4

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
5.12	1	1.58
Rainfall data for year 100		
5.12	6	3.42
Rainfall data for year 100		
5.12	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
85.4	97.1	5.12	1.000	0.058	0.940	0.054

Area-averaged adjusted loss rate Fm (In/Hr) = 0.054

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
4.81	0.940	85.4	97.1	0.30	0.945
0.31	0.060	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.946
Area-averaged low loss fraction, Yb = 0.054
++
Watercourse length = 4658.00(Ft.)
Length from concentration point to centroid = 1004.00(Ft.)
Elevation difference along watercourse = 25.00(Ft.)
Mannings friction factor along watercourse = 0.020
Watershed area = 5.12(Ac.)
Catchment Lag time = 0.129 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 64.5886
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.054(In/Hr)
Average low loss rate fraction (Yb) = 0.054 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 5.12(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.585(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.580(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 61.92 (CFS))		
1	7.517	4.655
2	47.262	24.610
3	85.608	23.744
4	96.931	7.011
5	99.032	1.301
6	100.000	0.600

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5846	0.5846

2	0.7714	0.1868
3	0.9073	0.1358
4	1.0179	0.1106
5	1.1129	0.0950
6	1.1971	0.0842
7	1.2733	0.0761
8	1.3431	0.0699
9	1.4079	0.0648
10	1.4685	0.0606
11	1.5256	0.0571
12	1.5796	0.0540
13	1.6351	0.0555
14	1.6882	0.0531
15	1.7392	0.0510
16	1.7882	0.0491
17	1.8356	0.0474
18	1.8814	0.0458
19	1.9258	0.0444
20	1.9688	0.0431
21	2.0107	0.0419
22	2.0514	0.0407
23	2.0911	0.0397
24	2.1298	0.0387
25	2.1677	0.0378
26	2.2046	0.0370
27	2.2408	0.0362
28	2.2762	0.0354
29	2.3109	0.0347
30	2.3450	0.0340
31	2.3783	0.0334
32	2.4111	0.0328
33	2.4433	0.0322
34	2.4750	0.0317
35	2.5061	0.0311
36	2.5367	0.0306
37	2.5669	0.0301
38	2.5965	0.0297
39	2.6258	0.0292
40	2.6546	0.0288
41	2.6830	0.0284
42	2.7110	0.0280
43	2.7386	0.0276
44	2.7659	0.0273
45	2.7928	0.0269
46	2.8194	0.0266
47	2.8457	0.0263
48	2.8716	0.0259
49	2.8972	0.0256
50	2.9226	0.0253
51	2.9476	0.0251
52	2.9724	0.0248
53	2.9969	0.0245
54	3.0211	0.0242
55	3.0451	0.0240
56	3.0689	0.0237
57	3.0924	0.0235
58	3.1156	0.0233
59	3.1387	0.0230
60	3.1615	0.0228

61	3.1841	0.0226
62	3.2065	0.0224
63	3.2287	0.0222
64	3.2507	0.0220
65	3.2725	0.0218
66	3.2941	0.0216
67	3.3155	0.0214
68	3.3367	0.0212
69	3.3578	0.0211
70	3.3787	0.0209
71	3.3994	0.0207
72	3.4199	0.0206
73	3.4407	0.0208
74	3.4614	0.0206
75	3.4819	0.0205
76	3.5022	0.0203
77	3.5224	0.0202
78	3.5424	0.0200
79	3.5623	0.0199
80	3.5820	0.0198
81	3.6017	0.0196
82	3.6211	0.0195
83	3.6405	0.0193
84	3.6597	0.0192
85	3.6788	0.0191
86	3.6977	0.0190
87	3.7166	0.0188
88	3.7353	0.0187
89	3.7539	0.0186
90	3.7724	0.0185
91	3.7907	0.0184
92	3.8090	0.0183
93	3.8271	0.0181
94	3.8452	0.0180
95	3.8631	0.0179
96	3.8809	0.0178
97	3.8986	0.0177
98	3.9163	0.0176
99	3.9338	0.0175
100	3.9512	0.0174
101	3.9685	0.0173
102	3.9857	0.0172
103	4.0029	0.0171
104	4.0199	0.0170
105	4.0368	0.0169
106	4.0537	0.0169
107	4.0704	0.0168
108	4.0871	0.0167
109	4.1037	0.0166
110	4.1202	0.0165
111	4.1366	0.0164
112	4.1530	0.0163
113	4.1692	0.0163
114	4.1854	0.0162
115	4.2015	0.0161
116	4.2175	0.0160
117	4.2335	0.0159
118	4.2493	0.0159
119	4.2651	0.0158

120	4.2809	0.0157
121	4.2965	0.0156
122	4.3121	0.0156
123	4.3276	0.0155
124	4.3430	0.0154
125	4.3584	0.0154
126	4.3736	0.0153
127	4.3889	0.0152
128	4.4040	0.0152
129	4.4191	0.0151
130	4.4341	0.0150
131	4.4491	0.0150
132	4.4640	0.0149
133	4.4788	0.0148
134	4.4936	0.0148
135	4.5083	0.0147
136	4.5230	0.0146
137	4.5375	0.0146
138	4.5521	0.0145
139	4.5665	0.0145
140	4.5810	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6238	0.0142
144	4.6380	0.0142
145	4.6522	0.0141
146	4.6662	0.0141
147	4.6803	0.0140
148	4.6942	0.0140
149	4.7081	0.0139
150	4.7220	0.0139
151	4.7358	0.0138
152	4.7496	0.0138
153	4.7633	0.0137
154	4.7769	0.0137
155	4.7905	0.0136
156	4.8041	0.0136
157	4.8176	0.0135
158	4.8311	0.0135
159	4.8445	0.0134
160	4.8579	0.0134
161	4.8712	0.0133
162	4.8845	0.0133
163	4.8977	0.0132
164	4.9109	0.0132
165	4.9240	0.0131
166	4.9371	0.0131
167	4.9502	0.0131
168	4.9632	0.0130
169	4.9761	0.0130
170	4.9891	0.0129
171	5.0019	0.0129
172	5.0148	0.0128
173	5.0276	0.0128
174	5.0403	0.0128
175	5.0530	0.0127
176	5.0657	0.0127
177	5.0783	0.0126
178	5.0909	0.0126

179	5.1035	0.0126
180	5.1160	0.0125
181	5.1285	0.0125
182	5.1409	0.0124
183	5.1533	0.0124
184	5.1656	0.0124
185	5.1780	0.0123
186	5.1903	0.0123
187	5.2025	0.0122
188	5.2147	0.0122
189	5.2269	0.0122
190	5.2390	0.0121
191	5.2511	0.0121
192	5.2632	0.0121
193	5.2752	0.0120
194	5.2872	0.0120
195	5.2992	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3349	0.0119
199	5.3467	0.0118
200	5.3585	0.0118
201	5.3702	0.0118
202	5.3820	0.0117
203	5.3937	0.0117
204	5.4053	0.0117
205	5.4170	0.0116
206	5.4286	0.0116
207	5.4401	0.0116
208	5.4517	0.0115
209	5.4632	0.0115
210	5.4746	0.0115
211	5.4861	0.0114
212	5.4975	0.0114
213	5.5089	0.0114
214	5.5202	0.0114
215	5.5315	0.0113
216	5.5428	0.0113
217	5.5541	0.0113
218	5.5653	0.0112
219	5.5765	0.0112
220	5.5877	0.0112
221	5.5989	0.0111
222	5.6100	0.0111
223	5.6211	0.0111
224	5.6322	0.0111
225	5.6432	0.0110
226	5.6542	0.0110
227	5.6652	0.0110
228	5.6761	0.0110
229	5.6871	0.0109
230	5.6980	0.0109
231	5.7088	0.0109
232	5.7197	0.0108
233	5.7305	0.0108
234	5.7413	0.0108
235	5.7521	0.0108
236	5.7628	0.0107
237	5.7736	0.0107

238	5.7843	0.0107
239	5.7949	0.0107
240	5.8056	0.0106
241	5.8162	0.0106
242	5.8268	0.0106
243	5.8374	0.0106
244	5.8479	0.0105
245	5.8584	0.0105
246	5.8689	0.0105
247	5.8794	0.0105
248	5.8898	0.0105
249	5.9003	0.0104
250	5.9107	0.0104
251	5.9211	0.0104
252	5.9314	0.0104
253	5.9417	0.0103
254	5.9521	0.0103
255	5.9623	0.0103
256	5.9726	0.0103
257	5.9829	0.0102
258	5.9931	0.0102
259	6.0033	0.0102
260	6.0135	0.0102
261	6.0236	0.0102
262	6.0337	0.0101
263	6.0439	0.0101
264	6.0539	0.0101
265	6.0640	0.0101
266	6.0741	0.0100
267	6.0841	0.0100
268	6.0941	0.0100
269	6.1041	0.0100
270	6.1140	0.0100
271	6.1240	0.0099
272	6.1339	0.0099
273	6.1438	0.0099
274	6.1537	0.0099
275	6.1635	0.0099
276	6.1734	0.0098
277	6.1832	0.0098
278	6.1930	0.0098
279	6.2028	0.0098
280	6.2126	0.0098
281	6.2223	0.0097
282	6.2320	0.0097
283	6.2417	0.0097
284	6.2514	0.0097
285	6.2611	0.0097
286	6.2707	0.0096
287	6.2804	0.0096
288	6.2900	0.0096

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0005	0.0091
2	0.0096	0.0005	0.0091
3	0.0097	0.0005	0.0091
4	0.0097	0.0005	0.0092
5	0.0097	0.0005	0.0092
6	0.0097	0.0005	0.0092
7	0.0098	0.0005	0.0093
8	0.0098	0.0005	0.0093
9	0.0098	0.0005	0.0093
10	0.0099	0.0005	0.0093
11	0.0099	0.0005	0.0094
12	0.0099	0.0005	0.0094
13	0.0100	0.0005	0.0094
14	0.0100	0.0005	0.0094
15	0.0100	0.0005	0.0095
16	0.0100	0.0005	0.0095
17	0.0101	0.0005	0.0095
18	0.0101	0.0005	0.0096
19	0.0102	0.0005	0.0096
20	0.0102	0.0006	0.0096
21	0.0102	0.0006	0.0097
22	0.0102	0.0006	0.0097
23	0.0103	0.0006	0.0097
24	0.0103	0.0006	0.0098
25	0.0104	0.0006	0.0098
26	0.0104	0.0006	0.0098
27	0.0104	0.0006	0.0099
28	0.0105	0.0006	0.0099
29	0.0105	0.0006	0.0099
30	0.0105	0.0006	0.0100
31	0.0106	0.0006	0.0100
32	0.0106	0.0006	0.0100
33	0.0106	0.0006	0.0101
34	0.0107	0.0006	0.0101
35	0.0107	0.0006	0.0101
36	0.0107	0.0006	0.0102
37	0.0108	0.0006	0.0102
38	0.0108	0.0006	0.0102
39	0.0109	0.0006	0.0103
40	0.0109	0.0006	0.0103
41	0.0110	0.0006	0.0104
42	0.0110	0.0006	0.0104
43	0.0110	0.0006	0.0104
44	0.0111	0.0006	0.0105
45	0.0111	0.0006	0.0105
46	0.0111	0.0006	0.0105
47	0.0112	0.0006	0.0106
48	0.0112	0.0006	0.0106
49	0.0113	0.0006	0.0107
50	0.0113	0.0006	0.0107
51	0.0114	0.0006	0.0108
52	0.0114	0.0006	0.0108
53	0.0115	0.0006	0.0109
54	0.0115	0.0006	0.0109
55	0.0116	0.0006	0.0109
56	0.0116	0.0006	0.0110
57	0.0117	0.0006	0.0110
58	0.0117	0.0006	0.0111
59	0.0118	0.0006	0.0111
60	0.0118	0.0006	0.0112
61	0.0119	0.0006	0.0112
62	0.0119	0.0006	0.0112

63	0.0120	0.0006	0.0113
64	0.0120	0.0006	0.0113
65	0.0121	0.0007	0.0114
66	0.0121	0.0007	0.0114
67	0.0122	0.0007	0.0115
68	0.0122	0.0007	0.0115
69	0.0123	0.0007	0.0116
70	0.0123	0.0007	0.0117
71	0.0124	0.0007	0.0117
72	0.0124	0.0007	0.0118
73	0.0125	0.0007	0.0118
74	0.0126	0.0007	0.0119
75	0.0126	0.0007	0.0119
76	0.0127	0.0007	0.0120
77	0.0128	0.0007	0.0121
78	0.0128	0.0007	0.0121
79	0.0129	0.0007	0.0122
80	0.0129	0.0007	0.0122
81	0.0130	0.0007	0.0123
82	0.0131	0.0007	0.0123
83	0.0131	0.0007	0.0124
84	0.0132	0.0007	0.0125
85	0.0133	0.0007	0.0126
86	0.0133	0.0007	0.0126
87	0.0134	0.0007	0.0127
88	0.0135	0.0007	0.0127
89	0.0136	0.0007	0.0128
90	0.0136	0.0007	0.0129
91	0.0137	0.0007	0.0130
92	0.0138	0.0007	0.0130
93	0.0139	0.0008	0.0131
94	0.0139	0.0008	0.0132
95	0.0140	0.0008	0.0133
96	0.0141	0.0008	0.0133
97	0.0142	0.0008	0.0134
98	0.0142	0.0008	0.0135
99	0.0144	0.0008	0.0136
100	0.0144	0.0008	0.0136
101	0.0145	0.0008	0.0137
102	0.0146	0.0008	0.0138
103	0.0147	0.0008	0.0139
104	0.0148	0.0008	0.0140
105	0.0149	0.0008	0.0141
106	0.0150	0.0008	0.0141
107	0.0151	0.0008	0.0143
108	0.0152	0.0008	0.0143
109	0.0153	0.0008	0.0145
110	0.0154	0.0008	0.0145
111	0.0155	0.0008	0.0147
112	0.0156	0.0008	0.0147
113	0.0157	0.0009	0.0149
114	0.0158	0.0009	0.0149
115	0.0159	0.0009	0.0151
116	0.0160	0.0009	0.0152
117	0.0162	0.0009	0.0153
118	0.0163	0.0009	0.0154
119	0.0164	0.0009	0.0155
120	0.0165	0.0009	0.0156
121	0.0167	0.0009	0.0158

122	0.0168	0.0009	0.0159
123	0.0169	0.0009	0.0160
124	0.0170	0.0009	0.0161
125	0.0172	0.0009	0.0163
126	0.0173	0.0009	0.0164
127	0.0175	0.0009	0.0166
128	0.0176	0.0010	0.0167
129	0.0178	0.0010	0.0169
130	0.0179	0.0010	0.0170
131	0.0181	0.0010	0.0172
132	0.0183	0.0010	0.0173
133	0.0185	0.0010	0.0175
134	0.0186	0.0010	0.0176
135	0.0188	0.0010	0.0178
136	0.0190	0.0010	0.0179
137	0.0192	0.0010	0.0182
138	0.0193	0.0010	0.0183
139	0.0196	0.0011	0.0186
140	0.0198	0.0011	0.0187
141	0.0200	0.0011	0.0189
142	0.0202	0.0011	0.0191
143	0.0205	0.0011	0.0194
144	0.0206	0.0011	0.0195
145	0.0206	0.0011	0.0194
146	0.0207	0.0011	0.0196
147	0.0211	0.0011	0.0199
148	0.0212	0.0011	0.0201
149	0.0216	0.0012	0.0204
150	0.0218	0.0012	0.0206
151	0.0222	0.0012	0.0210
152	0.0224	0.0012	0.0212
153	0.0228	0.0012	0.0216
154	0.0230	0.0012	0.0218
155	0.0235	0.0013	0.0222
156	0.0237	0.0013	0.0225
157	0.0242	0.0013	0.0229
158	0.0245	0.0013	0.0232
159	0.0251	0.0014	0.0237
160	0.0253	0.0014	0.0240
161	0.0259	0.0014	0.0245
162	0.0263	0.0014	0.0248
163	0.0269	0.0015	0.0255
164	0.0273	0.0015	0.0258
165	0.0280	0.0015	0.0265
166	0.0284	0.0015	0.0269
167	0.0292	0.0016	0.0277
168	0.0297	0.0016	0.0281
169	0.0306	0.0017	0.0290
170	0.0311	0.0017	0.0294
171	0.0322	0.0017	0.0305
172	0.0328	0.0018	0.0310
173	0.0340	0.0018	0.0322
174	0.0347	0.0019	0.0328
175	0.0362	0.0020	0.0342
176	0.0370	0.0020	0.0350
177	0.0387	0.0021	0.0366
178	0.0397	0.0021	0.0375
179	0.0419	0.0023	0.0396
180	0.0431	0.0023	0.0407

181	0.0458	0.0025	0.0433
182	0.0474	0.0026	0.0448
183	0.0510	0.0028	0.0482
184	0.0531	0.0029	0.0502
185	0.0540	0.0029	0.0511
186	0.0571	0.0031	0.0540
187	0.0648	0.0035	0.0613
188	0.0699	0.0038	0.0661
189	0.0842	0.0045	0.0797
190	0.0950	0.0045	0.0905
191	0.1358	0.0045	0.1313
192	0.1868	0.0045	0.1823
193	0.5846	0.0045	0.5801
194	0.1106	0.0045	0.1061
195	0.0761	0.0041	0.0720
196	0.0606	0.0033	0.0573
197	0.0555	0.0030	0.0525
198	0.0491	0.0027	0.0464
199	0.0444	0.0024	0.0420
200	0.0407	0.0022	0.0385
201	0.0378	0.0020	0.0358
202	0.0354	0.0019	0.0335
203	0.0334	0.0018	0.0316
204	0.0317	0.0017	0.0299
205	0.0301	0.0016	0.0285
206	0.0288	0.0016	0.0272
207	0.0276	0.0015	0.0261
208	0.0266	0.0014	0.0251
209	0.0256	0.0014	0.0242
210	0.0248	0.0013	0.0234
211	0.0240	0.0013	0.0227
212	0.0233	0.0013	0.0220
213	0.0226	0.0012	0.0214
214	0.0220	0.0012	0.0208
215	0.0214	0.0012	0.0203
216	0.0209	0.0011	0.0198
217	0.0208	0.0011	0.0197
218	0.0203	0.0011	0.0192
219	0.0199	0.0011	0.0188
220	0.0195	0.0011	0.0184
221	0.0191	0.0010	0.0181
222	0.0187	0.0010	0.0177
223	0.0184	0.0010	0.0174
224	0.0180	0.0010	0.0171
225	0.0177	0.0010	0.0168
226	0.0174	0.0009	0.0165
227	0.0171	0.0009	0.0162
228	0.0169	0.0009	0.0159
229	0.0166	0.0009	0.0157
230	0.0163	0.0009	0.0155
231	0.0161	0.0009	0.0152
232	0.0159	0.0009	0.0150
233	0.0156	0.0008	0.0148
234	0.0154	0.0008	0.0146
235	0.0152	0.0008	0.0144
236	0.0150	0.0008	0.0142
237	0.0148	0.0008	0.0140
238	0.0146	0.0008	0.0139
239	0.0145	0.0008	0.0137

240	0.0143	0.0008	0.0135
241	0.0141	0.0008	0.0134
242	0.0140	0.0008	0.0132
243	0.0138	0.0007	0.0131
244	0.0137	0.0007	0.0129
245	0.0135	0.0007	0.0128
246	0.0134	0.0007	0.0126
247	0.0132	0.0007	0.0125
248	0.0131	0.0007	0.0124
249	0.0130	0.0007	0.0123
250	0.0128	0.0007	0.0121
251	0.0127	0.0007	0.0120
252	0.0126	0.0007	0.0119
253	0.0125	0.0007	0.0118
254	0.0124	0.0007	0.0117
255	0.0122	0.0007	0.0116
256	0.0121	0.0007	0.0115
257	0.0120	0.0007	0.0114
258	0.0119	0.0006	0.0113
259	0.0118	0.0006	0.0112
260	0.0117	0.0006	0.0111
261	0.0116	0.0006	0.0110
262	0.0115	0.0006	0.0109
263	0.0114	0.0006	0.0108
264	0.0114	0.0006	0.0107
265	0.0113	0.0006	0.0107
266	0.0112	0.0006	0.0106
267	0.0111	0.0006	0.0105
268	0.0110	0.0006	0.0104
269	0.0109	0.0006	0.0103
270	0.0108	0.0006	0.0103
271	0.0108	0.0006	0.0102
272	0.0107	0.0006	0.0101
273	0.0106	0.0006	0.0100
274	0.0105	0.0006	0.0100
275	0.0105	0.0006	0.0099
276	0.0104	0.0006	0.0098
277	0.0103	0.0006	0.0098
278	0.0103	0.0006	0.0097
279	0.0102	0.0006	0.0096
280	0.0101	0.0005	0.0096
281	0.0101	0.0005	0.0095
282	0.0100	0.0005	0.0095
283	0.0099	0.0005	0.0094
284	0.0099	0.0005	0.0093
285	0.0098	0.0005	0.0093
286	0.0098	0.0005	0.0092
287	0.0097	0.0005	0.0092
288	0.0096	0.0005	0.0091

Total soil rain loss = 0.30(In)
Total effective rainfall = 5.99(In)
Peak flow rate in flood hydrograph = 20.18(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	7.5	15.0	22.5	30.0
0+ 5	0.0003	0.04	Q				
0+10	0.0021	0.27	Q				
0+15	0.0054	0.48	Q				
0+20	0.0092	0.55	Q				
0+25	0.0131	0.56	Q				
0+30	0.0170	0.57	Q				
0+35	0.0209	0.57	Q				
0+40	0.0249	0.57	Q				
0+45	0.0288	0.57	Q				
0+50	0.0328	0.57	Q				
0+55	0.0367	0.58	Q				
1+ 0	0.0407	0.58	Q				
1+ 5	0.0447	0.58	Q				
1+10	0.0487	0.58	Q				
1+15	0.0527	0.58	Q				
1+20	0.0568	0.59	Q				
1+25	0.0608	0.59	Q				
1+30	0.0649	0.59	QV				
1+35	0.0690	0.59	QV				
1+40	0.0730	0.59	QV				
1+45	0.0771	0.60	QV				
1+50	0.0813	0.60	QV				
1+55	0.0854	0.60	QV				
2+ 0	0.0895	0.60	QV				
2+ 5	0.0937	0.60	QV				
2+10	0.0978	0.60	QV				
2+15	0.1020	0.61	QV				
2+20	0.1062	0.61	QV				
2+25	0.1104	0.61	QV				
2+30	0.1146	0.61	QV				
2+35	0.1189	0.62	QV				
2+40	0.1231	0.62	QV				
2+45	0.1274	0.62	QV				
2+50	0.1317	0.62	Q V				
2+55	0.1360	0.62	Q V				
3+ 0	0.1403	0.63	Q V				
3+ 5	0.1446	0.63	Q V				
3+10	0.1490	0.63	Q V				
3+15	0.1533	0.63	Q V				
3+20	0.1577	0.64	Q V				
3+25	0.1621	0.64	Q V				
3+30	0.1665	0.64	Q V				
3+35	0.1709	0.64	Q V				
3+40	0.1754	0.64	Q V				
3+45	0.1798	0.65	Q V				
3+50	0.1843	0.65	Q V				
3+55	0.1888	0.65	Q V				
4+ 0	0.1933	0.65	Q V				
4+ 5	0.1978	0.66	Q V				
4+10	0.2023	0.66	Q V				
4+15	0.2069	0.66	Q V				
4+20	0.2115	0.66	Q V				
4+25	0.2161	0.67	Q V				
4+30	0.2207	0.67	Q V				

4+35	0.2253	0.67	Q V				
4+40	0.2300	0.68	Q V				
4+45	0.2346	0.68	Q V				
4+50	0.2393	0.68	Q V				
4+55	0.2440	0.68	Q V				
5+ 0	0.2488	0.69	Q V				
5+ 5	0.2535	0.69	Q V				
5+10	0.2583	0.69	Q V				
5+15	0.2631	0.70	Q V				
5+20	0.2679	0.70	Q V				
5+25	0.2727	0.70	Q V				
5+30	0.2775	0.70	Q V				
5+35	0.2824	0.71	Q V				
5+40	0.2873	0.71	Q V				
5+45	0.2922	0.71	Q V				
5+50	0.2972	0.72	Q V				
5+55	0.3021	0.72	Q V				
6+ 0	0.3071	0.72	Q V				
6+ 5	0.3121	0.73	Q V				
6+10	0.3171	0.73	Q V				
6+15	0.3222	0.73	Q V				
6+20	0.3273	0.74	Q V				
6+25	0.3324	0.74	Q V				
6+30	0.3375	0.74	Q V				
6+35	0.3426	0.75	Q V				
6+40	0.3478	0.75	IQ V				
6+45	0.3530	0.75	IQ V				
6+50	0.3582	0.76	IQ V				
6+55	0.3635	0.76	IQ V				
7+ 0	0.3688	0.77	IQ V				
7+ 5	0.3741	0.77	IQ V				
7+10	0.3794	0.77	IQ V				
7+15	0.3848	0.78	IQ V				
7+20	0.3902	0.78	IQ V				
7+25	0.3956	0.79	IQ V				
7+30	0.4010	0.79	IQ V				
7+35	0.4065	0.80	IQ V				
7+40	0.4120	0.80	IQ V				
7+45	0.4175	0.80	IQ V				
7+50	0.4231	0.81	IQ V				
7+55	0.4287	0.81	IQ V				
8+ 0	0.4343	0.82	IQ V				
8+ 5	0.4400	0.82	IQ V				
8+10	0.4457	0.83	IQ V				
8+15	0.4514	0.83	IQ V				
8+20	0.4572	0.84	IQ V				
8+25	0.4630	0.84	IQ V				
8+30	0.4688	0.85	IQ V				
8+35	0.4747	0.85	IQ V				
8+40	0.4806	0.86	IQ V				
8+45	0.4865	0.86	IQ V				
8+50	0.4925	0.87	IQ V				
8+55	0.4985	0.87	IQ V				
9+ 0	0.5046	0.88	IQ V				
9+ 5	0.5107	0.88	IQ V				
9+10	0.5168	0.89	IQ V				
9+15	0.5230	0.90	IQ V				
9+20	0.5292	0.90	IQ V				
9+25	0.5355	0.91	IQ V				

9+30	0.5418	0.92	Q	V			
9+35	0.5481	0.92	Q	V			
9+40	0.5545	0.93	Q	V			
9+45	0.5609	0.94	Q	V			
9+50	0.5674	0.94	Q	V			
9+55	0.5740	0.95	Q	V			
10+ 0	0.5805	0.96	Q	V			
10+ 5	0.5872	0.96	Q	V			
10+10	0.5939	0.97	Q	V			
10+15	0.6006	0.98	Q	V			
10+20	0.6074	0.99	Q	V			
10+25	0.6142	0.99	Q	V			
10+30	0.6211	1.00	Q	V			
10+35	0.6281	1.01	Q	V			
10+40	0.6351	1.02	Q	V			
10+45	0.6422	1.03	Q	V			
10+50	0.6493	1.04	Q	V			
10+55	0.6565	1.05	Q	V			
11+ 0	0.6638	1.06	Q	V			
11+ 5	0.6711	1.06	Q	V			
11+10	0.6785	1.07	Q	V			
11+15	0.6860	1.08	Q	V			
11+20	0.6935	1.09	Q	V			
11+25	0.7012	1.11	Q	V			
11+30	0.7088	1.12	Q	V			
11+35	0.7166	1.13	Q	V			
11+40	0.7245	1.14	Q	V			
11+45	0.7324	1.15	Q	V			
11+50	0.7404	1.16	Q	V			
11+55	0.7485	1.18	Q	V			
12+ 0	0.7567	1.19	Q	V			
12+ 5	0.7650	1.20	Q	V			
12+10	0.7733	1.21	Q	V			
12+15	0.7816	1.21	Q	V			
12+20	0.7900	1.22	Q	V			
12+25	0.7985	1.24	Q	V			
12+30	0.8072	1.25	Q	V			
12+35	0.8159	1.27	Q	V			
12+40	0.8247	1.29	Q	V			
12+45	0.8337	1.30	Q	V			
12+50	0.8428	1.32	Q	V			
12+55	0.8521	1.34	Q	V			
13+ 0	0.8614	1.36	Q	V			
13+ 5	0.8709	1.38	Q	V			
13+10	0.8806	1.40	Q	V			
13+15	0.8904	1.42	Q	V			
13+20	0.9004	1.45	Q	V			
13+25	0.9105	1.47	Q	V			
13+30	0.9208	1.50	Q	V			
13+35	0.9313	1.52	Q	V			
13+40	0.9420	1.55	Q	V			
13+45	0.9529	1.58	Q	V			
13+50	0.9641	1.62	Q	V			
13+55	0.9754	1.65	Q	V			
14+ 0	0.9870	1.68	Q	V			
14+ 5	0.9989	1.72	Q	V			
14+10	1.0110	1.76	Q	V			
14+15	1.0234	1.80	Q	V			
14+20	1.0361	1.85	Q	V			

14+25	1.0492	1.90	Q	V			
14+30	1.0626	1.95	Q	V			
14+35	1.0765	2.01	Q	V			
14+40	1.0907	2.07	Q	V			
14+45	1.1054	2.13	Q	V			
14+50	1.1206	2.21	Q	V			
14+55	1.1364	2.29	Q	V			
15+ 0	1.1527	2.38	Q	V			
15+ 5	1.1698	2.48	Q	V			
15+10	1.1876	2.59	Q	V			
15+15	1.2063	2.72	Q	V			
15+20	1.2261	2.86	Q	V			
15+25	1.2468	3.01	Q	V			
15+30	1.2683	3.12	Q	V			
15+35	1.2908	3.27	Q	V			
15+40	1.3153	3.55	Q	V			
15+45	1.3423	3.93	Q	V			
15+50	1.3732	4.48	Q	V			
15+55	1.4097	5.31	Q	V			
16+ 0	1.4573	6.91	Q	V			
16+ 5	1.5336	11.08	Q	V			
16+10	1.6726	20.18	Q				
16+15	1.7982	18.22	Q	V			
16+20	1.8597	8.94	Q	V			
16+25	1.8940	4.97	Q	V			
16+30	1.9206	3.86	Q	V			
16+35	1.9422	3.14	Q	V			
16+40	1.9615	2.80	Q	V			
16+45	1.9790	2.54	Q	V			
16+50	1.9951	2.34	Q	V			
16+55	2.0100	2.17	Q	V			
17+ 0	2.0241	2.04	Q	V			
17+ 5	2.0373	1.92	Q	V			
17+10	2.0499	1.83	Q	V			
17+15	2.0619	1.74	Q	V			
17+20	2.0734	1.67	Q	V			
17+25	2.0844	1.60	Q	V			
17+30	2.0950	1.54	Q	V			
17+35	2.1052	1.48	Q	V			
17+40	2.1151	1.44	Q	V			
17+45	2.1247	1.39	Q	V			
17+50	2.1339	1.35	Q	V			
17+55	2.1430	1.31	Q	V			
18+ 0	2.1518	1.28	Q	V			
18+ 5	2.1603	1.25	Q	V			
18+10	2.1688	1.22	Q	V			
18+15	2.1771	1.21	Q	V			
18+20	2.1852	1.18	Q	V			
18+25	2.1932	1.16	Q	V			
18+30	2.2010	1.13	Q	V			
18+35	2.2086	1.11	Q	V			
18+40	2.2161	1.09	Q	V			
18+45	2.2235	1.07	Q	V			
18+50	2.2307	1.05	Q	V			
18+55	2.2378	1.03	Q	V			
19+ 0	2.2448	1.01	Q	V			
19+ 5	2.2517	1.00	Q	V			
19+10	2.2584	0.98	Q	V			
19+15	2.2651	0.97	Q	V			

19+20	2.2717	0.95	Q			V	
19+25	2.2781	0.94	Q			V	
19+30	2.2845	0.92	Q			V	
19+35	2.2908	0.91	Q			V	
19+40	2.2970	0.90	Q			V	
19+45	2.3031	0.89	Q			V	
19+50	2.3091	0.88	Q			V	
19+55	2.3151	0.86	Q			V	
20+ 0	2.3209	0.85	Q			V	
20+ 5	2.3268	0.84	Q			V	
20+10	2.3325	0.83	Q			V	
20+15	2.3382	0.82	Q			V	
20+20	2.3438	0.81	Q			V	
20+25	2.3493	0.81	Q			V	
20+30	2.3548	0.80	Q			V	
20+35	2.3603	0.79	Q			V	
20+40	2.3656	0.78	Q			V	
20+45	2.3709	0.77	Q			V	
20+50	2.3762	0.76	Q			V	
20+55	2.3814	0.76	Q			V	
21+ 0	2.3866	0.75	Q			V	
21+ 5	2.3917	0.74	Q			V	
21+10	2.3967	0.73	Q			V	
21+15	2.4018	0.73	Q			V	
21+20	2.4067	0.72	Q			V	
21+25	2.4117	0.71	Q			V	
21+30	2.4165	0.71	Q			V	
21+35	2.4214	0.70	Q			V	
21+40	2.4262	0.70	Q			V	
21+45	2.4309	0.69	Q			V	
21+50	2.4356	0.68	Q			V	
21+55	2.4403	0.68	Q			V	
22+ 0	2.4450	0.67	Q			V	
22+ 5	2.4496	0.67	Q			V	
22+10	2.4541	0.66	Q			V	
22+15	2.4587	0.66	Q			V	
22+20	2.4632	0.65	Q			V	
22+25	2.4676	0.65	Q			V	
22+30	2.4720	0.64	Q			V	
22+35	2.4764	0.64	Q			V	
22+40	2.4808	0.63	Q			V	
22+45	2.4851	0.63	Q			V	
22+50	2.4894	0.62	Q			V	
22+55	2.4937	0.62	Q			V	
23+ 0	2.4980	0.62	Q			V	
23+ 5	2.5022	0.61	Q			V	
23+10	2.5064	0.61	Q			V	
23+15	2.5105	0.60	Q			V	
23+20	2.5147	0.60	Q			V	
23+25	2.5188	0.60	Q			V	
23+30	2.5228	0.59	Q			V	
23+35	2.5269	0.59	Q			V	
23+40	2.5309	0.58	Q			V	
23+45	2.5349	0.58	Q			V	
23+50	2.5389	0.58	Q			V	
23+55	2.5428	0.57	Q			V	
24+ 0	2.5468	0.57	Q			V	
24+ 5	2.5504	0.52	Q			V	
24+10	2.5524	0.30	Q			V	

24+15	2.5530	0.08	Q				V
24+20	2.5531	0.02	Q				V
24+25	2.5532	0.01	Q				V

APPENDIX B.5: UNIT HYDROGRAPH, AREA "5"

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0

Study date 06/20/19

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

Program License Serial Number 6279

BNSF
POST PROJECT HYDROLOGY
AREA 5

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
10.33	1	1.58
Rainfall data for year 100		
10.33	6	3.42
Rainfall data for year 100		
10.33	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
83.4	96.0	10.33	1.000	0.078	0.890	0.069

Area-averaged adjusted loss rate Fm (In/Hr) = 0.069

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
9.19	0.890	83.4	96.0	0.41	0.925
1.14	0.110	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.929
Area-averaged low loss fraction, Yb = 0.071
++
Watercourse length = 2513.00(Ft.)
Length from concentration point to centroid = 1404.00(Ft.)
Elevation difference along watercourse = 25.00(Ft.)
Mannings friction factor along watercourse = 0.020
Watershed area = 10.33(Ac.)
Catchment Lag time = 0.103 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 80.8312
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.069(In/Hr)
Average low loss rate fraction (Yb) = 0.071 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 10.33(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.584(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.579(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 124.93 (CFS))		
1	11.529	14.403
2	64.583	66.280
3	94.227	37.034
4	98.892	5.828
5	100.000	1.384

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5845	0.5845
2	0.7712	0.1867

3	0.9070	0.1358
4	1.0176	0.1106
5	1.1127	0.0950
6	1.1968	0.0842
7	1.2730	0.0761
8	1.3428	0.0698
9	1.4076	0.0648
10	1.4682	0.0606
11	1.5252	0.0571
12	1.5792	0.0540
13	1.6347	0.0555
14	1.6878	0.0531
15	1.7388	0.0510
16	1.7879	0.0491
17	1.8353	0.0474
18	1.8811	0.0458
19	1.9255	0.0444
20	1.9685	0.0431
21	2.0104	0.0419
22	2.0512	0.0408
23	2.0909	0.0397
24	2.1296	0.0387
25	2.1674	0.0378
26	2.2044	0.0370
27	2.2406	0.0362
28	2.2760	0.0354
29	2.3108	0.0347
30	2.3448	0.0340
31	2.3782	0.0334
32	2.4110	0.0328
33	2.4432	0.0322
34	2.4749	0.0317
35	2.5060	0.0311
36	2.5367	0.0306
37	2.5668	0.0301
38	2.5965	0.0297
39	2.6257	0.0292
40	2.6545	0.0288
41	2.6829	0.0284
42	2.7109	0.0280
43	2.7386	0.0276
44	2.7658	0.0273
45	2.7927	0.0269
46	2.8193	0.0266
47	2.8456	0.0263
48	2.8715	0.0259
49	2.8972	0.0256
50	2.9225	0.0253
51	2.9475	0.0251
52	2.9723	0.0248
53	2.9968	0.0245
54	3.0211	0.0242
55	3.0451	0.0240
56	3.0688	0.0237
57	3.0923	0.0235
58	3.1156	0.0233
59	3.1386	0.0230
60	3.1614	0.0228
61	3.1840	0.0226

62	3.2064	0.0224
63	3.2286	0.0222
64	3.2506	0.0220
65	3.2724	0.0218
66	3.2940	0.0216
67	3.3154	0.0214
68	3.3367	0.0212
69	3.3577	0.0211
70	3.3786	0.0209
71	3.3993	0.0207
72	3.4199	0.0206
73	3.4407	0.0208
74	3.4613	0.0206
75	3.4818	0.0205
76	3.5021	0.0203
77	3.5223	0.0202
78	3.5424	0.0200
79	3.5622	0.0199
80	3.5820	0.0198
81	3.6016	0.0196
82	3.6211	0.0195
83	3.6404	0.0193
84	3.6596	0.0192
85	3.6787	0.0191
86	3.6977	0.0190
87	3.7165	0.0188
88	3.7352	0.0187
89	3.7538	0.0186
90	3.7723	0.0185
91	3.7907	0.0184
92	3.8089	0.0183
93	3.8271	0.0181
94	3.8451	0.0180
95	3.8630	0.0179
96	3.8809	0.0178
97	3.8986	0.0177
98	3.9162	0.0176
99	3.9337	0.0175
100	3.9511	0.0174
101	3.9684	0.0173
102	3.9857	0.0172
103	4.0028	0.0171
104	4.0198	0.0170
105	4.0368	0.0169
106	4.0536	0.0169
107	4.0704	0.0168
108	4.0871	0.0167
109	4.1037	0.0166
110	4.1202	0.0165
111	4.1366	0.0164
112	4.1529	0.0163
113	4.1692	0.0163
114	4.1854	0.0162
115	4.2015	0.0161
116	4.2175	0.0160
117	4.2334	0.0159
118	4.2493	0.0159
119	4.2651	0.0158
120	4.2808	0.0157

121	4.2964	0.0156
122	4.3120	0.0156
123	4.3275	0.0155
124	4.3429	0.0154
125	4.3583	0.0154
126	4.3736	0.0153
127	4.3888	0.0152
128	4.4040	0.0152
129	4.4191	0.0151
130	4.4341	0.0150
131	4.4490	0.0150
132	4.4639	0.0149
133	4.4788	0.0148
134	4.4935	0.0148
135	4.5083	0.0147
136	4.5229	0.0146
137	4.5375	0.0146
138	4.5520	0.0145
139	4.5665	0.0145
140	4.5809	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6238	0.0142
144	4.6380	0.0142
145	4.6521	0.0141
146	4.6662	0.0141
147	4.6802	0.0140
148	4.6942	0.0140
149	4.7081	0.0139
150	4.7219	0.0139
151	4.7358	0.0138
152	4.7495	0.0138
153	4.7632	0.0137
154	4.7769	0.0137
155	4.7905	0.0136
156	4.8041	0.0136
157	4.8176	0.0135
158	4.8310	0.0135
159	4.8444	0.0134
160	4.8578	0.0134
161	4.8711	0.0133
162	4.8844	0.0133
163	4.8976	0.0132
164	4.9108	0.0132
165	4.9240	0.0131
166	4.9371	0.0131
167	4.9501	0.0131
168	4.9631	0.0130
169	4.9761	0.0130
170	4.9890	0.0129
171	5.0019	0.0129
172	5.0147	0.0128
173	5.0275	0.0128
174	5.0403	0.0128
175	5.0530	0.0127
176	5.0656	0.0127
177	5.0783	0.0126
178	5.0909	0.0126
179	5.1034	0.0126

180	5.1159	0.0125
181	5.1284	0.0125
182	5.1408	0.0124
183	5.1532	0.0124
184	5.1656	0.0124
185	5.1779	0.0123
186	5.1902	0.0123
187	5.2024	0.0122
188	5.2147	0.0122
189	5.2268	0.0122
190	5.2390	0.0121
191	5.2511	0.0121
192	5.2631	0.0121
193	5.2752	0.0120
194	5.2872	0.0120
195	5.2991	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3348	0.0119
199	5.3466	0.0118
200	5.3584	0.0118
201	5.3702	0.0118
202	5.3819	0.0117
203	5.3936	0.0117
204	5.4053	0.0117
205	5.4169	0.0116
206	5.4285	0.0116
207	5.4401	0.0116
208	5.4516	0.0115
209	5.4631	0.0115
210	5.4746	0.0115
211	5.4860	0.0114
212	5.4974	0.0114
213	5.5088	0.0114
214	5.5202	0.0114
215	5.5315	0.0113
216	5.5428	0.0113
217	5.5541	0.0113
218	5.5653	0.0112
219	5.5765	0.0112
220	5.5877	0.0112
221	5.5988	0.0111
222	5.6100	0.0111
223	5.6210	0.0111
224	5.6321	0.0111
225	5.6431	0.0110
226	5.6542	0.0110
227	5.6651	0.0110
228	5.6761	0.0110
229	5.6870	0.0109
230	5.6979	0.0109
231	5.7088	0.0109
232	5.7197	0.0108
233	5.7305	0.0108
234	5.7413	0.0108
235	5.7520	0.0108
236	5.7628	0.0107
237	5.7735	0.0107
238	5.7842	0.0107

239	5.7949	0.0107
240	5.8055	0.0106
241	5.8161	0.0106
242	5.8267	0.0106
243	5.8373	0.0106
244	5.8479	0.0105
245	5.8584	0.0105
246	5.8689	0.0105
247	5.8793	0.0105
248	5.8898	0.0105
249	5.9002	0.0104
250	5.9106	0.0104
251	5.9210	0.0104
252	5.9314	0.0104
253	5.9417	0.0103
254	5.9520	0.0103
255	5.9623	0.0103
256	5.9726	0.0103
257	5.9828	0.0102
258	5.9930	0.0102
259	6.0032	0.0102
260	6.0134	0.0102
261	6.0236	0.0102
262	6.0337	0.0101
263	6.0438	0.0101
264	6.0539	0.0101
265	6.0640	0.0101
266	6.0740	0.0100
267	6.0840	0.0100
268	6.0940	0.0100
269	6.1040	0.0100
270	6.1140	0.0100
271	6.1239	0.0099
272	6.1339	0.0099
273	6.1438	0.0099
274	6.1536	0.0099
275	6.1635	0.0099
276	6.1733	0.0098
277	6.1832	0.0098
278	6.1930	0.0098
279	6.2028	0.0098
280	6.2125	0.0098
281	6.2223	0.0097
282	6.2320	0.0097
283	6.2417	0.0097
284	6.2514	0.0097
285	6.2610	0.0097
286	6.2707	0.0096
287	6.2803	0.0096
288	6.2899	0.0096

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0007	0.0089
2	0.0096	0.0007	0.0089
3	0.0097	0.0007	0.0090
4	0.0097	0.0007	0.0090
5	0.0097	0.0007	0.0090
6	0.0097	0.0007	0.0091
7	0.0098	0.0007	0.0091
8	0.0098	0.0007	0.0091
9	0.0098	0.0007	0.0091
10	0.0099	0.0007	0.0092
11	0.0099	0.0007	0.0092
12	0.0099	0.0007	0.0092
13	0.0100	0.0007	0.0093
14	0.0100	0.0007	0.0093
15	0.0100	0.0007	0.0093
16	0.0100	0.0007	0.0093
17	0.0101	0.0007	0.0094
18	0.0101	0.0007	0.0094
19	0.0102	0.0007	0.0094
20	0.0102	0.0007	0.0095
21	0.0102	0.0007	0.0095
22	0.0102	0.0007	0.0095
23	0.0103	0.0007	0.0096
24	0.0103	0.0007	0.0096
25	0.0104	0.0007	0.0096
26	0.0104	0.0007	0.0096
27	0.0104	0.0007	0.0097
28	0.0105	0.0007	0.0097
29	0.0105	0.0007	0.0098
30	0.0105	0.0007	0.0098
31	0.0106	0.0007	0.0098
32	0.0106	0.0007	0.0098
33	0.0106	0.0008	0.0099
34	0.0107	0.0008	0.0099
35	0.0107	0.0008	0.0100
36	0.0107	0.0008	0.0100
37	0.0108	0.0008	0.0100
38	0.0108	0.0008	0.0101
39	0.0109	0.0008	0.0101
40	0.0109	0.0008	0.0101
41	0.0110	0.0008	0.0102
42	0.0110	0.0008	0.0102
43	0.0110	0.0008	0.0103
44	0.0111	0.0008	0.0103
45	0.0111	0.0008	0.0103
46	0.0111	0.0008	0.0104
47	0.0112	0.0008	0.0104
48	0.0112	0.0008	0.0104
49	0.0113	0.0008	0.0105
50	0.0113	0.0008	0.0105
51	0.0114	0.0008	0.0106
52	0.0114	0.0008	0.0106
53	0.0115	0.0008	0.0107
54	0.0115	0.0008	0.0107
55	0.0116	0.0008	0.0108
56	0.0116	0.0008	0.0108
57	0.0117	0.0008	0.0108
58	0.0117	0.0008	0.0109
59	0.0118	0.0008	0.0109
60	0.0118	0.0008	0.0110
61	0.0119	0.0008	0.0110
62	0.0119	0.0008	0.0111
63	0.0120	0.0008	0.0111

64	0.0120	0.0008	0.0112
65	0.0121	0.0009	0.0112
66	0.0121	0.0009	0.0112
67	0.0122	0.0009	0.0113
68	0.0122	0.0009	0.0113
69	0.0123	0.0009	0.0114
70	0.0123	0.0009	0.0115
71	0.0124	0.0009	0.0115
72	0.0124	0.0009	0.0116
73	0.0125	0.0009	0.0116
74	0.0126	0.0009	0.0117
75	0.0126	0.0009	0.0117
76	0.0127	0.0009	0.0118
77	0.0128	0.0009	0.0119
78	0.0128	0.0009	0.0119
79	0.0129	0.0009	0.0120
80	0.0129	0.0009	0.0120
81	0.0130	0.0009	0.0121
82	0.0131	0.0009	0.0121
83	0.0131	0.0009	0.0122
84	0.0132	0.0009	0.0123
85	0.0133	0.0009	0.0123
86	0.0133	0.0009	0.0124
87	0.0134	0.0009	0.0125
88	0.0135	0.0009	0.0125
89	0.0136	0.0010	0.0126
90	0.0136	0.0010	0.0126
91	0.0137	0.0010	0.0127
92	0.0138	0.0010	0.0128
93	0.0139	0.0010	0.0129
94	0.0139	0.0010	0.0129
95	0.0140	0.0010	0.0130
96	0.0141	0.0010	0.0131
97	0.0142	0.0010	0.0132
98	0.0142	0.0010	0.0132
99	0.0144	0.0010	0.0133
100	0.0144	0.0010	0.0134
101	0.0145	0.0010	0.0135
102	0.0146	0.0010	0.0136
103	0.0147	0.0010	0.0137
104	0.0148	0.0010	0.0137
105	0.0149	0.0011	0.0138
106	0.0150	0.0011	0.0139
107	0.0151	0.0011	0.0140
108	0.0152	0.0011	0.0141
109	0.0153	0.0011	0.0142
110	0.0154	0.0011	0.0143
111	0.0155	0.0011	0.0144
112	0.0156	0.0011	0.0145
113	0.0157	0.0011	0.0146
114	0.0158	0.0011	0.0147
115	0.0159	0.0011	0.0148
116	0.0160	0.0011	0.0149
117	0.0162	0.0011	0.0150
118	0.0163	0.0011	0.0151
119	0.0164	0.0012	0.0153
120	0.0165	0.0012	0.0153
121	0.0167	0.0012	0.0155
122	0.0168	0.0012	0.0156

123	0.0169	0.0012	0.0157
124	0.0170	0.0012	0.0158
125	0.0172	0.0012	0.0160
126	0.0173	0.0012	0.0161
127	0.0175	0.0012	0.0163
128	0.0176	0.0012	0.0164
129	0.0178	0.0013	0.0166
130	0.0179	0.0013	0.0167
131	0.0181	0.0013	0.0169
132	0.0183	0.0013	0.0170
133	0.0185	0.0013	0.0172
134	0.0186	0.0013	0.0173
135	0.0188	0.0013	0.0175
136	0.0190	0.0013	0.0176
137	0.0192	0.0014	0.0179
138	0.0193	0.0014	0.0180
139	0.0196	0.0014	0.0182
140	0.0198	0.0014	0.0184
141	0.0200	0.0014	0.0186
142	0.0202	0.0014	0.0188
143	0.0205	0.0014	0.0190
144	0.0206	0.0015	0.0192
145	0.0206	0.0015	0.0191
146	0.0207	0.0015	0.0193
147	0.0211	0.0015	0.0196
148	0.0212	0.0015	0.0197
149	0.0216	0.0015	0.0201
150	0.0218	0.0015	0.0203
151	0.0222	0.0016	0.0206
152	0.0224	0.0016	0.0208
153	0.0228	0.0016	0.0212
154	0.0230	0.0016	0.0214
155	0.0235	0.0017	0.0218
156	0.0237	0.0017	0.0221
157	0.0242	0.0017	0.0225
158	0.0245	0.0017	0.0228
159	0.0251	0.0018	0.0233
160	0.0253	0.0018	0.0236
161	0.0259	0.0018	0.0241
162	0.0263	0.0019	0.0244
163	0.0269	0.0019	0.0250
164	0.0273	0.0019	0.0253
165	0.0280	0.0020	0.0260
166	0.0284	0.0020	0.0264
167	0.0292	0.0021	0.0272
168	0.0297	0.0021	0.0276
169	0.0306	0.0022	0.0285
170	0.0311	0.0022	0.0289
171	0.0322	0.0023	0.0299
172	0.0328	0.0023	0.0305
173	0.0340	0.0024	0.0316
174	0.0347	0.0024	0.0323
175	0.0362	0.0026	0.0336
176	0.0370	0.0026	0.0344
177	0.0387	0.0027	0.0360
178	0.0397	0.0028	0.0369
179	0.0419	0.0030	0.0389
180	0.0431	0.0030	0.0400
181	0.0458	0.0032	0.0426

182	0.0474	0.0033	0.0440
183	0.0510	0.0036	0.0474
184	0.0531	0.0037	0.0494
185	0.0540	0.0038	0.0502
186	0.0571	0.0040	0.0530
187	0.0648	0.0046	0.0602
188	0.0698	0.0049	0.0649
189	0.0842	0.0058	0.0784
190	0.0950	0.0058	0.0892
191	0.1358	0.0058	0.1300
192	0.1867	0.0058	0.1810
193	0.5845	0.0058	0.5787
194	0.1106	0.0058	0.1048
195	0.0761	0.0054	0.0707
196	0.0606	0.0043	0.0563
197	0.0555	0.0039	0.0516
198	0.0491	0.0035	0.0456
199	0.0444	0.0031	0.0413
200	0.0408	0.0029	0.0379
201	0.0378	0.0027	0.0352
202	0.0354	0.0025	0.0329
203	0.0334	0.0024	0.0310
204	0.0317	0.0022	0.0294
205	0.0301	0.0021	0.0280
206	0.0288	0.0020	0.0268
207	0.0276	0.0019	0.0257
208	0.0266	0.0019	0.0247
209	0.0256	0.0018	0.0238
210	0.0248	0.0017	0.0230
211	0.0240	0.0017	0.0223
212	0.0233	0.0016	0.0216
213	0.0226	0.0016	0.0210
214	0.0220	0.0016	0.0204
215	0.0214	0.0015	0.0199
216	0.0209	0.0015	0.0194
217	0.0208	0.0015	0.0193
218	0.0203	0.0014	0.0189
219	0.0199	0.0014	0.0185
220	0.0195	0.0014	0.0181
221	0.0191	0.0013	0.0177
222	0.0187	0.0013	0.0174
223	0.0184	0.0013	0.0171
224	0.0180	0.0013	0.0168
225	0.0177	0.0012	0.0165
226	0.0174	0.0012	0.0162
227	0.0171	0.0012	0.0159
228	0.0169	0.0012	0.0157
229	0.0166	0.0012	0.0154
230	0.0163	0.0012	0.0152
231	0.0161	0.0011	0.0150
232	0.0159	0.0011	0.0147
233	0.0156	0.0011	0.0145
234	0.0154	0.0011	0.0143
235	0.0152	0.0011	0.0141
236	0.0150	0.0011	0.0140
237	0.0148	0.0010	0.0138
238	0.0146	0.0010	0.0136
239	0.0145	0.0010	0.0134
240	0.0143	0.0010	0.0133

241	0.0141	0.0010	0.0131
242	0.0140	0.0010	0.0130
243	0.0138	0.0010	0.0128
244	0.0137	0.0010	0.0127
245	0.0135	0.0010	0.0126
246	0.0134	0.0009	0.0124
247	0.0132	0.0009	0.0123
248	0.0131	0.0009	0.0122
249	0.0130	0.0009	0.0120
250	0.0128	0.0009	0.0119
251	0.0127	0.0009	0.0118
252	0.0126	0.0009	0.0117
253	0.0125	0.0009	0.0116
254	0.0124	0.0009	0.0115
255	0.0122	0.0009	0.0114
256	0.0121	0.0009	0.0113
257	0.0120	0.0008	0.0112
258	0.0119	0.0008	0.0111
259	0.0118	0.0008	0.0110
260	0.0117	0.0008	0.0109
261	0.0116	0.0008	0.0108
262	0.0115	0.0008	0.0107
263	0.0114	0.0008	0.0106
264	0.0114	0.0008	0.0106
265	0.0113	0.0008	0.0105
266	0.0112	0.0008	0.0104
267	0.0111	0.0008	0.0103
268	0.0110	0.0008	0.0102
269	0.0109	0.0008	0.0102
270	0.0108	0.0008	0.0101
271	0.0108	0.0008	0.0100
272	0.0107	0.0008	0.0099
273	0.0106	0.0007	0.0099
274	0.0105	0.0007	0.0098
275	0.0105	0.0007	0.0097
276	0.0104	0.0007	0.0097
277	0.0103	0.0007	0.0096
278	0.0103	0.0007	0.0095
279	0.0102	0.0007	0.0095
280	0.0101	0.0007	0.0094
281	0.0101	0.0007	0.0094
282	0.0100	0.0007	0.0093
283	0.0099	0.0007	0.0092
284	0.0099	0.0007	0.0092
285	0.0098	0.0007	0.0091
286	0.0098	0.0007	0.0091
287	0.0097	0.0007	0.0090
288	0.0096	0.0007	0.0090

Total soil rain loss = 0.39(In)
Total effective rainfall = 5.90(In)
Peak flow rate in flood hydrograph = 47.45(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	12.5	25.0	37.5	50.0
0+ 5	0.0009	0.13	Q				
0+10	0.0059	0.72	Q				
0+15	0.0131	1.05	Q				
0+20	0.0207	1.11	Q				
0+25	0.0285	1.12	Q				
0+30	0.0362	1.13	Q				
0+35	0.0440	1.13	Q				
0+40	0.0518	1.13	Q				
0+45	0.0597	1.14	Q				
0+50	0.0675	1.14	Q				
0+55	0.0754	1.14	Q				
1+ 0	0.0833	1.15	Q				
1+ 5	0.0913	1.15	Q				
1+10	0.0992	1.16	Q				
1+15	0.1072	1.16	Q				
1+20	0.1152	1.16	Q				
1+25	0.1232	1.17	Q				
1+30	0.1313	1.17	QV				
1+35	0.1394	1.17	QV				
1+40	0.1475	1.18	QV				
1+45	0.1556	1.18	QV				
1+50	0.1638	1.19	QV				
1+55	0.1720	1.19	QV				
2+ 0	0.1802	1.19	QV				
2+ 5	0.1884	1.20	QV				
2+10	0.1967	1.20	QV				
2+15	0.2050	1.20	QV				
2+20	0.2133	1.21	QV				
2+25	0.2217	1.21	QV				
2+30	0.2301	1.22	QV				
2+35	0.2385	1.22	QV				
2+40	0.2469	1.23	QV				
2+45	0.2554	1.23	Q V				
2+50	0.2639	1.23	Q V				
2+55	0.2724	1.24	Q V				
3+ 0	0.2810	1.24	Q V				
3+ 5	0.2895	1.25	Q V				
3+10	0.2982	1.25	|QV				
3+15	0.3068	1.26	|QV				
3+20	0.3155	1.26	|QV				
3+25	0.3242	1.27	|QV				
3+30	0.3330	1.27	|QV				
3+35	0.3417	1.27	|QV				
3+40	0.3505	1.28	|QV				
3+45	0.3594	1.28	|QV				
3+50	0.3683	1.29	|QV				
3+55	0.3772	1.29	|QV				
4+ 0	0.3861	1.30	|Q V				
4+ 5	0.3951	1.30	|Q V				
4+10	0.4041	1.31	|Q V				
4+15	0.4132	1.31	|Q V				
4+20	0.4223	1.32	|Q V				
4+25	0.4314	1.32	|Q V				
4+30	0.4405	1.33	|Q V				
4+35	0.4497	1.34	|Q V				

4+40	0.4590	1.34	|Q V				
4+45	0.4682	1.35	|Q V				
4+50	0.4775	1.35	|Q V				
4+55	0.4869	1.36	|Q V				
5+ 0	0.4963	1.36	|Q V				
5+ 5	0.5057	1.37	|Q V				
5+10	0.5152	1.37	|Q V				
5+15	0.5247	1.38	|Q V				
5+20	0.5342	1.39	|Q V				
5+25	0.5438	1.39	|Q V				
5+30	0.5534	1.40	|Q V				
5+35	0.5631	1.40	|Q V				
5+40	0.5728	1.41	|Q V				
5+45	0.5826	1.42	|Q V				
5+50	0.5924	1.42	|Q V				
5+55	0.6022	1.43	|Q V				
6+ 0	0.6121	1.44	|Q V				
6+ 5	0.6221	1.44	|Q V				
6+10	0.6320	1.45	|Q V				
6+15	0.6421	1.46	|Q V				
6+20	0.6522	1.46	|Q V				
6+25	0.6623	1.47	|Q V				
6+30	0.6725	1.48	|Q V				
6+35	0.6827	1.48	|Q V				
6+40	0.6930	1.49	|Q V				
6+45	0.7033	1.50	|Q V				
6+50	0.7137	1.51	|Q V				
6+55	0.7241	1.51	|Q V				
7+ 0	0.7346	1.52	|Q V				
7+ 5	0.7451	1.53	|Q V				
7+10	0.7557	1.54	|Q V				
7+15	0.7663	1.55	|Q V				
7+20	0.7770	1.55	|Q V				
7+25	0.7878	1.56	|Q V				
7+30	0.7986	1.57	|Q V				
7+35	0.8095	1.58	|Q V				
7+40	0.8204	1.59	|Q V				
7+45	0.8314	1.60	|Q V				
7+50	0.8425	1.61	|Q V				
7+55	0.8536	1.61	|Q V				
8+ 0	0.8648	1.62	|Q V				
8+ 5	0.8760	1.63	|Q V				
8+10	0.8873	1.64	|Q V				
8+15	0.8987	1.65	|Q V				
8+20	0.9102	1.66	|Q V				
8+25	0.9217	1.67	|Q V				
8+30	0.9333	1.68	|Q V				
8+35	0.9449	1.69	|Q V				
8+40	0.9567	1.70	|Q V				
8+45	0.9685	1.71	|Q V				
8+50	0.9803	1.72	|Q V				
8+55	0.9923	1.74	|Q V				
9+ 0	1.0043	1.75	|Q V				
9+ 5	1.0164	1.76	|Q V				
9+10	1.0286	1.77	|Q V				
9+15	1.0409	1.78	|Q V				
9+20	1.0532	1.79	|Q V				
9+25	1.0657	1.81	|Q V				
9+30	1.0782	1.82	|Q V				

9+35	1.0908	1.83	Q V			
9+40	1.1035	1.85	Q V			
9+45	1.1163	1.86	Q V			
9+50	1.1292	1.87	Q V			
9+55	1.1422	1.89	Q V			
10+ 0	1.1553	1.90	Q V			
10+ 5	1.1685	1.91	Q V			
10+10	1.1818	1.93	Q V			
10+15	1.1952	1.94	Q V			
10+20	1.2087	1.96	Q V			
10+25	1.2223	1.98	Q V			
10+30	1.2360	1.99	Q V			
10+35	1.2498	2.01	Q V			
10+40	1.2638	2.03	Q V			
10+45	1.2778	2.04	Q V			
10+50	1.2920	2.06	Q V			
10+55	1.3064	2.08	Q V			
11+ 0	1.3208	2.10	Q V			
11+ 5	1.3354	2.12	Q V			
11+10	1.3501	2.14	Q V			
11+15	1.3650	2.16	Q V			
11+20	1.3800	2.18	Q V			
11+25	1.3951	2.20	Q V			
11+30	1.4104	2.22	Q V			
11+35	1.4258	2.24	Q V			
11+40	1.4414	2.27	Q V			
11+45	1.4572	2.29	Q V			
11+50	1.4732	2.32	Q V			
11+55	1.4893	2.34	Q V			
12+ 0	1.5056	2.37	Q V			
12+ 5	1.5220	2.39	Q V			
12+10	1.5385	2.39	Q V			
12+15	1.5550	2.40	Q V			
12+20	1.5718	2.43	Q V			
12+25	1.5887	2.46	Q V			
12+30	1.6059	2.49	Q V			
12+35	1.6233	2.53	Q V			
12+40	1.6409	2.56	Q V			
12+45	1.6588	2.59	Q V			
12+50	1.6770	2.63	Q V			
12+55	1.6953	2.67	Q V			
13+ 0	1.7140	2.71	Q V			
13+ 5	1.7329	2.75	Q V			
13+10	1.7522	2.80	Q V			
13+15	1.7717	2.84	Q V			
13+20	1.7916	2.89	Q V			
13+25	1.8118	2.93	Q V			
13+30	1.8324	2.99	Q V			
13+35	1.8534	3.04	Q V			
13+40	1.8747	3.10	Q V			
13+45	1.8965	3.16	Q V			
13+50	1.9187	3.22	Q V			
13+55	1.9413	3.29	Q V			
14+ 0	1.9645	3.36	Q V			
14+ 5	1.9881	3.43	Q V			
14+10	2.0124	3.52	Q V			
14+15	2.0372	3.60	Q V			
14+20	2.0627	3.70	Q V			
14+25	2.0888	3.79	Q V			

14+30	2.1157	3.91	Q V			
14+35	2.1433	4.01	Q V			
14+40	2.1719	4.15	Q V			
14+45	2.2013	4.27	Q V			
14+50	2.2318	4.43	Q V			
14+55	2.2634	4.59	Q V			
15+ 0	2.2963	4.78	Q V			
15+ 5	2.3306	4.97	Q V			
15+10	2.3665	5.22	Q V			
15+15	2.4042	5.47	Q V			
15+20	2.4440	5.79	Q V			
15+25	2.4858	6.07	Q V			
15+30	2.5289	6.26	Q V			
15+35	2.5743	6.59	Q V			
15+40	2.6242	7.25	Q V			
15+45	2.6796	8.04	Q V			
15+50	2.7437	9.31	Q V			
15+55	2.8205	11.15	Q V			
16+ 0	2.9243	15.07	Q V			
16+ 5	3.1018	25.77	Q V			
16+10	3.4286	47.45	Q V			
16+15	3.6396	30.63	Q V			
16+20	3.7292	13.01	Q V			
16+25	3.7877	8.51	Q V			
16+30	3.8340	6.72	Q V			
16+35	3.8750	5.95	Q V			
16+40	3.9118	5.35	Q V			
16+45	3.9455	4.88	Q V			
16+50	3.9765	4.51	Q V			
16+55	4.0055	4.21	Q V			
17+ 0	4.0328	3.96	Q V			
17+ 5	4.0586	3.74	Q V			
17+10	4.0831	3.56	Q V			
17+15	4.1065	3.40	Q V			
17+20	4.1289	3.25	Q V			
17+25	4.1504	3.13	Q V			
17+30	4.1712	3.01	Q V			
17+35	4.1912	2.91	Q V			
17+40	4.2106	2.82	Q V			
17+45	4.2294	2.73	Q V			
17+50	4.2476	2.65	Q V			
17+55	4.2654	2.58	Q V			
18+ 0	4.2827	2.51	Q V			
18+ 5	4.2995	2.45	Q V			
18+10	4.3162	2.42	Q V			
18+15	4.3325	2.38	Q V			
18+20	4.3486	2.33	Q V			
18+25	4.3642	2.28	Q V			
18+30	4.3796	2.23	Q V			
18+35	4.3947	2.19	Q V			
18+40	4.4094	2.15	Q V			
18+45	4.4239	2.11	Q V			
18+50	4.4382	2.07	Q V			
18+55	4.4522	2.03	Q V			
19+ 0	4.4660	2.00	Q V			
19+ 5	4.4795	1.97	Q V			
19+10	4.4928	1.94	Q V			
19+15	4.5060	1.91	Q V			
19+20	4.5189	1.88	Q V			

19+25	4.5317	1.85	Q			V	
19+30	4.5442	1.82	Q			V	
19+35	4.5566	1.80	Q			V	
19+40	4.5688	1.78	Q			V	
19+45	4.5809	1.75	Q			V	
19+50	4.5928	1.73	Q			V	
19+55	4.6046	1.71	Q			V	
20+ 0	4.6162	1.69	Q			V	
20+ 5	4.6277	1.67	Q			V	
20+10	4.6390	1.65	Q			V	
20+15	4.6502	1.63	Q			V	
20+20	4.6613	1.61	Q			V	
20+25	4.6723	1.59	Q			V	
20+30	4.6831	1.57	Q			V	
20+35	4.6938	1.56	Q			V	
20+40	4.7044	1.54	Q			V	
20+45	4.7150	1.53	Q			V	
20+50	4.7254	1.51	Q			V	
20+55	4.7357	1.50	Q			V	
21+ 0	4.7458	1.48	Q			V	
21+ 5	4.7559	1.47	Q			V	
21+10	4.7660	1.45	Q			V	
21+15	4.7759	1.44	Q			V	
21+20	4.7857	1.43	Q			V	
21+25	4.7954	1.41	Q			V	
21+30	4.8051	1.40	Q			V	
21+35	4.8146	1.39	Q			V	
21+40	4.8241	1.38	Q			V	
21+45	4.8335	1.37	Q			V	
21+50	4.8428	1.35	Q			V	
21+55	4.8521	1.34	Q			V	
22+ 0	4.8613	1.33	Q			V	
22+ 5	4.8704	1.32	Q			V	
22+10	4.8794	1.31	Q			V	
22+15	4.8884	1.30	Q			V	
22+20	4.8972	1.29	Q			V	
22+25	4.9061	1.28	Q			V	
22+30	4.9148	1.27	Q			V	
22+35	4.9235	1.26	Q			V	
22+40	4.9322	1.25	Q			V	
22+45	4.9407	1.24	Q			V	
22+50	4.9492	1.24	Q			V	
22+55	4.9577	1.23	Q			V	
23+ 0	4.9661	1.22	Q			V	
23+ 5	4.9744	1.21	Q			V	
23+10	4.9827	1.20	Q			V	
23+15	4.9909	1.19	Q			V	
23+20	4.9991	1.19	Q			V	
23+25	5.0072	1.18	Q			V	
23+30	5.0153	1.17	Q			V	
23+35	5.0233	1.16	Q			V	
23+40	5.0313	1.16	Q			V	
23+45	5.0392	1.15	Q			V	
23+50	5.0471	1.14	Q			V	
23+55	5.0549	1.14	Q			V	
24+ 0	5.0627	1.13	Q			V	
24+ 5	5.0695	0.99	Q			V	
24+10	5.0722	0.40	Q			V	
24+15	5.0727	0.06	Q			V	

24+20	5.0728	0.01	Q				V

APPENDIX B.6: UNIT HYDROGRAPH, AREA "6"

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0

Study date 06/20/19

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

Program License Serial Number 6279

BNSF
POST PROJECT HYDROLOGY
AREA 6

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
7.49	1	1.58
Rainfall data for year 100		
7.49	6	3.42
Rainfall data for year 100		
7.49	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
85.3	97.1	7.49	1.000	0.058	0.980	0.057

Area-averaged adjusted loss rate Fm (In/Hr) = 0.057

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
7.34	0.980	85.3	97.1	0.30	0.944
0.15	0.020	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.945
Area-averaged low loss fraction, Yb = 0.055
++
Watercourse length = 2238.00(Ft.)
Length from concentration point to centroid = 1224.00(Ft.)
Elevation difference along watercourse = 15.00(Ft.)
Mannings friction factor along watercourse = 0.020
Watershed area = 7.49(Ac.)
Catchment Lag time = 0.101 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 82.5581
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.057(In/Hr)
Average low loss rate fraction (Yb) = 0.055 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 7.49(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.585(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.579(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 90.58 (CFS))		
1	11.995	10.866
2	66.210	49.109
3	94.734	25.837
4	99.001	3.865
5	100.000	0.905

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5846	0.5846
2	0.7713	0.1868

3	0.9072	0.1358
4	1.0178	0.1106
5	1.1128	0.0950
6	1.1970	0.0842
7	1.2731	0.0761
8	1.3430	0.0698
9	1.4078	0.0648
10	1.4684	0.0606
11	1.5254	0.0571
12	1.5794	0.0540
13	1.6349	0.0555
14	1.6880	0.0531
15	1.7390	0.0510
16	1.7881	0.0491
17	1.8354	0.0474
18	1.8812	0.0458
19	1.9256	0.0444
20	1.9687	0.0431
21	2.0106	0.0419
22	2.0513	0.0407
23	2.0910	0.0397
24	2.1297	0.0387
25	2.1676	0.0378
26	2.2045	0.0370
27	2.2407	0.0362
28	2.2761	0.0354
29	2.3108	0.0347
30	2.3449	0.0340
31	2.3783	0.0334
32	2.4111	0.0328
33	2.4433	0.0322
34	2.4749	0.0317
35	2.5061	0.0311
36	2.5367	0.0306
37	2.5668	0.0301
38	2.5965	0.0297
39	2.6257	0.0292
40	2.6545	0.0288
41	2.6829	0.0284
42	2.7110	0.0280
43	2.7386	0.0276
44	2.7659	0.0273
45	2.7928	0.0269
46	2.8194	0.0266
47	2.8456	0.0263
48	2.8716	0.0259
49	2.8972	0.0256
50	2.9225	0.0253
51	2.9476	0.0251
52	2.9724	0.0248
53	2.9969	0.0245
54	3.0211	0.0242
55	3.0451	0.0240
56	3.0688	0.0237
57	3.0923	0.0235
58	3.1156	0.0233
59	3.1386	0.0230
60	3.1615	0.0228
61	3.1841	0.0226

62	3.2065	0.0224
63	3.2286	0.0222
64	3.2506	0.0220
65	3.2724	0.0218
66	3.2940	0.0216
67	3.3155	0.0214
68	3.3367	0.0212
69	3.3578	0.0211
70	3.3786	0.0209
71	3.3994	0.0207
72	3.4199	0.0206
73	3.4407	0.0208
74	3.4614	0.0206
75	3.4818	0.0205
76	3.5022	0.0203
77	3.5223	0.0202
78	3.5424	0.0200
79	3.5623	0.0199
80	3.5820	0.0198
81	3.6016	0.0196
82	3.6211	0.0195
83	3.6405	0.0193
84	3.6597	0.0192
85	3.6788	0.0191
86	3.6977	0.0190
87	3.7166	0.0188
88	3.7353	0.0187
89	3.7539	0.0186
90	3.7723	0.0185
91	3.7907	0.0184
92	3.8090	0.0183
93	3.8271	0.0181
94	3.8451	0.0180
95	3.8631	0.0179
96	3.8809	0.0178
97	3.8986	0.0177
98	3.9162	0.0176
99	3.9337	0.0175
100	3.9512	0.0174
101	3.9685	0.0173
102	3.9857	0.0172
103	4.0028	0.0171
104	4.0199	0.0170
105	4.0368	0.0169
106	4.0537	0.0169
107	4.0704	0.0168
108	4.0871	0.0167
109	4.1037	0.0166
110	4.1202	0.0165
111	4.1366	0.0164
112	4.1530	0.0163
113	4.1692	0.0163
114	4.1854	0.0162
115	4.2015	0.0161
116	4.2175	0.0160
117	4.2335	0.0159
118	4.2493	0.0159
119	4.2651	0.0158
120	4.2808	0.0157

121	4.2965	0.0156
122	4.3120	0.0156
123	4.3275	0.0155
124	4.3430	0.0154
125	4.3583	0.0154
126	4.3736	0.0153
127	4.3888	0.0152
128	4.4040	0.0152
129	4.4191	0.0151
130	4.4341	0.0150
131	4.4491	0.0150
132	4.4640	0.0149
133	4.4788	0.0148
134	4.4936	0.0148
135	4.5083	0.0147
136	4.5229	0.0146
137	4.5375	0.0146
138	4.5521	0.0145
139	4.5665	0.0145
140	4.5809	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6238	0.0142
144	4.6380	0.0142
145	4.6521	0.0141
146	4.6662	0.0141
147	4.6802	0.0140
148	4.6942	0.0140
149	4.7081	0.0139
150	4.7220	0.0139
151	4.7358	0.0138
152	4.7495	0.0138
153	4.7633	0.0137
154	4.7769	0.0137
155	4.7905	0.0136
156	4.8041	0.0136
157	4.8176	0.0135
158	4.8311	0.0135
159	4.8445	0.0134
160	4.8578	0.0134
161	4.8712	0.0133
162	4.8844	0.0133
163	4.8977	0.0132
164	4.9109	0.0132
165	4.9240	0.0131
166	4.9371	0.0131
167	4.9501	0.0131
168	4.9631	0.0130
169	4.9761	0.0130
170	4.9890	0.0129
171	5.0019	0.0129
172	5.0147	0.0128
173	5.0275	0.0128
174	5.0403	0.0128
175	5.0530	0.0127
176	5.0657	0.0127
177	5.0783	0.0126
178	5.0909	0.0126
179	5.1034	0.0126

180	5.1160	0.0125
181	5.1284	0.0125
182	5.1409	0.0124
183	5.1533	0.0124
184	5.1656	0.0124
185	5.1779	0.0123
186	5.1902	0.0123
187	5.2025	0.0122
188	5.2147	0.0122
189	5.2269	0.0122
190	5.2390	0.0121
191	5.2511	0.0121
192	5.2632	0.0121
193	5.2752	0.0120
194	5.2872	0.0120
195	5.2992	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3348	0.0119
199	5.3467	0.0118
200	5.3585	0.0118
201	5.3702	0.0118
202	5.3819	0.0117
203	5.3936	0.0117
204	5.4053	0.0117
205	5.4169	0.0116
206	5.4285	0.0116
207	5.4401	0.0116
208	5.4516	0.0115
209	5.4631	0.0115
210	5.4746	0.0115
211	5.4861	0.0114
212	5.4975	0.0114
213	5.5088	0.0114
214	5.5202	0.0114
215	5.5315	0.0113
216	5.5428	0.0113
217	5.5541	0.0113
218	5.5653	0.0112
219	5.5765	0.0112
220	5.5877	0.0112
221	5.5989	0.0111
222	5.6100	0.0111
223	5.6211	0.0111
224	5.6321	0.0111
225	5.6432	0.0110
226	5.6542	0.0110
227	5.6652	0.0110
228	5.6761	0.0110
229	5.6871	0.0109
230	5.6980	0.0109
231	5.7088	0.0109
232	5.7197	0.0108
233	5.7305	0.0108
234	5.7413	0.0108
235	5.7521	0.0108
236	5.7628	0.0107
237	5.7735	0.0107
238	5.7842	0.0107

239	5.7949	0.0107
240	5.8055	0.0106
241	5.8162	0.0106
242	5.8268	0.0106
243	5.8373	0.0106
244	5.8479	0.0105
245	5.8584	0.0105
246	5.8689	0.0105
247	5.8794	0.0105
248	5.8898	0.0105
249	5.9003	0.0104
250	5.9107	0.0104
251	5.9210	0.0104
252	5.9314	0.0104
253	5.9417	0.0103
254	5.9520	0.0103
255	5.9623	0.0103
256	5.9726	0.0103
257	5.9828	0.0102
258	5.9931	0.0102
259	6.0033	0.0102
260	6.0134	0.0102
261	6.0236	0.0102
262	6.0337	0.0101
263	6.0438	0.0101
264	6.0539	0.0101
265	6.0640	0.0101
266	6.0740	0.0100
267	6.0841	0.0100
268	6.0941	0.0100
269	6.1041	0.0100
270	6.1140	0.0100
271	6.1240	0.0099
272	6.1339	0.0099
273	6.1438	0.0099
274	6.1537	0.0099
275	6.1635	0.0099
276	6.1734	0.0098
277	6.1832	0.0098
278	6.1930	0.0098
279	6.2028	0.0098
280	6.2125	0.0098
281	6.2223	0.0097
282	6.2320	0.0097
283	6.2417	0.0097
284	6.2514	0.0097
285	6.2611	0.0097
286	6.2707	0.0096
287	6.2803	0.0096
288	6.2899	0.0096

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0005	0.0091
2	0.0096	0.0005	0.0091
3	0.0097	0.0005	0.0091
4	0.0097	0.0005	0.0092
5	0.0097	0.0005	0.0092
6	0.0097	0.0005	0.0092
7	0.0098	0.0005	0.0092
8	0.0098	0.0005	0.0093
9	0.0098	0.0005	0.0093
10	0.0099	0.0005	0.0093
11	0.0099	0.0005	0.0094
12	0.0099	0.0005	0.0094
13	0.0100	0.0006	0.0094
14	0.0100	0.0006	0.0094
15	0.0100	0.0006	0.0095
16	0.0100	0.0006	0.0095
17	0.0101	0.0006	0.0095
18	0.0101	0.0006	0.0096
19	0.0102	0.0006	0.0096
20	0.0102	0.0006	0.0096
21	0.0102	0.0006	0.0097
22	0.0102	0.0006	0.0097
23	0.0103	0.0006	0.0097
24	0.0103	0.0006	0.0097
25	0.0104	0.0006	0.0098
26	0.0104	0.0006	0.0098
27	0.0104	0.0006	0.0099
28	0.0105	0.0006	0.0099
29	0.0105	0.0006	0.0099
30	0.0105	0.0006	0.0099
31	0.0106	0.0006	0.0100
32	0.0106	0.0006	0.0100
33	0.0106	0.0006	0.0101
34	0.0107	0.0006	0.0101
35	0.0107	0.0006	0.0101
36	0.0107	0.0006	0.0102
37	0.0108	0.0006	0.0102
38	0.0108	0.0006	0.0102
39	0.0109	0.0006	0.0103
40	0.0109	0.0006	0.0103
41	0.0110	0.0006	0.0104
42	0.0110	0.0006	0.0104
43	0.0110	0.0006	0.0104
44	0.0111	0.0006	0.0105
45	0.0111	0.0006	0.0105
46	0.0111	0.0006	0.0105
47	0.0112	0.0006	0.0106
48	0.0112	0.0006	0.0106
49	0.0113	0.0006	0.0107
50	0.0113	0.0006	0.0107
51	0.0114	0.0006	0.0108
52	0.0114	0.0006	0.0108
53	0.0115	0.0006	0.0108
54	0.0115	0.0006	0.0109
55	0.0116	0.0006	0.0109
56	0.0116	0.0006	0.0110
57	0.0117	0.0006	0.0110
58	0.0117	0.0006	0.0110
59	0.0118	0.0006	0.0111
60	0.0118	0.0007	0.0111
61	0.0119	0.0007	0.0112
62	0.0119	0.0007	0.0112
63	0.0120	0.0007	0.0113

64	0.0120	0.0007	0.0113
65	0.0121	0.0007	0.0114
66	0.0121	0.0007	0.0114
67	0.0122	0.0007	0.0115
68	0.0122	0.0007	0.0115
69	0.0123	0.0007	0.0116
70	0.0123	0.0007	0.0116
71	0.0124	0.0007	0.0117
72	0.0124	0.0007	0.0117
73	0.0125	0.0007	0.0118
74	0.0126	0.0007	0.0119
75	0.0126	0.0007	0.0119
76	0.0127	0.0007	0.0120
77	0.0128	0.0007	0.0120
78	0.0128	0.0007	0.0121
79	0.0129	0.0007	0.0122
80	0.0129	0.0007	0.0122
81	0.0130	0.0007	0.0123
82	0.0131	0.0007	0.0123
83	0.0131	0.0007	0.0124
84	0.0132	0.0007	0.0125
85	0.0133	0.0007	0.0125
86	0.0133	0.0007	0.0126
87	0.0134	0.0007	0.0127
88	0.0135	0.0007	0.0127
89	0.0136	0.0007	0.0128
90	0.0136	0.0008	0.0129
91	0.0137	0.0008	0.0130
92	0.0138	0.0008	0.0130
93	0.0139	0.0008	0.0131
94	0.0139	0.0008	0.0131
95	0.0140	0.0008	0.0132
96	0.0141	0.0008	0.0133
97	0.0142	0.0008	0.0134
98	0.0142	0.0008	0.0135
99	0.0144	0.0008	0.0136
100	0.0144	0.0008	0.0136
101	0.0145	0.0008	0.0137
102	0.0146	0.0008	0.0138
103	0.0147	0.0008	0.0139
104	0.0148	0.0008	0.0140
105	0.0149	0.0008	0.0141
106	0.0150	0.0008	0.0141
107	0.0151	0.0008	0.0143
108	0.0152	0.0008	0.0143
109	0.0153	0.0008	0.0144
110	0.0154	0.0008	0.0145
111	0.0155	0.0009	0.0146
112	0.0156	0.0009	0.0147
113	0.0157	0.0009	0.0148
114	0.0158	0.0009	0.0149
115	0.0159	0.0009	0.0151
116	0.0160	0.0009	0.0151
117	0.0162	0.0009	0.0153
118	0.0163	0.0009	0.0154
119	0.0164	0.0009	0.0155
120	0.0165	0.0009	0.0156
121	0.0167	0.0009	0.0158
122	0.0168	0.0009	0.0158

123	0.0169	0.0009	0.0160
124	0.0170	0.0009	0.0161
125	0.0172	0.0010	0.0163
126	0.0173	0.0010	0.0164
127	0.0175	0.0010	0.0165
128	0.0176	0.0010	0.0166
129	0.0178	0.0010	0.0168
130	0.0179	0.0010	0.0169
131	0.0181	0.0010	0.0171
132	0.0183	0.0010	0.0172
133	0.0185	0.0010	0.0175
134	0.0186	0.0010	0.0176
135	0.0188	0.0010	0.0178
136	0.0190	0.0010	0.0179
137	0.0192	0.0011	0.0182
138	0.0193	0.0011	0.0183
139	0.0196	0.0011	0.0185
140	0.0198	0.0011	0.0187
141	0.0200	0.0011	0.0189
142	0.0202	0.0011	0.0191
143	0.0205	0.0011	0.0194
144	0.0206	0.0011	0.0195
145	0.0206	0.0011	0.0194
146	0.0207	0.0011	0.0196
147	0.0211	0.0012	0.0199
148	0.0212	0.0012	0.0201
149	0.0216	0.0012	0.0204
150	0.0218	0.0012	0.0206
151	0.0222	0.0012	0.0210
152	0.0224	0.0012	0.0212
153	0.0228	0.0013	0.0216
154	0.0230	0.0013	0.0218
155	0.0235	0.0013	0.0222
156	0.0237	0.0013	0.0224
157	0.0242	0.0013	0.0229
158	0.0245	0.0014	0.0232
159	0.0251	0.0014	0.0237
160	0.0253	0.0014	0.0239
161	0.0259	0.0014	0.0245
162	0.0263	0.0014	0.0248
163	0.0269	0.0015	0.0254
164	0.0273	0.0015	0.0258
165	0.0280	0.0015	0.0265
166	0.0284	0.0016	0.0268
167	0.0292	0.0016	0.0276
168	0.0297	0.0016	0.0280
169	0.0306	0.0017	0.0289
170	0.0311	0.0017	0.0294
171	0.0322	0.0018	0.0304
172	0.0328	0.0018	0.0310
173	0.0340	0.0019	0.0322
174	0.0347	0.0019	0.0328
175	0.0362	0.0020	0.0342
176	0.0370	0.0020	0.0349
177	0.0387	0.0021	0.0366
178	0.0397	0.0022	0.0375
179	0.0419	0.0023	0.0396
180	0.0431	0.0024	0.0407
181	0.0458	0.0025	0.0433

182	0.0474	0.0026	0.0448
183	0.0510	0.0028	0.0482
184	0.0531	0.0029	0.0502
185	0.0540	0.0030	0.0510
186	0.0571	0.0031	0.0539
187	0.0648	0.0036	0.0612
188	0.0698	0.0039	0.0660
189	0.0842	0.0046	0.0795
190	0.0950	0.0047	0.0903
191	0.1358	0.0047	0.1311
192	0.1868	0.0047	0.1820
193	0.5846	0.0047	0.5798
194	0.1106	0.0047	0.1059
195	0.0761	0.0042	0.0719
196	0.0606	0.0033	0.0573
197	0.0555	0.0031	0.0524
198	0.0491	0.0027	0.0464
199	0.0444	0.0024	0.0419
200	0.0407	0.0022	0.0385
201	0.0378	0.0021	0.0357
202	0.0354	0.0020	0.0335
203	0.0334	0.0018	0.0316
204	0.0317	0.0017	0.0299
205	0.0301	0.0017	0.0285
206	0.0288	0.0016	0.0272
207	0.0276	0.0015	0.0261
208	0.0266	0.0015	0.0251
209	0.0256	0.0014	0.0242
210	0.0248	0.0014	0.0234
211	0.0240	0.0013	0.0227
212	0.0233	0.0013	0.0220
213	0.0226	0.0012	0.0214
214	0.0220	0.0012	0.0208
215	0.0214	0.0012	0.0202
216	0.0209	0.0012	0.0197
217	0.0208	0.0011	0.0196
218	0.0203	0.0011	0.0192
219	0.0199	0.0011	0.0188
220	0.0195	0.0011	0.0184
221	0.0191	0.0011	0.0180
222	0.0187	0.0010	0.0177
223	0.0184	0.0010	0.0174
224	0.0180	0.0010	0.0170
225	0.0177	0.0010	0.0167
226	0.0174	0.0010	0.0165
227	0.0171	0.0009	0.0162
228	0.0169	0.0009	0.0159
229	0.0166	0.0009	0.0157
230	0.0163	0.0009	0.0154
231	0.0161	0.0009	0.0152
232	0.0159	0.0009	0.0150
233	0.0156	0.0009	0.0148
234	0.0154	0.0009	0.0146
235	0.0152	0.0008	0.0144
236	0.0150	0.0008	0.0142
237	0.0148	0.0008	0.0140
238	0.0146	0.0008	0.0138
239	0.0145	0.0008	0.0137
240	0.0143	0.0008	0.0135

241	0.0141	0.0008	0.0133
242	0.0140	0.0008	0.0132
243	0.0138	0.0008	0.0130
244	0.0137	0.0008	0.0129
245	0.0135	0.0007	0.0128
246	0.0134	0.0007	0.0126
247	0.0132	0.0007	0.0125
248	0.0131	0.0007	0.0124
249	0.0130	0.0007	0.0122
250	0.0128	0.0007	0.0121
251	0.0127	0.0007	0.0120
252	0.0126	0.0007	0.0119
253	0.0125	0.0007	0.0118
254	0.0124	0.0007	0.0117
255	0.0122	0.0007	0.0116
256	0.0121	0.0007	0.0115
257	0.0120	0.0007	0.0114
258	0.0119	0.0007	0.0113
259	0.0118	0.0007	0.0112
260	0.0117	0.0006	0.0111
261	0.0116	0.0006	0.0110
262	0.0115	0.0006	0.0109
263	0.0114	0.0006	0.0108
264	0.0114	0.0006	0.0107
265	0.0113	0.0006	0.0106
266	0.0112	0.0006	0.0106
267	0.0111	0.0006	0.0105
268	0.0110	0.0006	0.0104
269	0.0109	0.0006	0.0103
270	0.0108	0.0006	0.0103
271	0.0108	0.0006	0.0102
272	0.0107	0.0006	0.0101
273	0.0106	0.0006	0.0100
274	0.0105	0.0006	0.0100
275	0.0105	0.0006	0.0099
276	0.0104	0.0006	0.0098
277	0.0103	0.0006	0.0098
278	0.0103	0.0006	0.0097
279	0.0102	0.0006	0.0096
280	0.0101	0.0006	0.0096
281	0.0101	0.0006	0.0095
282	0.0100	0.0006	0.0095
283	0.0099	0.0005	0.0094
284	0.0099	0.0005	0.0093
285	0.0098	0.0005	0.0093
286	0.0098	0.0005	0.0092
287	0.0097	0.0005	0.0092
288	0.0096	0.0005	0.0091

Total soil rain loss = 0.31(In)
Total effective rainfall = 5.98(In)
Peak flow rate in flood hydrograph = 34.92(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	10.0	20.0	30.0	40.0
0+ 5	0.0007	0.10	Q				
0+10	0.0044	0.54	Q				
0+15	0.0098	0.78	Q				
0+20	0.0154	0.82	Q				
0+25	0.0211	0.83	Q				
0+30	0.0269	0.83	Q				
0+35	0.0326	0.83	Q				
0+40	0.0384	0.84	Q				
0+45	0.0441	0.84	Q				
0+50	0.0499	0.84	Q				
0+55	0.0557	0.84	Q				
1+ 0	0.0616	0.85	Q				
1+ 5	0.0674	0.85	Q				
1+10	0.0733	0.85	Q				
1+15	0.0792	0.85	Q				
1+20	0.0851	0.86	Q				
1+25	0.0910	0.86	Q				
1+30	0.0969	0.86	QV				
1+35	0.1029	0.86	QV				
1+40	0.1089	0.87	QV				
1+45	0.1149	0.87	QV				
1+50	0.1209	0.87	QV				
1+55	0.1269	0.88	QV				
2+ 0	0.1330	0.88	QV				
2+ 5	0.1390	0.88	QV				
2+10	0.1451	0.89	QV				
2+15	0.1513	0.89	QV				
2+20	0.1574	0.89	QV				
2+25	0.1635	0.89	QV				
2+30	0.1697	0.90	QV				
2+35	0.1759	0.90	QV				
2+40	0.1821	0.90	QV				
2+45	0.1884	0.91	Q V				
2+50	0.1947	0.91	Q V				
2+55	0.2009	0.91	Q V				
3+ 0	0.2072	0.92	Q V				
3+ 5	0.2136	0.92	Q V				
3+10	0.2199	0.92	Q V				
3+15	0.2263	0.93	Q V				
3+20	0.2327	0.93	Q V				
3+25	0.2391	0.93	Q V				
3+30	0.2456	0.94	Q V				
3+35	0.2520	0.94	Q V				
3+40	0.2585	0.94	Q V				
3+45	0.2651	0.95	Q V				
3+50	0.2716	0.95	Q V				
3+55	0.2782	0.95	Q V				
4+ 0	0.2848	0.96	Q V				
4+ 5	0.2914	0.96	Q V				
4+10	0.2980	0.96	Q V				
4+15	0.3047	0.97	Q V				
4+20	0.3114	0.97	Q V				
4+25	0.3181	0.98	Q V				
4+30	0.3249	0.98	Q V				
4+35	0.3317	0.98	Q V				

4+40	0.3385	0.99	Q V				
4+45	0.3453	0.99	Q V				
4+50	0.3522	1.00	Q V				
4+55	0.3590	1.00	Q V				
5+ 0	0.3660	1.00	Q V				
5+ 5	0.3729	1.01	Q V				
5+10	0.3799	1.01	Q V				
5+15	0.3869	1.02	Q V				
5+20	0.3939	1.02	Q V				
5+25	0.4010	1.03	Q V				
5+30	0.4081	1.03	Q V				
5+35	0.4152	1.04	Q V				
5+40	0.4224	1.04	Q V				
5+45	0.4296	1.04	Q V				
5+50	0.4368	1.05	Q V				
5+55	0.4441	1.05	Q V				
6+ 0	0.4514	1.06	Q V				
6+ 5	0.4587	1.06	Q V				
6+10	0.4660	1.07	Q V				
6+15	0.4734	1.07	Q V				
6+20	0.4809	1.08	Q V				
6+25	0.4883	1.08	Q V				
6+30	0.4958	1.09	Q V				
6+35	0.5034	1.09	Q V				
6+40	0.5109	1.10	Q V				
6+45	0.5186	1.11	Q V				
6+50	0.5262	1.11	Q V				
6+55	0.5339	1.12	Q V				
7+ 0	0.5416	1.12	Q V				
7+ 5	0.5494	1.13	Q V				
7+10	0.5572	1.13	Q V				
7+15	0.5650	1.14	Q V				
7+20	0.5729	1.15	Q V				
7+25	0.5809	1.15	Q V				
7+30	0.5888	1.16	Q V				
7+35	0.5968	1.16	Q V				
7+40	0.6049	1.17	Q V				
7+45	0.6130	1.18	Q V				
7+50	0.6212	1.18	Q V				
7+55	0.6294	1.19	Q V				
8+ 0	0.6376	1.20	Q V				
8+ 5	0.6459	1.20	Q V				
8+10	0.6542	1.21	Q V				
8+15	0.6626	1.22	Q V				
8+20	0.6711	1.23	Q V				
8+25	0.6795	1.23	Q V				
8+30	0.6881	1.24	Q V				
8+35	0.6967	1.25	Q V				
8+40	0.7053	1.26	Q V				
8+45	0.7140	1.26	Q V				
8+50	0.7228	1.27	Q V				
8+55	0.7316	1.28	Q V				
9+ 0	0.7405	1.29	Q V				
9+ 5	0.7494	1.30	Q V				
9+10	0.7584	1.31	Q V				
9+15	0.7674	1.31	Q V				
9+20	0.7765	1.32	Q V				
9+25	0.7857	1.33	Q V				
9+30	0.7949	1.34	Q V				

9+35	0.8042	1.35	Q V				
9+40	0.8136	1.36	Q V				
9+45	0.8230	1.37	Q V				
9+50	0.8325	1.38	Q V				
9+55	0.8421	1.39	Q V				
10+ 0	0.8518	1.40	Q V				
10+ 5	0.8615	1.41	Q V				
10+10	0.8713	1.42	Q V				
10+15	0.8812	1.43	Q V				
10+20	0.8911	1.45	Q V				
10+25	0.9011	1.46	Q V				
10+30	0.9113	1.47	Q V				
10+35	0.9214	1.48	Q V				
10+40	0.9317	1.49	Q V				
10+45	0.9421	1.51	Q V				
10+50	0.9526	1.52	Q V				
10+55	0.9631	1.53	Q V				
11+ 0	0.9738	1.55	Q V				
11+ 5	0.9845	1.56	Q V				
11+10	0.9954	1.58	Q V				
11+15	1.0063	1.59	Q V				
11+20	1.0174	1.61	Q V				
11+25	1.0285	1.62	Q V				
11+30	1.0398	1.64	Q V				
11+35	1.0512	1.65	Q V				
11+40	1.0627	1.67	Q V				
11+45	1.0743	1.69	Q V				
11+50	1.0861	1.71	Q V				
11+55	1.0980	1.72	Q V				
12+ 0	1.1100	1.74	Q V				
12+ 5	1.1221	1.76	Q V				
12+10	1.1342	1.76	Q V				
12+15	1.1464	1.77	Q V				
12+20	1.1588	1.79	Q V				
12+25	1.1713	1.81	Q V				
12+30	1.1840	1.84	Q V				
12+35	1.1968	1.86	Q V				
12+40	1.2098	1.89	Q V				
12+45	1.2230	1.91	Q V				
12+50	1.2363	1.94	Q V				
12+55	1.2499	1.97	Q V				
13+ 0	1.2637	2.00	Q V				
13+ 5	1.2776	2.03	Q V				
13+10	1.2918	2.06	Q V				
13+15	1.3062	2.09	Q V				
13+20	1.3209	2.13	Q V				
13+25	1.3358	2.16	Q V				
13+30	1.3510	2.20	Q V				
13+35	1.3664	2.24	Q V				
13+40	1.3822	2.29	Q V				
13+45	1.3982	2.33	Q V				
13+50	1.4146	2.38	Q V				
13+55	1.4313	2.42	Q V				
14+ 0	1.4484	2.48	Q V				
14+ 5	1.4658	2.53	Q V				
14+10	1.4837	2.60	Q V				
14+15	1.5020	2.66	Q V				
14+20	1.5208	2.73	Q V				
14+25	1.5400	2.80	Q V				

14+30	1.5599	2.88	Q V				
14+35	1.5802	2.96	Q V				
14+40	1.6013	3.06	Q V				
14+45	1.6230	3.15	Q V				
14+50	1.6455	3.27	Q V				
14+55	1.6688	3.38	Q V				
15+ 0	1.6931	3.53	Q V				
15+ 5	1.7184	3.67	Q V				
15+10	1.7449	3.85	Q V				
15+15	1.7727	4.03	Q V				
15+20	1.8021	4.27	Q V				
15+25	1.8329	4.47	Q V				
15+30	1.8647	4.62	Q V				
15+35	1.8982	4.87	Q V				
15+40	1.9351	5.36	Q V				
15+45	1.9760	5.94	Q V				
15+50	2.0234	6.88	Q V				
15+55	2.0800	8.22	Q V				
16+ 0	2.1566	11.11	Q V				
16+ 5	2.2878	19.05	Q V				
16+10	2.5282	34.92	Q V				
16+15	2.6783	21.78	Q V				
16+20	2.7423	9.30	Q V				
16+25	2.7848	6.17	Q V				
16+30	2.8188	4.93	Q V				
16+35	2.8489	4.37	Q V				
16+40	2.8759	3.93	Q V				
16+45	2.9007	3.59	Q V				
16+50	2.9235	3.32	Q V				
16+55	2.9448	3.10	Q V				
17+ 0	2.9649	2.91	Q V				
17+ 5	2.9839	2.76	Q V				
17+10	3.0019	2.62	Q V				
17+15	3.0191	2.50	Q V				
17+20	3.0356	2.40	Q V				
17+25	3.0515	2.30	Q V				
17+30	3.0667	2.22	Q V				
17+35	3.0815	2.14	Q V				
17+40	3.0958	2.07	Q V				
17+45	3.1096	2.01	Q V				
17+50	3.1230	1.95	Q V				
17+55	3.1361	1.90	Q V				
18+ 0	3.1488	1.85	Q V				
18+ 5	3.1613	1.81	Q V				
18+10	3.1735	1.78	Q V				
18+15	3.1856	1.75	Q V				
18+20	3.1974	1.71	Q V				
18+25	3.2089	1.68	Q V				
18+30	3.2203	1.64	Q V				
18+35	3.2313	1.61	Q V				
18+40	3.2422	1.58	Q V				
18+45	3.2529	1.55	Q V				
18+50	3.2634	1.52	Q V				
18+55	3.2737	1.50	Q V				
19+ 0	3.2839	1.47	Q V				
19+ 5	3.2939	1.45	Q V				
19+10	3.3037	1.43	Q V				
19+15	3.3134	1.40	Q V				
19+20	3.3229	1.38	Q V				

19+25	3.3323	1.36	Q			V	
19+30	3.3415	1.34	Q			V	
19+35	3.3507	1.33	Q			V	
19+40	3.3597	1.31	Q			V	
19+45	3.3686	1.29	Q			V	
19+50	3.3773	1.27	Q			V	
19+55	3.3860	1.26	Q			V	
20+ 0	3.3946	1.24	Q			V	
20+ 5	3.4030	1.23	Q			V	
20+10	3.4114	1.21	Q			V	
20+15	3.4196	1.20	Q			V	
20+20	3.4278	1.19	Q			V	
20+25	3.4359	1.17	Q			V	
20+30	3.4439	1.16	Q			V	
20+35	3.4518	1.15	Q			V	
20+40	3.4596	1.14	Q			V	
20+45	3.4673	1.12	Q			V	
20+50	3.4750	1.11	Q			V	
20+55	3.4826	1.10	Q			V	
21+ 0	3.4901	1.09	Q			V	
21+ 5	3.4975	1.08	Q			V	
21+10	3.5049	1.07	Q			V	
21+15	3.5122	1.06	Q			V	
21+20	3.5194	1.05	Q			V	
21+25	3.5266	1.04	Q			V	
21+30	3.5337	1.03	Q			V	
21+35	3.5408	1.02	Q			V	
21+40	3.5478	1.01	Q			V	
21+45	3.5547	1.01	Q			V	
21+50	3.5616	1.00	Q			V	
21+55	3.5684	0.99	Q			V	
22+ 0	3.5751	0.98	Q			V	
22+ 5	3.5818	0.97	Q			V	
22+10	3.5885	0.97	Q			V	
22+15	3.5951	0.96	Q			V	
22+20	3.6017	0.95	Q			V	
22+25	3.6082	0.94	Q			V	
22+30	3.6146	0.94	Q			V	
22+35	3.6210	0.93	Q			V	
22+40	3.6274	0.92	Q			V	
22+45	3.6337	0.92	Q			V	
22+50	3.6400	0.91	Q			V	
22+55	3.6462	0.90	Q			V	
23+ 0	3.6524	0.90	Q			V	
23+ 5	3.6585	0.89	Q			V	
23+10	3.6646	0.89	Q			V	
23+15	3.6707	0.88	Q			V	
23+20	3.6767	0.87	Q			V	
23+25	3.6827	0.87	Q			V	
23+30	3.6886	0.86	Q			V	
23+35	3.6946	0.86	Q			V	
23+40	3.7004	0.85	Q			V	
23+45	3.7063	0.85	Q			V	
23+50	3.7121	0.84	Q			V	
23+55	3.7178	0.84	Q			V	
24+ 0	3.7236	0.83	Q			V	
24+ 5	3.7286	0.73	Q			V	
24+10	3.7305	0.28	Q			V	
24+15	3.7308	0.04	Q			V	

24+20	3.7308	0.01	Q				V

APPENDIX B.7: UNIT HYDROGRAPH, AREA "7"

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/20/19

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

Program License Serial Number 6279

BNSF
POST PROJECT HYDROLOGY
AREA 7

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
1.64	1	1.58
Rainfall data for year 100		
1.64	6	3.42
Rainfall data for year 100		
1.64	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
86.0	97.2	1.64	1.000	0.055	0.960	0.053

Area-averaged adjusted loss rate Fm (In/Hr) = 0.053

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
1.57	0.960	86.0	97.2	0.29	0.947
0.07	0.040	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.948
Area-averaged low loss fraction, Yb = 0.052
++
Watercourse length = 598.00(Ft.)
Length from concentration point to centroid = 231.00(Ft.)
Elevation difference along watercourse = 10.00(Ft.)
Mannings friction factor along watercourse = 0.020
Watershed area = 1.64(Ac.)
Catchment Lag time = 0.027 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 305.6240
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.053(In/Hr)
Average low loss rate fraction (Yb) = 0.052 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 1.64(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.585(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.580(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 19.83 (CFS))		
1	65.446	12.980
2	100.000	6.853

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5847	0.5847
2	0.7715	0.1868
3	0.9074	0.1359
4	1.0181	0.1107
5	1.1131	0.0950

6	1.1973	0.0842
7	1.2735	0.0762
8	1.3433	0.0699
9	1.4081	0.0648
10	1.4688	0.0606
11	1.5258	0.0571
12	1.5799	0.0540
13	1.6353	0.0555
14	1.6884	0.0531
15	1.7394	0.0510
16	1.7885	0.0491
17	1.8358	0.0474
18	1.8816	0.0458
19	1.9260	0.0444
20	1.9690	0.0431
21	2.0109	0.0418
22	2.0516	0.0407
23	2.0913	0.0397
24	2.1300	0.0387
25	2.1678	0.0378
26	2.2048	0.0370
27	2.2409	0.0362
28	2.2763	0.0354
29	2.3110	0.0347
30	2.3451	0.0340
31	2.3784	0.0334
32	2.4112	0.0328
33	2.4434	0.0322
34	2.4750	0.0316
35	2.5062	0.0311
36	2.5368	0.0306
37	2.5669	0.0301
38	2.5966	0.0297
39	2.6258	0.0292
40	2.6546	0.0288
41	2.6830	0.0284
42	2.7110	0.0280
43	2.7387	0.0276
44	2.7659	0.0273
45	2.7929	0.0269
46	2.8195	0.0266
47	2.8457	0.0263
48	2.8716	0.0259
49	2.8973	0.0256
50	2.9226	0.0253
51	2.9477	0.0251
52	2.9724	0.0248
53	2.9969	0.0245
54	3.0212	0.0242
55	3.0452	0.0240
56	3.0689	0.0237
57	3.0924	0.0235
58	3.1157	0.0233
59	3.1387	0.0230
60	3.1615	0.0228
61	3.1841	0.0226
62	3.2065	0.0224
63	3.2287	0.0222
64	3.2507	0.0220

65	3.2725	0.0218
66	3.2941	0.0216
67	3.3155	0.0214
68	3.3368	0.0212
69	3.3578	0.0211
70	3.3787	0.0209
71	3.3994	0.0207
72	3.4200	0.0206
73	3.4408	0.0208
74	3.4614	0.0206
75	3.4819	0.0205
76	3.5022	0.0203
77	3.5224	0.0202
78	3.5424	0.0200
79	3.5623	0.0199
80	3.5821	0.0197
81	3.6017	0.0196
82	3.6212	0.0195
83	3.6405	0.0193
84	3.6597	0.0192
85	3.6788	0.0191
86	3.6978	0.0190
87	3.7166	0.0188
88	3.7353	0.0187
89	3.7539	0.0186
90	3.7724	0.0185
91	3.7908	0.0184
92	3.8090	0.0183
93	3.8272	0.0181
94	3.8452	0.0180
95	3.8631	0.0179
96	3.8810	0.0178
97	3.8987	0.0177
98	3.9163	0.0176
99	3.9338	0.0175
100	3.9512	0.0174
101	3.9685	0.0173
102	3.9858	0.0172
103	4.0029	0.0171
104	4.0199	0.0170
105	4.0369	0.0169
106	4.0537	0.0169
107	4.0705	0.0168
108	4.0872	0.0167
109	4.1038	0.0166
110	4.1203	0.0165
111	4.1367	0.0164
112	4.1530	0.0163
113	4.1693	0.0163
114	4.1855	0.0162
115	4.2016	0.0161
116	4.2176	0.0160
117	4.2335	0.0159
118	4.2494	0.0159
119	4.2652	0.0158
120	4.2809	0.0157
121	4.2965	0.0156
122	4.3121	0.0156
123	4.3276	0.0155

124	4.3430	0.0154
125	4.3584	0.0154
126	4.3737	0.0153
127	4.3889	0.0152
128	4.4041	0.0152
129	4.4192	0.0151
130	4.4342	0.0150
131	4.4491	0.0150
132	4.4640	0.0149
133	4.4789	0.0148
134	4.4936	0.0148
135	4.5083	0.0147
136	4.5230	0.0146
137	4.5376	0.0146
138	4.5521	0.0145
139	4.5666	0.0145
140	4.5810	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6239	0.0142
144	4.6381	0.0142
145	4.6522	0.0141
146	4.6663	0.0141
147	4.6803	0.0140
148	4.6943	0.0140
149	4.7082	0.0139
150	4.7220	0.0139
151	4.7358	0.0138
152	4.7496	0.0138
153	4.7633	0.0137
154	4.7770	0.0137
155	4.7906	0.0136
156	4.8041	0.0136
157	4.8177	0.0135
158	4.8311	0.0135
159	4.8445	0.0134
160	4.8579	0.0134
161	4.8712	0.0133
162	4.8845	0.0133
163	4.8977	0.0132
164	4.9109	0.0132
165	4.9241	0.0131
166	4.9371	0.0131
167	4.9502	0.0131
168	4.9632	0.0130
169	4.9762	0.0130
170	4.9891	0.0129
171	5.0020	0.0129
172	5.0148	0.0128
173	5.0276	0.0128
174	5.0404	0.0128
175	5.0531	0.0127
176	5.0657	0.0127
177	5.0784	0.0126
178	5.0910	0.0126
179	5.1035	0.0126
180	5.1160	0.0125
181	5.1285	0.0125
182	5.1409	0.0124

183	5.1533	0.0124
184	5.1657	0.0124
185	5.1780	0.0123
186	5.1903	0.0123
187	5.2025	0.0122
188	5.2147	0.0122
189	5.2269	0.0122
190	5.2391	0.0121
191	5.2512	0.0121
192	5.2632	0.0121
193	5.2753	0.0120
194	5.2872	0.0120
195	5.2992	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3349	0.0119
199	5.3467	0.0118
200	5.3585	0.0118
201	5.3703	0.0118
202	5.3820	0.0117
203	5.3937	0.0117
204	5.4054	0.0117
205	5.4170	0.0116
206	5.4286	0.0116
207	5.4401	0.0116
208	5.4517	0.0115
209	5.4632	0.0115
210	5.4747	0.0115
211	5.4861	0.0114
212	5.4975	0.0114
213	5.5089	0.0114
214	5.5203	0.0114
215	5.5316	0.0113
216	5.5429	0.0113
217	5.5541	0.0113
218	5.5654	0.0112
219	5.5766	0.0112
220	5.5878	0.0112
221	5.5989	0.0111
222	5.6100	0.0111
223	5.6211	0.0111
224	5.6322	0.0111
225	5.6432	0.0110
226	5.6542	0.0110
227	5.6652	0.0110
228	5.6762	0.0110
229	5.6871	0.0109
230	5.6980	0.0109
231	5.7089	0.0109
232	5.7197	0.0108
233	5.7306	0.0108
234	5.7414	0.0108
235	5.7521	0.0108
236	5.7629	0.0107
237	5.7736	0.0107
238	5.7843	0.0107
239	5.7950	0.0107
240	5.8056	0.0106
241	5.8162	0.0106

242	5.8268	0.0106
243	5.8374	0.0106
244	5.8479	0.0105
245	5.8585	0.0105
246	5.8689	0.0105
247	5.8794	0.0105
248	5.8899	0.0105
249	5.9003	0.0104
250	5.9107	0.0104
251	5.9211	0.0104
252	5.9314	0.0104
253	5.9418	0.0103
254	5.9521	0.0103
255	5.9624	0.0103
256	5.9726	0.0103
257	5.9829	0.0102
258	5.9931	0.0102
259	6.0033	0.0102
260	6.0135	0.0102
261	6.0236	0.0102
262	6.0338	0.0101
263	6.0439	0.0101
264	6.0540	0.0101
265	6.0640	0.0101
266	6.0741	0.0100
267	6.0841	0.0100
268	6.0941	0.0100
269	6.1041	0.0100
270	6.1141	0.0100
271	6.1240	0.0099
272	6.1339	0.0099
273	6.1438	0.0099
274	6.1537	0.0099
275	6.1636	0.0099
276	6.1734	0.0098
277	6.1832	0.0098
278	6.1930	0.0098
279	6.2028	0.0098
280	6.2126	0.0098
281	6.2223	0.0097
282	6.2320	0.0097
283	6.2418	0.0097
284	6.2514	0.0097
285	6.2611	0.0097
286	6.2708	0.0096
287	6.2804	0.0096
288	6.2900	0.0096

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0005	0.0091
2	0.0096	0.0005	0.0091
3	0.0097	0.0005	0.0092
4	0.0097	0.0005	0.0092
5	0.0097	0.0005	0.0092
6	0.0097	0.0005	0.0092
7	0.0098	0.0005	0.0093

8	0.0098	0.0005	0.0093
9	0.0098	0.0005	0.0093
10	0.0099	0.0005	0.0093
11	0.0099	0.0005	0.0094
12	0.0099	0.0005	0.0094
13	0.0100	0.0005	0.0094
14	0.0100	0.0005	0.0095
15	0.0100	0.0005	0.0095
16	0.0100	0.0005	0.0095
17	0.0101	0.0005	0.0096
18	0.0101	0.0005	0.0096
19	0.0102	0.0005	0.0096
20	0.0102	0.0005	0.0096
21	0.0102	0.0005	0.0097
22	0.0102	0.0005	0.0097
23	0.0103	0.0005	0.0098
24	0.0103	0.0005	0.0098
25	0.0104	0.0005	0.0098
26	0.0104	0.0005	0.0098
27	0.0104	0.0005	0.0099
28	0.0105	0.0005	0.0099
29	0.0105	0.0005	0.0099
30	0.0105	0.0006	0.0100
31	0.0106	0.0006	0.0100
32	0.0106	0.0006	0.0100
33	0.0106	0.0006	0.0101
34	0.0107	0.0006	0.0101
35	0.0107	0.0006	0.0102
36	0.0107	0.0006	0.0102
37	0.0108	0.0006	0.0102
38	0.0108	0.0006	0.0103
39	0.0109	0.0006	0.0103
40	0.0109	0.0006	0.0103
41	0.0110	0.0006	0.0104
42	0.0110	0.0006	0.0104
43	0.0110	0.0006	0.0105
44	0.0111	0.0006	0.0105
45	0.0111	0.0006	0.0105
46	0.0111	0.0006	0.0106
47	0.0112	0.0006	0.0106
48	0.0112	0.0006	0.0106
49	0.0113	0.0006	0.0107
50	0.0113	0.0006	0.0107
51	0.0114	0.0006	0.0108
52	0.0114	0.0006	0.0108
53	0.0115	0.0006	0.0109
54	0.0115	0.0006	0.0109
55	0.0116	0.0006	0.0110
56	0.0116	0.0006	0.0110
57	0.0117	0.0006	0.0111
58	0.0117	0.0006	0.0111
59	0.0118	0.0006	0.0111
60	0.0118	0.0006	0.0112
61	0.0119	0.0006	0.0112
62	0.0119	0.0006	0.0113
63	0.0120	0.0006	0.0113
64	0.0120	0.0006	0.0114
65	0.0121	0.0006	0.0114
66	0.0121	0.0006	0.0115

67	0.0122	0.0006	0.0115
68	0.0122	0.0006	0.0116
69	0.0123	0.0006	0.0116
70	0.0123	0.0006	0.0117
71	0.0124	0.0006	0.0117
72	0.0124	0.0007	0.0118
73	0.0125	0.0007	0.0119
74	0.0126	0.0007	0.0119
75	0.0126	0.0007	0.0120
76	0.0127	0.0007	0.0120
77	0.0128	0.0007	0.0121
78	0.0128	0.0007	0.0121
79	0.0129	0.0007	0.0122
80	0.0129	0.0007	0.0122
81	0.0130	0.0007	0.0123
82	0.0131	0.0007	0.0124
83	0.0131	0.0007	0.0125
84	0.0132	0.0007	0.0125
85	0.0133	0.0007	0.0126
86	0.0133	0.0007	0.0126
87	0.0134	0.0007	0.0127
88	0.0135	0.0007	0.0128
89	0.0136	0.0007	0.0129
90	0.0136	0.0007	0.0129
91	0.0137	0.0007	0.0130
92	0.0138	0.0007	0.0130
93	0.0139	0.0007	0.0131
94	0.0139	0.0007	0.0132
95	0.0140	0.0007	0.0133
96	0.0141	0.0007	0.0133
97	0.0142	0.0007	0.0134
98	0.0142	0.0007	0.0135
99	0.0144	0.0008	0.0136
100	0.0144	0.0008	0.0137
101	0.0145	0.0008	0.0138
102	0.0146	0.0008	0.0138
103	0.0147	0.0008	0.0139
104	0.0148	0.0008	0.0140
105	0.0149	0.0008	0.0141
106	0.0150	0.0008	0.0142
107	0.0151	0.0008	0.0143
108	0.0152	0.0008	0.0144
109	0.0153	0.0008	0.0145
110	0.0154	0.0008	0.0146
111	0.0155	0.0008	0.0147
112	0.0156	0.0008	0.0148
113	0.0157	0.0008	0.0149
114	0.0158	0.0008	0.0150
115	0.0159	0.0008	0.0151
116	0.0160	0.0008	0.0152
117	0.0162	0.0008	0.0153
118	0.0163	0.0009	0.0154
119	0.0164	0.0009	0.0156
120	0.0165	0.0009	0.0156
121	0.0167	0.0009	0.0158
122	0.0168	0.0009	0.0159
123	0.0169	0.0009	0.0161
124	0.0170	0.0009	0.0161
125	0.0172	0.0009	0.0163

126	0.0173	0.0009	0.0164
127	0.0175	0.0009	0.0166
128	0.0176	0.0009	0.0167
129	0.0178	0.0009	0.0169
130	0.0179	0.0009	0.0170
131	0.0181	0.0009	0.0172
132	0.0183	0.0010	0.0173
133	0.0185	0.0010	0.0175
134	0.0186	0.0010	0.0176
135	0.0188	0.0010	0.0179
136	0.0190	0.0010	0.0180
137	0.0192	0.0010	0.0182
138	0.0193	0.0010	0.0183
139	0.0196	0.0010	0.0186
140	0.0197	0.0010	0.0187
141	0.0200	0.0010	0.0190
142	0.0202	0.0011	0.0191
143	0.0205	0.0011	0.0194
144	0.0206	0.0011	0.0196
145	0.0206	0.0011	0.0195
146	0.0207	0.0011	0.0196
147	0.0211	0.0011	0.0200
148	0.0212	0.0011	0.0201
149	0.0216	0.0011	0.0205
150	0.0218	0.0011	0.0207
151	0.0222	0.0012	0.0210
152	0.0224	0.0012	0.0212
153	0.0228	0.0012	0.0216
154	0.0230	0.0012	0.0218
155	0.0235	0.0012	0.0223
156	0.0237	0.0012	0.0225
157	0.0242	0.0013	0.0230
158	0.0245	0.0013	0.0232
159	0.0251	0.0013	0.0237
160	0.0253	0.0013	0.0240
161	0.0259	0.0014	0.0246
162	0.0263	0.0014	0.0249
163	0.0269	0.0014	0.0255
164	0.0273	0.0014	0.0258
165	0.0280	0.0015	0.0265
166	0.0284	0.0015	0.0269
167	0.0292	0.0015	0.0277
168	0.0297	0.0016	0.0281
169	0.0306	0.0016	0.0290
170	0.0311	0.0016	0.0295
171	0.0322	0.0017	0.0305
172	0.0328	0.0017	0.0311
173	0.0340	0.0018	0.0322
174	0.0347	0.0018	0.0329
175	0.0362	0.0019	0.0343
176	0.0370	0.0019	0.0350
177	0.0387	0.0020	0.0367
178	0.0397	0.0021	0.0376
179	0.0418	0.0022	0.0397
180	0.0431	0.0023	0.0408
181	0.0458	0.0024	0.0434
182	0.0474	0.0025	0.0449
183	0.0510	0.0027	0.0483
184	0.0531	0.0028	0.0503

185	0.0540	0.0028	0.0512
186	0.0571	0.0030	0.0541
187	0.0648	0.0034	0.0614
188	0.0699	0.0037	0.0662
189	0.0842	0.0044	0.0798
190	0.0950	0.0044	0.0906
191	0.1359	0.0044	0.1314
192	0.1868	0.0044	0.1824
193	0.5847	0.0044	0.5803
194	0.1107	0.0044	0.1062
195	0.0762	0.0040	0.0722
196	0.0606	0.0032	0.0574
197	0.0555	0.0029	0.0526
198	0.0491	0.0026	0.0465
199	0.0444	0.0023	0.0420
200	0.0407	0.0021	0.0386
201	0.0378	0.0020	0.0358
202	0.0354	0.0019	0.0336
203	0.0334	0.0017	0.0316
204	0.0316	0.0017	0.0300
205	0.0301	0.0016	0.0286
206	0.0288	0.0015	0.0273
207	0.0276	0.0014	0.0262
208	0.0266	0.0014	0.0252
209	0.0256	0.0013	0.0243
210	0.0248	0.0013	0.0235
211	0.0240	0.0013	0.0227
212	0.0233	0.0012	0.0220
213	0.0226	0.0012	0.0214
214	0.0220	0.0012	0.0208
215	0.0214	0.0011	0.0203
216	0.0209	0.0011	0.0198
217	0.0208	0.0011	0.0197
218	0.0203	0.0011	0.0193
219	0.0199	0.0010	0.0188
220	0.0195	0.0010	0.0185
221	0.0191	0.0010	0.0181
222	0.0187	0.0010	0.0177
223	0.0184	0.0010	0.0174
224	0.0180	0.0009	0.0171
225	0.0177	0.0009	0.0168
226	0.0174	0.0009	0.0165
227	0.0171	0.0009	0.0162
228	0.0169	0.0009	0.0160
229	0.0166	0.0009	0.0157
230	0.0163	0.0009	0.0155
231	0.0161	0.0008	0.0153
232	0.0159	0.0008	0.0150
233	0.0156	0.0008	0.0148
234	0.0154	0.0008	0.0146
235	0.0152	0.0008	0.0144
236	0.0150	0.0008	0.0142
237	0.0148	0.0008	0.0141
238	0.0146	0.0008	0.0139
239	0.0145	0.0008	0.0137
240	0.0143	0.0007	0.0135
241	0.0141	0.0007	0.0134
242	0.0140	0.0007	0.0132
243	0.0138	0.0007	0.0131

244	0.0137	0.0007	0.0129
245	0.0135	0.0007	0.0128
246	0.0134	0.0007	0.0127
247	0.0132	0.0007	0.0125
248	0.0131	0.0007	0.0124
249	0.0130	0.0007	0.0123
250	0.0128	0.0007	0.0122
251	0.0127	0.0007	0.0120
252	0.0126	0.0007	0.0119
253	0.0125	0.0007	0.0118
254	0.0124	0.0006	0.0117
255	0.0122	0.0006	0.0116
256	0.0121	0.0006	0.0115
257	0.0120	0.0006	0.0114
258	0.0119	0.0006	0.0113
259	0.0118	0.0006	0.0112
260	0.0117	0.0006	0.0111
261	0.0116	0.0006	0.0110
262	0.0115	0.0006	0.0109
263	0.0114	0.0006	0.0108
264	0.0114	0.0006	0.0108
265	0.0113	0.0006	0.0107
266	0.0112	0.0006	0.0106
267	0.0111	0.0006	0.0105
268	0.0110	0.0006	0.0104
269	0.0109	0.0006	0.0104
270	0.0108	0.0006	0.0103
271	0.0108	0.0006	0.0102
272	0.0107	0.0006	0.0101
273	0.0106	0.0006	0.0101
274	0.0105	0.0006	0.0100
275	0.0105	0.0005	0.0099
276	0.0104	0.0005	0.0099
277	0.0103	0.0005	0.0098
278	0.0103	0.0005	0.0097
279	0.0102	0.0005	0.0097
280	0.0101	0.0005	0.0096
281	0.0101	0.0005	0.0095
282	0.0100	0.0005	0.0095
283	0.0099	0.0005	0.0094
284	0.0099	0.0005	0.0094
285	0.0098	0.0005	0.0093
286	0.0098	0.0005	0.0093
287	0.0097	0.0005	0.0092
288	0.0096	0.0005	0.0091

Total soil rain loss = 0.29(In)
Total effective rainfall = 6.00(In)
Peak flow rate in flood hydrograph = 8.78(CFS)

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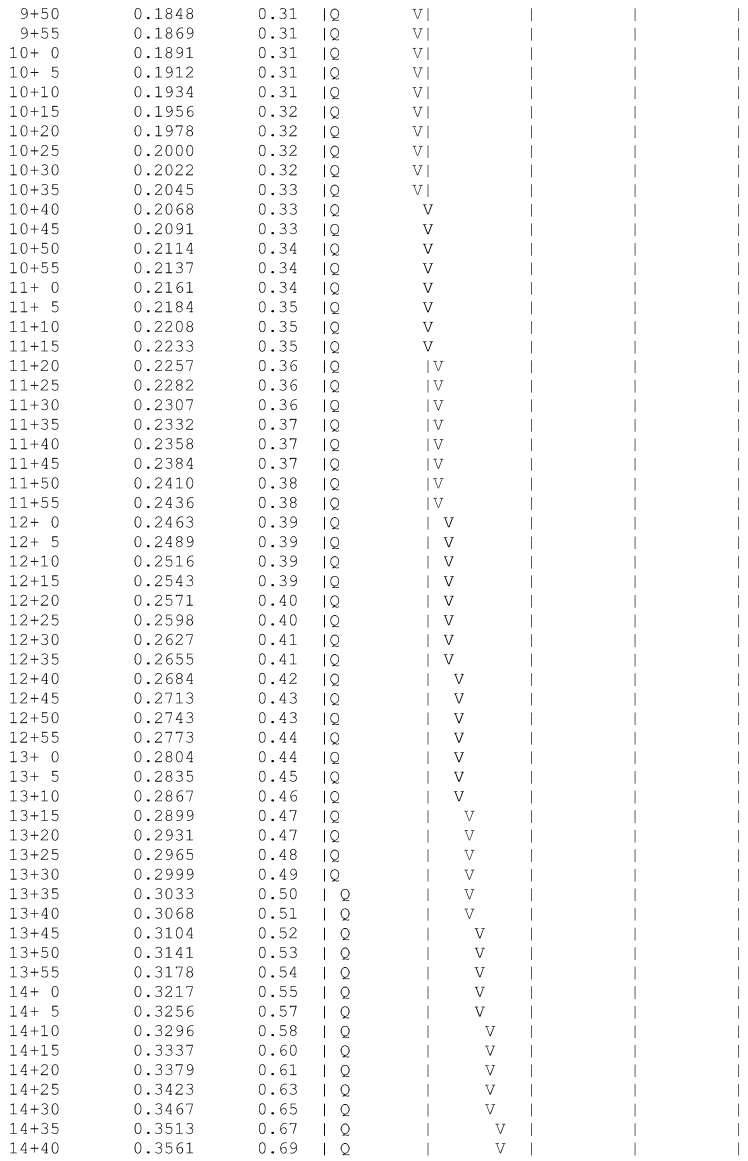
24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

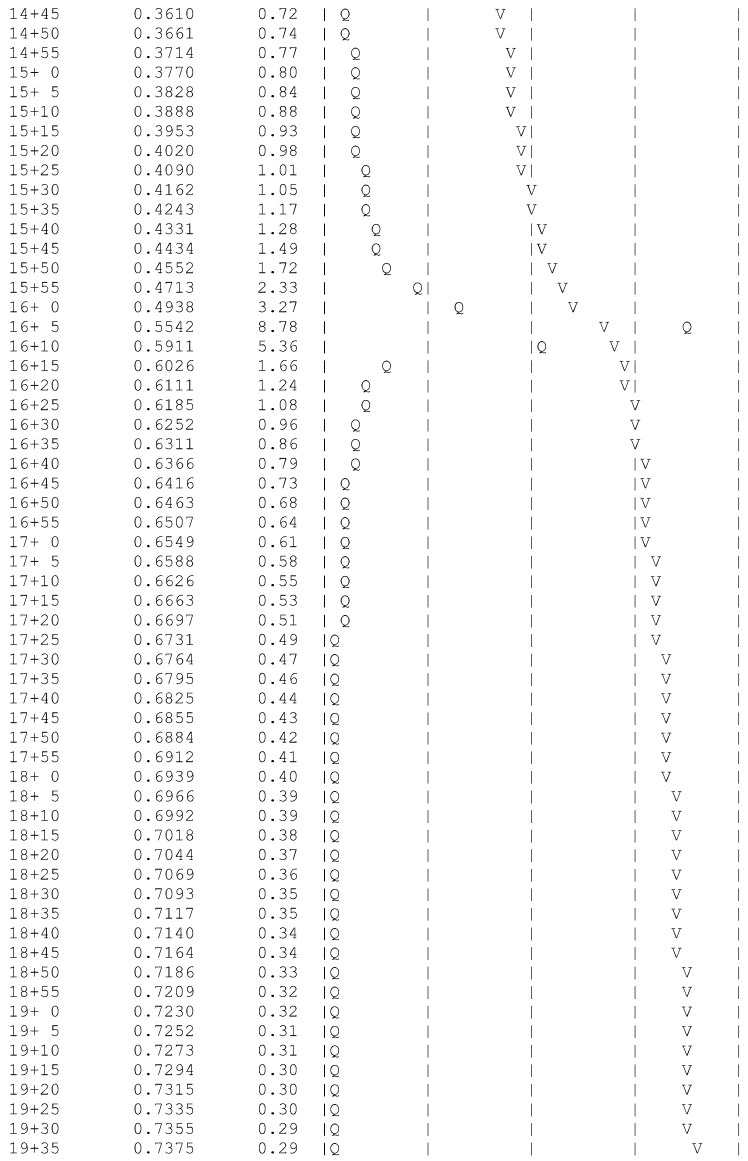
Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0

0+ 5	0.0008	0.12	Q				
0+10	0.0021	0.18	Q				
0+15	0.0033	0.18	Q				
0+20	0.0046	0.18	Q				
0+25	0.0058	0.18	Q				
0+30	0.0071	0.18	Q				
0+35	0.0083	0.18	Q				
0+40	0.0096	0.18	Q				
0+45	0.0109	0.18	Q				
0+50	0.0122	0.19	Q				
0+55	0.0134	0.19	Q				
1+ 0	0.0147	0.19	Q				
1+ 5	0.0160	0.19	Q				
1+10	0.0173	0.19	Q				
1+15	0.0186	0.19	Q				
1+20	0.0199	0.19	Q				
1+25	0.0212	0.19	QV				
1+30	0.0225	0.19	QV				
1+35	0.0238	0.19	QV				
1+40	0.0251	0.19	QV				
1+45	0.0265	0.19	QV				
1+50	0.0278	0.19	QV				
1+55	0.0291	0.19	QV				
2+ 0	0.0304	0.19	QV				
2+ 5	0.0318	0.19	QV				
2+10	0.0331	0.19	QV				
2+15	0.0345	0.20	QV				
2+20	0.0358	0.20	QV				
2+25	0.0372	0.20	QV				
2+30	0.0385	0.20	QV				
2+35	0.0399	0.20	QV				
2+40	0.0413	0.20	Q V				
2+45	0.0427	0.20	Q V				
2+50	0.0440	0.20	Q V				
2+55	0.0454	0.20	Q V				
3+ 0	0.0468	0.20	Q V				
3+ 5	0.0482	0.20	Q V				
3+10	0.0496	0.20	Q V				
3+15	0.0510	0.20	Q V				
3+20	0.0524	0.20	Q V				
3+25	0.0538	0.21	Q V				
3+30	0.0553	0.21	Q V				
3+35	0.0567	0.21	Q V				
3+40	0.0581	0.21	Q V				
3+45	0.0596	0.21	Q V				
3+50	0.0610	0.21	Q V				
3+55	0.0624	0.21	Q V				
4+ 0	0.0639	0.21	Q V				
4+ 5	0.0654	0.21	Q V				
4+10	0.0668	0.21	Q V				
4+15	0.0683	0.21	Q V				
4+20	0.0698	0.21	Q V				
4+25	0.0713	0.22	Q V				
4+30	0.0727	0.22	Q V				
4+35	0.0742	0.22	Q V				
4+40	0.0757	0.22	Q V				
4+45	0.0772	0.22	Q V				
4+50	0.0788	0.22	Q V				

4+55	0.0803	0.22	Q V				
5+ 0	0.0818	0.22	Q V				
5+ 5	0.0833	0.22	Q V				
5+10	0.0849	0.22	Q V				
5+15	0.0864	0.22	Q V				
5+20	0.0880	0.23	Q V				
5+25	0.0895	0.23	Q V				
5+30	0.0911	0.23	Q V				
5+35	0.0927	0.23	Q V				
5+40	0.0942	0.23	Q V				
5+45	0.0958	0.23	Q V				
5+50	0.0974	0.23	Q V				
5+55	0.0990	0.23	Q V				
6+ 0	0.1006	0.23	Q V				
6+ 5	0.1022	0.23	Q V				
6+10	0.1039	0.24	Q V				
6+15	0.1055	0.24	Q V				
6+20	0.1071	0.24	Q V				
6+25	0.1088	0.24	Q V				
6+30	0.1104	0.24	Q V				
6+35	0.1121	0.24	Q V				
6+40	0.1138	0.24	Q V				
6+45	0.1155	0.24	Q V				
6+50	0.1171	0.25	Q V				
6+55	0.1188	0.25	Q V				
7+ 0	0.1205	0.25	Q V				
7+ 5	0.1223	0.25	Q V				
7+10	0.1240	0.25	Q V				
7+15	0.1257	0.25	Q V				
7+20	0.1275	0.25	Q V				
7+25	0.1292	0.25	Q V				
7+30	0.1310	0.26	Q V				
7+35	0.1327	0.26	Q V				
7+40	0.1345	0.26	Q V				
7+45	0.1363	0.26	Q V				
7+50	0.1381	0.26	Q V				
7+55	0.1399	0.26	Q V				
8+ 0	0.1417	0.26	Q V				
8+ 5	0.1436	0.27	Q V				
8+10	0.1454	0.27	Q V				
8+15	0.1473	0.27	Q V				
8+20	0.1491	0.27	Q V				
8+25	0.1510	0.27	Q V				
8+30	0.1529	0.27	Q V				
8+35	0.1548	0.28	Q V				
8+40	0.1567	0.28	Q V				
8+45	0.1586	0.28	Q V				
8+50	0.1605	0.28	Q V				
8+55	0.1625	0.28	Q V				
9+ 0	0.1645	0.28	Q V				
9+ 5	0.1664	0.29	Q V				
9+10	0.1684	0.29	Q V				
9+15	0.1704	0.29	Q V				
9+20	0.1724	0.29	Q V				
9+25	0.1745	0.29	Q V				
9+30	0.1765	0.30	Q V				
9+35	0.1785	0.30	Q V				
9+40	0.1806	0.30	Q V				
9+45	0.1827	0.30	Q V				



9+50	0.1848	0.31	|Q V| | | |
9+55	0.1869	0.31	|Q V| | | |
10+ 0	0.1891	0.31	|Q V| | | |
10+ 5	0.1912	0.31	|Q V| | | |
10+10	0.1934	0.31	|Q V| | | |
10+15	0.1956	0.32	|Q V| | | |
10+20	0.1978	0.32	|Q V| | | |
10+25	0.2000	0.32	|Q V| | | |
10+30	0.2022	0.32	|Q V| | | |
10+35	0.2045	0.33	|Q V| | | |
10+40	0.2068	0.33	|Q V | | |
10+45	0.2091	0.33	|Q V | | |
10+50	0.2114	0.34	|Q V | | |
10+55	0.2137	0.34	|Q V | | |
11+ 0	0.2161	0.34	|Q V | | |
11+ 5	0.2184	0.35	|Q V | | |
11+10	0.2208	0.35	|Q V | | |
11+15	0.2233	0.35	|Q V | | |
11+20	0.2257	0.36	|Q |V | | |
11+25	0.2282	0.36	|Q |V | | |
11+30	0.2307	0.36	|Q |V | | |
11+35	0.2332	0.37	|Q |V | | |
11+40	0.2358	0.37	|Q |V | | |
11+45	0.2384	0.37	|Q |V | | |
11+50	0.2410	0.38	|Q |V | | |
11+55	0.2436	0.38	|Q |V | | |
12+ 0	0.2463	0.39	|Q | V | | |
12+ 5	0.2489	0.39	|Q | V | | |
12+10	0.2516	0.39	|Q | V | | |
12+15	0.2543	0.39	|Q | V | | |
12+20	0.2571	0.40	|Q | V | | |
12+25	0.2598	0.40	|Q | V | | |
12+30	0.2627	0.41	|Q | V | | |
12+35	0.2655	0.41	|Q | V | | |
12+40	0.2684	0.42	|Q | V | | |
12+45	0.2713	0.43	|Q | V | | |
12+50	0.2743	0.43	|Q | V | | |
12+55	0.2773	0.44	|Q | V | | |
13+ 0	0.2804	0.44	|Q | V | | |
13+ 5	0.2835	0.45	|Q | V | | |
13+10	0.2867	0.46	|Q | V | | |
13+15	0.2899	0.47	|Q | V | | |
13+20	0.2931	0.47	|Q | V | | |
13+25	0.2965	0.48	|Q | V | | |
13+30	0.2999	0.49	|Q | V | | |
13+35	0.3033	0.50	| Q | V | | |
13+40	0.3068	0.51	| Q | V | | |
13+45	0.3104	0.52	| Q | V | | |
13+50	0.3141	0.53	| Q | V | | |
13+55	0.3178	0.54	| Q | V | | |
14+ 0	0.3217	0.55	| Q | V | | |
14+ 5	0.3256	0.57	| Q | V | | |
14+10	0.3296	0.58	| Q | V | | |
14+15	0.3337	0.60	| Q | V | | |
14+20	0.3379	0.61	| Q | V | | |
14+25	0.3423	0.63	| Q | V | | |
14+30	0.3467	0.65	| Q | V | | |
14+35	0.3513	0.67	| Q | V | | |
14+40	0.3561	0.69	| Q | V | | |



14+45	0.3610	0.72	| Q | V | | |
14+50	0.3661	0.74	| Q | V | | |
14+55	0.3714	0.77	| Q | V | | |
15+ 0	0.3770	0.80	| Q | V | | |
15+ 5	0.3828	0.84	| Q | V | | |
15+10	0.3888	0.88	| Q | V | | |
15+15	0.3953	0.93	| Q | V| | |
15+20	0.4020	0.98	| Q | V| | |
15+25	0.4090	1.01	| Q | V| | |
15+30	0.4162	1.05	| Q | V | |
15+35	0.4243	1.17	| Q | V | |
15+40	0.4331	1.28	| Q |V | |
15+45	0.4434	1.49	| Q |V | |
15+50	0.4552	1.72	| Q | V | |
15+55	0.4713	2.33	| Q| V | |
16+ 0	0.4938	3.27	| Q | V | |
16+ 5	0.5542	8.78	| | V | Q |
16+10	0.5911	5.36	| |Q V | |
16+15	0.6026	1.66	| Q | V| |
16+20	0.6111	1.24	| Q | V| |
16+25	0.6185	1.08	| Q | V |
16+30	0.6252	0.96	| Q | V |
16+35	0.6311	0.86	| Q | V |
16+40	0.6366	0.79	| Q | |V |
16+45	0.6416	0.73	| Q | |V |
16+50	0.6463	0.68	| Q | |V |
16+55	0.6507	0.64	| Q | |V |
17+ 0	0.6549	0.61	| Q | |V |
17+ 5	0.6588	0.58	| Q | | V |
17+10	0.6626	0.55	| Q | | V |
17+15	0.6663	0.53	| Q | | V |
17+20	0.6697	0.51	| Q | | V |
17+25	0.6731	0.49	|Q | | V |
17+30	0.6764	0.47	|Q | | | V |
17+35	0.6795	0.46	|Q | | | V |
17+40	0.6825	0.44	|Q | | | V |
17+45	0.6855	0.43	|Q | | | V |
17+50	0.6884	0.42	|Q | | | V |
17+55	0.6912	0.41	|Q | | | V |
18+ 0	0.6939	0.40	|Q | | | V |
18+ 5	0.6966	0.39	|Q | | | V |
18+10	0.6992	0.39	|Q | | | V |
18+15	0.7018	0.38	|Q | | | V |
18+20	0.7044	0.37	|Q | | | V |
18+25	0.7069	0.36	|Q | | | V |
18+30	0.7093	0.35	|Q | | | V |
18+35	0.7117	0.35	|Q | | | V |
18+40	0.7140	0.34	|Q | | | V |
18+45	0.7164	0.34	|Q | | | V |
18+50	0.7186	0.33	|Q | | | V |
18+55	0.7209	0.32	|Q | | | V |
19+ 0	0.7230	0.32	|Q | | | V |
19+ 5	0.7252	0.31	|Q | | | V |
19+10	0.7273	0.31	|Q | | | V |
19+15	0.7294	0.30	|Q | | | V |
19+20	0.7315	0.30	|Q | | | V |
19+25	0.7335	0.30	|Q | | | V |
19+30	0.7355	0.29	|Q | | | V |
19+35	0.7375	0.29	|Q | | | V |

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   19+40       0.7395      0.28  |Q        |         |         |     V   |
   19+45       0.7414      0.28  |Q        |         |         |     V   |
   19+50       0.7433      0.28  |Q        |         |         |     V   |
   19+55       0.7452      0.27  |Q        |         |         |     V   |
   20+ 0       0.7470      0.27  |Q        |         |         |     V   |
   20+ 5       0.7489      0.27  |Q        |         |         |     V   |
   20+10       0.7507      0.26  |Q        |         |         |     V   |
   20+15       0.7525      0.26  |Q        |         |         |     V   |
   20+20       0.7543      0.26  |Q        |         |         |     V   |
   20+25       0.7560      0.25  |Q        |         |         |     V   |
   20+30       0.7578      0.25  |Q        |         |         |      V  |
   20+35       0.7595      0.25  Q         |         |         |      V  |
   20+40       0.7612      0.25  Q         |         |         |      V  |
   20+45       0.7629      0.24  Q         |         |         |      V  |
   20+50       0.7645      0.24  Q         |         |         |      V  |
   20+55       0.7662      0.24  Q         |         |         |      V  |
   21+ 0       0.7678      0.24  Q         |         |         |      V  |
   21+ 5       0.7694      0.24  Q         |         |         |      V  |
   21+10       0.7710      0.23  Q         |         |         |      V  |
   21+15       0.7726      0.23  Q         |         |         |      V  |
   21+20       0.7742      0.23  Q         |         |         |      V  |
   21+25       0.7758      0.23  Q         |         |         |      V  |
   21+30       0.7773      0.22  Q         |         |         |      V  |
   21+35       0.7788      0.22  Q         |         |         |       V |
   21+40       0.7804      0.22  Q         |         |         |       V |
   21+45       0.7819      0.22  Q         |         |         |       V |
   21+50       0.7834      0.22  Q         |         |         |       V |
   21+55       0.7849      0.22  Q         |         |         |       V |
   22+ 0       0.7863      0.21  Q         |         |         |       V |
   22+ 5       0.7878      0.21  Q         |         |         |       V |
   22+10       0.7892      0.21  Q         |         |         |       V |
   22+15       0.7907      0.21  Q         |         |         |       V |
   22+20       0.7921      0.21  Q         |         |         |       V |
   22+25       0.7935      0.21  Q         |         |         |       V |
   22+30       0.7949      0.20  Q         |         |         |       V |
   22+35       0.7963      0.20  Q         |         |         |       V |
   22+40       0.7977      0.20  Q         |         |         |       V |
   22+45       0.7991      0.20  Q         |         |         |        V|
   22+50       0.8005      0.20  Q         |         |         |        V|
   22+55       0.8018      0.20  Q         |         |         |        V|
   23+ 0       0.8032      0.20  Q         |         |         |        V|
   23+ 5       0.8045      0.19  Q         |         |         |        V|
   23+10       0.8059      0.19  Q         |         |         |        V|
   23+15       0.8072      0.19  Q         |         |         |        V|
   23+20       0.8085      0.19  Q         |         |         |        V|
   23+25       0.8098      0.19  Q         |         |         |        V|
   23+30       0.8111      0.19  Q         |         |         |        V|
   23+35       0.8124      0.19  Q         |         |         |        V|
   23+40       0.8137      0.19  Q         |         |         |        V|
   23+45       0.8149      0.18  Q         |         |         |        V|
   23+50       0.8162      0.18  Q         |         |         |        V|
   23+55       0.8175      0.18  Q         |         |         |        V|
   24+ 0       0.8187      0.18  Q         |         |         |        V|
   24+ 5       0.8192      0.06  Q         |         |         |         V
-----------------------------------------------------------------------
```

APPENDIX B.8: UNIT HYDROGRAPH, AREA "8"

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/20/19

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

Program License Serial Number 6279

BNSF
POST PROJECT HYDROLOGY
AREA 8

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
2.80	1	1.58
Rainfall data for year 100		
2.80	6	3.42
Rainfall data for year 100		
2.80	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
80.7	94.4	2.80	1.000	0.109	0.810	0.088

Area-averaged adjusted loss rate Fm (In/Hr) = 0.088

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
2.27	0.810	80.7	94.4	0.59	0.895
0.53	0.190	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.908
Area-averaged low loss fraction, Yb = 0.092
++
Watercourse length = 690.00(Ft.)
Length from concentration point to centroid = 205.00(Ft.)
Elevation difference along watercourse = 5.00(Ft.)
Mannings friction factor along watercourse = 0.020
Watershed area = 2.80(Ac.)
Catchment Lag time = 0.032 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 258.3887
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.088(In/Hr)
Average low loss rate fraction (Yb) = 0.092 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 2.80(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.585(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.580(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 33.86 (CFS))		
1	59.334	20.092
2	100.000	13.770

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5847	0.5847
2	0.7715	0.1868
3	0.9074	0.1358
4	1.0180	0.1107
5	1.1131	0.0950

6	1.1973	0.0842
7	1.2734	0.0761
8	1.3433	0.0699
9	1.4081	0.0648
10	1.4687	0.0606
11	1.5258	0.0571
12	1.5798	0.0540
13	1.6353	0.0555
14	1.6883	0.0531
15	1.7393	0.0510
16	1.7884	0.0491
17	1.8357	0.0474
18	1.8815	0.0458
19	1.9259	0.0444
20	1.9690	0.0431
21	2.0108	0.0419
22	2.0515	0.0407
23	2.0912	0.0397
24	2.1300	0.0387
25	2.1678	0.0378
26	2.2047	0.0370
27	2.2409	0.0362
28	2.2763	0.0354
29	2.3110	0.0347
30	2.3450	0.0340
31	2.3784	0.0334
32	2.4112	0.0328
33	2.4434	0.0322
34	2.4750	0.0316
35	2.5061	0.0311
36	2.5368	0.0306
37	2.5669	0.0301
38	2.5966	0.0297
39	2.6258	0.0292
40	2.6546	0.0288
41	2.6830	0.0284
42	2.7110	0.0280
43	2.7387	0.0276
44	2.7659	0.0273
45	2.7929	0.0269
46	2.8194	0.0266
47	2.8457	0.0263
48	2.8716	0.0259
49	2.8973	0.0256
50	2.9226	0.0253
51	2.9476	0.0251
52	2.9724	0.0248
53	2.9969	0.0245
54	3.0212	0.0242
55	3.0452	0.0240
56	3.0689	0.0237
57	3.0924	0.0235
58	3.1157	0.0233
59	3.1387	0.0230
60	3.1615	0.0228
61	3.1841	0.0226
62	3.2065	0.0224
63	3.2287	0.0222
64	3.2507	0.0220

65	3.2725	0.0218
66	3.2941	0.0216
67	3.3155	0.0214
68	3.3367	0.0212
69	3.3578	0.0211
70	3.3787	0.0209
71	3.3994	0.0207
72	3.4200	0.0206
73	3.4408	0.0208
74	3.4614	0.0206
75	3.4819	0.0205
76	3.5022	0.0203
77	3.5224	0.0202
78	3.5424	0.0200
79	3.5623	0.0199
80	3.5821	0.0197
81	3.6017	0.0196
82	3.6212	0.0195
83	3.6405	0.0193
84	3.6597	0.0192
85	3.6788	0.0191
86	3.6978	0.0190
87	3.7166	0.0188
88	3.7353	0.0187
89	3.7539	0.0186
90	3.7724	0.0185
91	3.7908	0.0184
92	3.8090	0.0183
93	3.8272	0.0181
94	3.8452	0.0180
95	3.8631	0.0179
96	3.8809	0.0178
97	3.8987	0.0177
98	3.9163	0.0176
99	3.9338	0.0175
100	3.9512	0.0174
101	3.9685	0.0173
102	3.9857	0.0172
103	4.0029	0.0171
104	4.0199	0.0170
105	4.0369	0.0169
106	4.0537	0.0169
107	4.0705	0.0168
108	4.0872	0.0167
109	4.1037	0.0166
110	4.1202	0.0165
111	4.1367	0.0164
112	4.1530	0.0163
113	4.1693	0.0163
114	4.1854	0.0162
115	4.2015	0.0161
116	4.2176	0.0160
117	4.2335	0.0159
118	4.2494	0.0159
119	4.2652	0.0158
120	4.2809	0.0157
121	4.2965	0.0156
122	4.3121	0.0156
123	4.3276	0.0155

124	4.3430	0.0154
125	4.3584	0.0154
126	4.3737	0.0153
127	4.3889	0.0152
128	4.4041	0.0152
129	4.4191	0.0151
130	4.4342	0.0150
131	4.4491	0.0150
132	4.4640	0.0149
133	4.4789	0.0148
134	4.4936	0.0148
135	4.5083	0.0147
136	4.5230	0.0146
137	4.5376	0.0146
138	4.5521	0.0145
139	4.5666	0.0145
140	4.5810	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6239	0.0142
144	4.6381	0.0142
145	4.6522	0.0141
146	4.6663	0.0141
147	4.6803	0.0140
148	4.6942	0.0140
149	4.7082	0.0139
150	4.7220	0.0139
151	4.7358	0.0138
152	4.7496	0.0138
153	4.7633	0.0137
154	4.7770	0.0137
155	4.7906	0.0136
156	4.8041	0.0136
157	4.8176	0.0135
158	4.8311	0.0135
159	4.8445	0.0134
160	4.8579	0.0134
161	4.8712	0.0133
162	4.8845	0.0133
163	4.8977	0.0132
164	4.9109	0.0132
165	4.9240	0.0131
166	4.9371	0.0131
167	4.9502	0.0131
168	4.9632	0.0130
169	4.9762	0.0130
170	4.9891	0.0129
171	5.0020	0.0129
172	5.0148	0.0128
173	5.0276	0.0128
174	5.0403	0.0128
175	5.0531	0.0127
176	5.0657	0.0127
177	5.0784	0.0126
178	5.0909	0.0126
179	5.1035	0.0126
180	5.1160	0.0125
181	5.1285	0.0125
182	5.1409	0.0124

183	5.1533	0.0124
184	5.1657	0.0124
185	5.1780	0.0123
186	5.1903	0.0123
187	5.2025	0.0122
188	5.2147	0.0122
189	5.2269	0.0122
190	5.2390	0.0121
191	5.2511	0.0121
192	5.2632	0.0121
193	5.2752	0.0120
194	5.2872	0.0120
195	5.2992	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3349	0.0119
199	5.3467	0.0118
200	5.3585	0.0118
201	5.3703	0.0118
202	5.3820	0.0117
203	5.3937	0.0117
204	5.4053	0.0117
205	5.4170	0.0116
206	5.4286	0.0116
207	5.4401	0.0116
208	5.4517	0.0115
209	5.4632	0.0115
210	5.4747	0.0115
211	5.4861	0.0114
212	5.4975	0.0114
213	5.5089	0.0114
214	5.5202	0.0114
215	5.5316	0.0113
216	5.5429	0.0113
217	5.5541	0.0113
218	5.5654	0.0112
219	5.5766	0.0112
220	5.5877	0.0112
221	5.5989	0.0111
222	5.6100	0.0111
223	5.6211	0.0111
224	5.6322	0.0111
225	5.6432	0.0110
226	5.6542	0.0110
227	5.6652	0.0110
228	5.6762	0.0110
229	5.6871	0.0109
230	5.6980	0.0109
231	5.7089	0.0109
232	5.7197	0.0108
233	5.7305	0.0108
234	5.7413	0.0108
235	5.7521	0.0108
236	5.7629	0.0107
237	5.7736	0.0107
238	5.7843	0.0107
239	5.7949	0.0107
240	5.8056	0.0106
241	5.8162	0.0106

242	5.8268	0.0106
243	5.8374	0.0106
244	5.8479	0.0105
245	5.8584	0.0105
246	5.8689	0.0105
247	5.8794	0.0105
248	5.8899	0.0105
249	5.9003	0.0104
250	5.9107	0.0104
251	5.9211	0.0104
252	5.9314	0.0104
253	5.9418	0.0103
254	5.9521	0.0103
255	5.9624	0.0103
256	5.9726	0.0103
257	5.9829	0.0102
258	5.9931	0.0102
259	6.0033	0.0102
260	6.0135	0.0102
261	6.0236	0.0102
262	6.0338	0.0101
263	6.0439	0.0101
264	6.0540	0.0101
265	6.0640	0.0101
266	6.0741	0.0100
267	6.0841	0.0100
268	6.0941	0.0100
269	6.1041	0.0100
270	6.1141	0.0100
271	6.1240	0.0099
272	6.1339	0.0099
273	6.1438	0.0099
274	6.1537	0.0099
275	6.1636	0.0099
276	6.1734	0.0098
277	6.1832	0.0098
278	6.1930	0.0098
279	6.2028	0.0098
280	6.2126	0.0098
281	6.2223	0.0097
282	6.2320	0.0097
283	6.2417	0.0097
284	6.2514	0.0097
285	6.2611	0.0097
286	6.2707	0.0096
287	6.2804	0.0096
288	6.2900	0.0096

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0009	0.0087
2	0.0096	0.0009	0.0087
3	0.0097	0.0009	0.0088
4	0.0097	0.0009	0.0088
5	0.0097	0.0009	0.0088
6	0.0097	0.0009	0.0088
7	0.0098	0.0009	0.0089
8	0.0098	0.0009	0.0089
9	0.0098	0.0009	0.0089
10	0.0099	0.0009	0.0090
11	0.0099	0.0009	0.0090
12	0.0099	0.0009	0.0090
13	0.0100	0.0009	0.0090
14	0.0100	0.0009	0.0091
15	0.0100	0.0009	0.0091
16	0.0100	0.0009	0.0091
17	0.0101	0.0009	0.0092
18	0.0101	0.0009	0.0092
19	0.0102	0.0009	0.0092
20	0.0102	0.0009	0.0092
21	0.0102	0.0009	0.0093
22	0.0102	0.0009	0.0093
23	0.0103	0.0009	0.0093
24	0.0103	0.0009	0.0094
25	0.0104	0.0010	0.0094
26	0.0104	0.0010	0.0094
27	0.0104	0.0010	0.0095
28	0.0105	0.0010	0.0095
29	0.0105	0.0010	0.0095
30	0.0105	0.0010	0.0096
31	0.0106	0.0010	0.0096
32	0.0106	0.0010	0.0096
33	0.0106	0.0010	0.0097
34	0.0107	0.0010	0.0097
35	0.0107	0.0010	0.0097
36	0.0107	0.0010	0.0098
37	0.0108	0.0010	0.0098
38	0.0108	0.0010	0.0098
39	0.0109	0.0010	0.0099
40	0.0109	0.0010	0.0099
41	0.0110	0.0010	0.0099
42	0.0110	0.0010	0.0100
43	0.0110	0.0010	0.0100
44	0.0111	0.0010	0.0100
45	0.0111	0.0010	0.0101
46	0.0111	0.0010	0.0101
47	0.0112	0.0010	0.0102
48	0.0112	0.0010	0.0102
49	0.0113	0.0010	0.0103
50	0.0113	0.0010	0.0103
51	0.0114	0.0010	0.0103
52	0.0114	0.0010	0.0104
53	0.0115	0.0011	0.0104
54	0.0115	0.0011	0.0104
55	0.0116	0.0011	0.0105
56	0.0116	0.0011	0.0105
57	0.0117	0.0011	0.0106
58	0.0117	0.0011	0.0106
59	0.0118	0.0011	0.0107
60	0.0118	0.0011	0.0107
61	0.0119	0.0011	0.0108
62	0.0119	0.0011	0.0108
63	0.0120	0.0011	0.0109
64	0.0120	0.0011	0.0109
65	0.0121	0.0011	0.0110
66	0.0121	0.0011	0.0110

67	0.0122	0.0011	0.0111
68	0.0122	0.0011	0.0111
69	0.0123	0.0011	0.0112
70	0.0123	0.0011	0.0112
71	0.0124	0.0011	0.0113
72	0.0124	0.0011	0.0113
73	0.0125	0.0011	0.0114
74	0.0126	0.0012	0.0114
75	0.0126	0.0012	0.0115
76	0.0127	0.0012	0.0115
77	0.0128	0.0012	0.0116
78	0.0128	0.0012	0.0116
79	0.0129	0.0012	0.0117
80	0.0129	0.0012	0.0117
81	0.0130	0.0012	0.0118
82	0.0131	0.0012	0.0119
83	0.0131	0.0012	0.0119
84	0.0132	0.0012	0.0120
85	0.0133	0.0012	0.0121
86	0.0133	0.0012	0.0121
87	0.0134	0.0012	0.0122
88	0.0135	0.0012	0.0122
89	0.0136	0.0012	0.0123
90	0.0136	0.0013	0.0124
91	0.0137	0.0013	0.0124
92	0.0138	0.0013	0.0125
93	0.0139	0.0013	0.0126
94	0.0139	0.0013	0.0126
95	0.0140	0.0013	0.0127
96	0.0141	0.0013	0.0128
97	0.0142	0.0013	0.0129
98	0.0142	0.0013	0.0129
99	0.0144	0.0013	0.0130
100	0.0144	0.0013	0.0131
101	0.0145	0.0013	0.0132
102	0.0146	0.0013	0.0132
103	0.0147	0.0014	0.0134
104	0.0148	0.0014	0.0134
105	0.0149	0.0014	0.0135
106	0.0150	0.0014	0.0136
107	0.0151	0.0014	0.0137
108	0.0152	0.0014	0.0138
109	0.0153	0.0014	0.0139
110	0.0154	0.0014	0.0139
111	0.0155	0.0014	0.0141
112	0.0156	0.0014	0.0141
113	0.0157	0.0014	0.0143
114	0.0158	0.0015	0.0143
115	0.0159	0.0015	0.0145
116	0.0160	0.0015	0.0145
117	0.0162	0.0015	0.0147
118	0.0163	0.0015	0.0148
119	0.0164	0.0015	0.0149
120	0.0165	0.0015	0.0150
121	0.0167	0.0015	0.0151
122	0.0168	0.0015	0.0152
123	0.0169	0.0016	0.0154
124	0.0170	0.0016	0.0155
125	0.0172	0.0016	0.0156

126	0.0173	0.0016	0.0157
127	0.0175	0.0016	0.0159
128	0.0176	0.0016	0.0160
129	0.0178	0.0016	0.0162
130	0.0179	0.0016	0.0163
131	0.0181	0.0017	0.0165
132	0.0183	0.0017	0.0166
133	0.0185	0.0017	0.0168
134	0.0186	0.0017	0.0169
135	0.0188	0.0017	0.0171
136	0.0190	0.0017	0.0172
137	0.0192	0.0018	0.0174
138	0.0193	0.0018	0.0176
139	0.0196	0.0018	0.0178
140	0.0197	0.0018	0.0179
141	0.0200	0.0018	0.0182
142	0.0202	0.0019	0.0183
143	0.0205	0.0019	0.0186
144	0.0206	0.0019	0.0187
145	0.0206	0.0019	0.0187
146	0.0207	0.0019	0.0188
147	0.0211	0.0019	0.0191
148	0.0212	0.0020	0.0193
149	0.0216	0.0020	0.0196
150	0.0218	0.0020	0.0198
151	0.0222	0.0020	0.0202
152	0.0224	0.0021	0.0203
153	0.0228	0.0021	0.0207
154	0.0230	0.0021	0.0209
155	0.0235	0.0022	0.0213
156	0.0237	0.0022	0.0216
157	0.0242	0.0022	0.0220
158	0.0245	0.0023	0.0223
159	0.0251	0.0023	0.0227
160	0.0253	0.0023	0.0230
161	0.0259	0.0024	0.0236
162	0.0263	0.0024	0.0238
163	0.0269	0.0025	0.0244
164	0.0273	0.0025	0.0248
165	0.0280	0.0026	0.0254
166	0.0284	0.0026	0.0258
167	0.0292	0.0027	0.0265
168	0.0297	0.0027	0.0269
169	0.0306	0.0028	0.0278
170	0.0311	0.0029	0.0283
171	0.0322	0.0030	0.0292
172	0.0328	0.0030	0.0298
173	0.0340	0.0031	0.0309
174	0.0347	0.0032	0.0315
175	0.0362	0.0033	0.0328
176	0.0370	0.0034	0.0336
177	0.0387	0.0036	0.0352
178	0.0397	0.0036	0.0360
179	0.0419	0.0038	0.0380
180	0.0431	0.0040	0.0391
181	0.0458	0.0042	0.0416
182	0.0474	0.0044	0.0430
183	0.0510	0.0047	0.0463
184	0.0531	0.0049	0.0482

185	0.0540	0.0050	0.0491
186	0.0571	0.0052	0.0518
187	0.0648	0.0060	0.0588
188	0.0699	0.0064	0.0634
189	0.0842	0.0074	0.0768
190	0.0950	0.0074	0.0877
191	0.1358	0.0074	0.1285
192	0.1868	0.0074	0.1794
193	0.5847	0.0074	0.5773
194	0.1107	0.0074	0.1033
195	0.0761	0.0070	0.0692
196	0.0606	0.0056	0.0550
197	0.0555	0.0051	0.0504
198	0.0491	0.0045	0.0446
199	0.0444	0.0041	0.0403
200	0.0407	0.0037	0.0370
201	0.0378	0.0035	0.0343
202	0.0354	0.0033	0.0322
203	0.0334	0.0031	0.0303
204	0.0316	0.0029	0.0287
205	0.0301	0.0028	0.0274
206	0.0288	0.0026	0.0262
207	0.0276	0.0025	0.0251
208	0.0266	0.0024	0.0241
209	0.0256	0.0024	0.0233
210	0.0248	0.0023	0.0225
211	0.0240	0.0022	0.0218
212	0.0233	0.0021	0.0211
213	0.0226	0.0021	0.0205
214	0.0220	0.0020	0.0200
215	0.0214	0.0020	0.0195
216	0.0209	0.0019	0.0190
217	0.0208	0.0019	0.0189
218	0.0203	0.0019	0.0185
219	0.0199	0.0018	0.0181
220	0.0195	0.0018	0.0177
221	0.0191	0.0018	0.0173
222	0.0187	0.0017	0.0170
223	0.0184	0.0017	0.0167
224	0.0180	0.0017	0.0164
225	0.0177	0.0016	0.0161
226	0.0174	0.0016	0.0158
227	0.0171	0.0016	0.0156
228	0.0169	0.0015	0.0153
229	0.0166	0.0015	0.0151
230	0.0163	0.0015	0.0148
231	0.0161	0.0015	0.0146
232	0.0159	0.0015	0.0144
233	0.0156	0.0014	0.0142
234	0.0154	0.0014	0.0140
235	0.0152	0.0014	0.0138
236	0.0150	0.0014	0.0136
237	0.0148	0.0014	0.0135
238	0.0146	0.0013	0.0133
239	0.0145	0.0013	0.0131
240	0.0143	0.0013	0.0130
241	0.0141	0.0013	0.0128
242	0.0140	0.0013	0.0127
243	0.0138	0.0013	0.0125

244	0.0137	0.0013	0.0124
245	0.0135	0.0012	0.0123
246	0.0134	0.0012	0.0121
247	0.0132	0.0012	0.0120
248	0.0131	0.0012	0.0119
249	0.0130	0.0012	0.0118
250	0.0128	0.0012	0.0117
251	0.0127	0.0012	0.0115
252	0.0126	0.0012	0.0114
253	0.0125	0.0011	0.0113
254	0.0124	0.0011	0.0112
255	0.0122	0.0011	0.0111
256	0.0121	0.0011	0.0110
257	0.0120	0.0011	0.0109
258	0.0119	0.0011	0.0108
259	0.0118	0.0011	0.0107
260	0.0117	0.0011	0.0106
261	0.0116	0.0011	0.0106
262	0.0115	0.0011	0.0105
263	0.0114	0.0011	0.0104
264	0.0114	0.0010	0.0103
265	0.0113	0.0010	0.0102
266	0.0112	0.0010	0.0102
267	0.0111	0.0010	0.0101
268	0.0110	0.0010	0.0100
269	0.0109	0.0010	0.0099
270	0.0108	0.0010	0.0099
271	0.0108	0.0010	0.0098
272	0.0107	0.0010	0.0097
273	0.0106	0.0010	0.0096
274	0.0105	0.0010	0.0096
275	0.0105	0.0010	0.0095
276	0.0104	0.0010	0.0094
277	0.0103	0.0009	0.0094
278	0.0103	0.0009	0.0093
279	0.0102	0.0009	0.0093
280	0.0101	0.0009	0.0092
281	0.0101	0.0009	0.0091
282	0.0100	0.0009	0.0091
283	0.0099	0.0009	0.0090
284	0.0099	0.0009	0.0090
285	0.0098	0.0009	0.0089
286	0.0098	0.0009	0.0089
287	0.0097	0.0009	0.0088
288	0.0096	0.0009	0.0088

Total soil rain loss = 0.51(In)
Total effective rainfall = 5.78(In)
Peak flow rate in flood hydrograph = 14.07(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	0.0012	0.18	Q				
0+10	0.0032	0.30	Q				
0+15	0.0053	0.30	Q				
0+20	0.0073	0.30	Q				
0+25	0.0094	0.30	Q				
0+30	0.0115	0.30	Q				
0+35	0.0135	0.30	Q				
0+40	0.0156	0.30	Q				
0+45	0.0177	0.30	Q				
0+50	0.0198	0.30	Q				
0+55	0.0219	0.30	Q				
1+ 0	0.0240	0.30	Q				
1+ 5	0.0261	0.31	Q				
1+10	0.0282	0.31	Q				
1+15	0.0303	0.31	Q				
1+20	0.0324	0.31	Q				
1+25	0.0346	0.31	QV				
1+30	0.0367	0.31	QV				
1+35	0.0388	0.31	QV				
1+40	0.0410	0.31	QV				
1+45	0.0432	0.31	QV				
1+50	0.0453	0.31	QV				
1+55	0.0475	0.32	QV				
2+ 0	0.0497	0.32	QV				
2+ 5	0.0519	0.32	QV				
2+10	0.0541	0.32	QV				
2+15	0.0563	0.32	QV				
2+20	0.0585	0.32	QV				
2+25	0.0607	0.32	QV				
2+30	0.0629	0.32	QV				
2+35	0.0652	0.32	QV				
2+40	0.0674	0.33	Q V				
2+45	0.0697	0.33	Q V				
2+50	0.0719	0.33	Q V				
2+55	0.0742	0.33	Q V				
3+ 0	0.0765	0.33	Q V				
3+ 5	0.0787	0.33	Q V				
3+10	0.0810	0.33	Q V				
3+15	0.0833	0.33	Q V				
3+20	0.0856	0.33	Q V				
3+25	0.0879	0.34	Q V				
3+30	0.0903	0.34	Q V				
3+35	0.0926	0.34	Q V				
3+40	0.0949	0.34	Q V				
3+45	0.0973	0.34	Q V				
3+50	0.0997	0.34	Q V				
3+55	0.1020	0.34	Q V				
4+ 0	0.1044	0.35	Q V				
4+ 5	0.1068	0.35	Q V				
4+10	0.1092	0.35	Q V				
4+15	0.1116	0.35	Q V				
4+20	0.1140	0.35	Q V				
4+25	0.1164	0.35	Q V				
4+30	0.1189	0.35	Q V				
4+35	0.1213	0.35	Q V				
4+40	0.1238	0.36	Q V				
4+45	0.1262	0.36	Q V				
4+50	0.1287	0.36	Q V				

4+55	0.1312	0.36	Q V				
5+ 0	0.1337	0.36	Q V				
5+ 5	0.1362	0.36	Q V				
5+10	0.1387	0.37	Q V				
5+15	0.1412	0.37	Q V				
5+20	0.1438	0.37	Q V				
5+25	0.1463	0.37	Q V				
5+30	0.1489	0.37	Q V				
5+35	0.1514	0.37	Q V				
5+40	0.1540	0.38	Q V				
5+45	0.1566	0.38	Q V				
5+50	0.1592	0.38	Q V				
5+55	0.1618	0.38	Q V				
6+ 0	0.1645	0.38	Q V				
6+ 5	0.1671	0.38	Q V				
6+10	0.1698	0.39	Q V				
6+15	0.1724	0.39	Q V				
6+20	0.1751	0.39	Q V				
6+25	0.1778	0.39	Q V				
6+30	0.1805	0.39	Q V				
6+35	0.1832	0.39	Q V				
6+40	0.1860	0.40	Q V				
6+45	0.1887	0.40	Q V				
6+50	0.1915	0.40	Q V				
6+55	0.1943	0.40	Q V				
7+ 0	0.1970	0.40	Q V				
7+ 5	0.1999	0.41	Q V				
7+10	0.2027	0.41	Q V				
7+15	0.2055	0.41	Q V				
7+20	0.2083	0.41	Q V				
7+25	0.2112	0.42	Q V				
7+30	0.2141	0.42	Q V				
7+35	0.2170	0.42	Q V				
7+40	0.2199	0.42	Q V				
7+45	0.2228	0.43	Q V				
7+50	0.2258	0.43	Q V				
7+55	0.2287	0.43	Q V				
8+ 0	0.2317	0.43	Q V				
8+ 5	0.2347	0.43	Q V				
8+10	0.2377	0.44	Q V				
8+15	0.2407	0.44	Q V				
8+20	0.2438	0.44	Q V				
8+25	0.2469	0.45	Q V				
8+30	0.2499	0.45	Q V				
8+35	0.2530	0.45	Q V				
8+40	0.2562	0.45	Q V				
8+45	0.2593	0.46	Q V				
8+50	0.2625	0.46	Q V				
8+55	0.2657	0.46	Q V				
9+ 0	0.2689	0.47	Q V				
9+ 5	0.2721	0.47	Q V				
9+10	0.2753	0.47	Q V				
9+15	0.2786	0.47	Q V				
9+20	0.2819	0.48	Q V				
9+25	0.2852	0.48	Q V				
9+30	0.2885	0.48	Q V				
9+35	0.2919	0.49	Q V				
9+40	0.2953	0.49	Q V				
9+45	0.2987	0.50	Q V				

9+50	0.3021	0.50	Q	V			
9+55	0.3056	0.50	Q	V			
10+ 0	0.3091	0.51	Q	V			
10+ 5	0.3126	0.51	Q	V			
10+10	0.3162	0.51	Q	V			
10+15	0.3197	0.52	Q	V			
10+20	0.3233	0.52	Q	V			
10+25	0.3270	0.53	Q	V			
10+30	0.3306	0.53	Q	V			
10+35	0.3343	0.54	Q	V			
10+40	0.3380	0.54	Q	V			
10+45	0.3418	0.55	Q	V			
10+50	0.3456	0.55	Q	V			
10+55	0.3494	0.56	Q	V			
11+ 0	0.3533	0.56	Q	V			
11+ 5	0.3572	0.57	Q	V			
11+10	0.3611	0.57	Q	V			
11+15	0.3651	0.58	Q	V			
11+20	0.3691	0.58	Q	V			
11+25	0.3731	0.59	Q	V			
11+30	0.3772	0.59	Q	V			
11+35	0.3813	0.60	Q	V			
11+40	0.3855	0.61	Q	V			
11+45	0.3897	0.61	Q	V			
11+50	0.3940	0.62	Q	V			
11+55	0.3983	0.63	Q	V			
12+ 0	0.4026	0.63	Q	V			
12+ 5	0.4070	0.63	Q	V			
12+10	0.4114	0.64	Q	V			
12+15	0.4158	0.64	Q	V			
12+20	0.4203	0.65	Q	V			
12+25	0.4248	0.66	Q	V			
12+30	0.4294	0.67	Q	V			
12+35	0.4341	0.68	Q	V			
12+40	0.4388	0.69	Q	V			
12+45	0.4436	0.70	Q	V			
12+50	0.4485	0.71	Q	V			
12+55	0.4534	0.72	Q	V			
13+ 0	0.4584	0.73	Q	V			
13+ 5	0.4635	0.74	Q	V			
13+10	0.4687	0.75	Q	V			
13+15	0.4739	0.76	Q	V			
13+20	0.4793	0.78	Q	V			
13+25	0.4847	0.79	Q	V			
13+30	0.4903	0.80	Q	V			
13+35	0.4959	0.82	Q	V			
13+40	0.5016	0.83	Q	V			
13+45	0.5075	0.85	Q	V			
13+50	0.5135	0.87	Q	V			
13+55	0.5196	0.89	Q	V			
14+ 0	0.5259	0.91	Q	V			
14+ 5	0.5323	0.93	Q	V			
14+10	0.5388	0.95	Q	V			
14+15	0.5455	0.98	Q	V			
14+20	0.5524	1.00	Q	V			
14+25	0.5595	1.03	Q	V			
14+30	0.5668	1.06	Q	V			
14+35	0.5744	1.09	Q	V			
14+40	0.5821	1.13	Q	V			

14+45	0.5902	1.17	Q	V			
14+50	0.5985	1.21	Q	V			
14+55	0.6072	1.26	Q	V			
15+ 0	0.6162	1.31	Q	V			
15+ 5	0.6256	1.37	Q	V			
15+10	0.6355	1.44	Q	V			
15+15	0.6460	1.52	Q	V			
15+20	0.6571	1.61	Q	V			
15+25	0.6684	1.65	Q	V			
15+30	0.6803	1.72	Q	V			
15+35	0.6933	1.90	Q	V			
15+40	0.7077	2.09	Q	V			
15+45	0.7243	2.42	Q	V			
15+50	0.7438	2.82	Q	V			
15+55	0.7698	3.79	Q	V			
16+ 0	0.8069	5.37	Q	V			
16+ 5	0.9038	14.07	Q	V			
16+10	0.9728	10.03	Q	V			
16+15	0.9922	2.81	Q	V			
16+20	1.0063	2.06	Q	V			
16+25	1.0185	1.77	Q	V			
16+30	1.0295	1.59	Q	V			
16+35	1.0393	1.42	Q	V			
16+40	1.0482	1.30	Q	V			
16+45	1.0565	1.20	Q	V			
16+50	1.0642	1.12	Q	V			
16+55	1.0714	1.05	Q	V			
17+ 0	1.0783	0.99	Q	V			
17+ 5	1.0848	0.95	Q	V			
17+10	1.0910	0.90	Q	V			
17+15	1.0970	0.86	Q	V			
17+20	1.1027	0.83	Q	V			
17+25	1.1082	0.80	Q	V			
17+30	1.1135	0.77	Q	V			
17+35	1.1187	0.75	Q	V			
17+40	1.1237	0.72	Q	V			
17+45	1.1285	0.70	Q	V			
17+50	1.1332	0.68	Q	V			
17+55	1.1378	0.67	Q	V			
18+ 0	1.1423	0.65	Q	V			
18+ 5	1.1467	0.64	Q	V			
18+10	1.1510	0.63	Q	V			
18+15	1.1553	0.62	Q	V			
18+20	1.1594	0.60	Q	V			
18+25	1.1635	0.59	Q	V			
18+30	1.1675	0.58	Q	V			
18+35	1.1714	0.57	Q	V			
18+40	1.1753	0.56	Q	V			
18+45	1.1791	0.55	Q	V			
18+50	1.1828	0.54	Q	V			
18+55	1.1864	0.53	Q	V			
19+ 0	1.1900	0.52	Q	V			
19+ 5	1.1935	0.51	Q	V			
19+10	1.1970	0.51	Q	V			
19+15	1.2005	0.50	Q	V			
19+20	1.2038	0.49	Q	V			
19+25	1.2072	0.48	Q	V			
19+30	1.2105	0.48	Q	V			
19+35	1.2137	0.47	Q	V			

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   19+40       1.2169      0.46  Q         |         |         |     V   |
   19+45       1.2201      0.46  Q         |         |         |     V   |
   19+50       1.2232      0.45  Q         |         |         |     V   |
   19+55       1.2263      0.45  Q         |         |         |     V   |
   20+ 0       1.2293      0.44  Q         |         |         |     V   |
   20+ 5       1.2323      0.44  Q         |         |         |     V   |
   20+10       1.2353      0.43  Q         |         |         |     V   |
   20+15       1.2382      0.43  Q         |         |         |     V   |
   20+20       1.2411      0.42  Q         |         |         |     V   |
   20+25       1.2440      0.42  Q         |         |         |     V   |
   20+30       1.2468      0.41  Q         |         |         |      V  |
   20+35       1.2497      0.41  Q         |         |         |      V  |
   20+40       1.2524      0.40  Q         |         |         |      V  |
   20+45       1.2552      0.40  Q         |         |         |      V  |
   20+50       1.2579      0.40  Q         |         |         |      V  |
   20+55       1.2606      0.39  Q         |         |         |      V  |
   21+ 0       1.2633      0.39  Q         |         |         |      V  |
   21+ 5       1.2660      0.39  Q         |         |         |      V  |
   21+10       1.2686      0.38  Q         |         |         |      V  |
   21+15       1.2712      0.38  Q         |         |         |      V  |
   21+20       1.2738      0.37  Q         |         |         |      V  |
   21+25       1.2763      0.37  Q         |         |         |      V  |
   21+30       1.2789      0.37  Q         |         |         |      V  |
   21+35       1.2814      0.36  Q         |         |         |       V |
   21+40       1.2839      0.36  Q         |         |         |       V |
   21+45       1.2863      0.36  Q         |         |         |       V |
   21+50       1.2888      0.36  Q         |         |         |       V |
   21+55       1.2912      0.35  Q         |         |         |       V |
   22+ 0       1.2936      0.35  Q         |         |         |       V |
   22+ 5       1.2960      0.35  Q         |         |         |       V |
   22+10       1.2984      0.34  Q         |         |         |       V |
   22+15       1.3008      0.34  Q         |         |         |       V |
   22+20       1.3031      0.34  Q         |         |         |       V |
   22+25       1.3054      0.34  Q         |         |         |       V |
   22+30       1.3077      0.33  Q         |         |         |       V |
   22+35       1.3100      0.33  Q         |         |         |       V |
   22+40       1.3123      0.33  Q         |         |         |       V |
   22+45       1.3145      0.33  Q         |         |         |        V|
   22+50       1.3168      0.33  Q         |         |         |        V|
   22+55       1.3190      0.32  Q         |         |         |        V|
   23+ 0       1.3212      0.32  Q         |         |         |        V|
   23+ 5       1.3234      0.32  Q         |         |         |        V|
   23+10       1.3256      0.32  Q         |         |         |        V|
   23+15       1.3277      0.31  Q         |         |         |        V|
   23+20       1.3299      0.31  Q         |         |         |        V|
   23+25       1.3320      0.31  Q         |         |         |        V|
   23+30       1.3342      0.31  Q         |         |         |        V|
   23+35       1.3363      0.31  Q         |         |         |        V|
   23+40       1.3384      0.30  Q         |         |         |        V|
   23+45       1.3405      0.30  Q         |         |         |        V|
   23+50       1.3425      0.30  Q         |         |         |        V|
   23+55       1.3446      0.30  Q         |         |         |        V|
   24+ 0       1.3466      0.30  Q         |         |         |        V|
   24+ 5       1.3475      0.12  Q         |         |         |         V
-------------------------------------------------------------------------
```

APPENDIX B.9: UNIT HYDROGRAPH, AREA "9"

U n i t H y d r o g r a p h A n a l y s i s

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Study date 06/20/19

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

Program License Serial Number 6279

BNSF
POST PROJECT HYDROLOGY
AREA 9

Storm Event Year = 100

Antecedent Moisture Condition = 3

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 100		
3.86	1	1.58
Rainfall data for year 100		
3.86	6	3.42
Rainfall data for year 100		
3.86	24	6.29

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 3)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
86.0	97.2	3.86	1.000	0.055	0.970	0.054

Area-averaged adjusted loss rate Fm (In/Hr) = 0.054

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
3.74	0.970	86.0	97.2	0.29	0.947
0.12	0.030	98.0	98.0	0.20	0.962

Area-averaged catchment yield fraction, Y = 0.948
Area-averaged low loss fraction, Yb = 0.052
++
Watercourse length = 1280.00(Ft.)
Length from concentration point to centroid = 745.00(Ft.)
Elevation difference along watercourse = 10.00(Ft.)
Mannings friction factor along watercourse = 0.020
Watershed area = 3.86(Ac.)
Catchment Lag time = 0.066 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 126.9260
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.054(In/Hr)
Average low loss rate fraction (Yb) = 0.052 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.585(In)
Computed peak 30-minute rainfall = 1.197(In)
Specified peak 1-hour rainfall = 1.580(In)
Computed peak 3-hour rainfall = 2.537(In)
Specified peak 6-hour rainfall = 3.420(In)
Specified peak 24-hour rainfall = 6.290(In)

Rainfall depth area reduction factors:
Using a total area of 3.86(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.585(In)
30-minute factor = 1.000 Adjusted rainfall = 1.197(In)
1-hour factor = 1.000 Adjusted rainfall = 1.580(In)
3-hour factor = 1.000 Adjusted rainfall = 2.537(In)
6-hour factor = 1.000 Adjusted rainfall = 3.420(In)
24-hour factor = 1.000 Adjusted rainfall = 6.290(In)

U n i t H y d r o g r a p h

++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 46.68 (CFS))		
1	26.580	12.408
2	90.693	29.929
3	100.000	4.345

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5847	0.5847
2	0.7715	0.1868
3	0.9073	0.1358
4	1.0180	0.1107

5	1.1130	0.0950
6	1.1972	0.0842
7	1.2733	0.0761
8	1.3432	0.0699
9	1.4080	0.0648
10	1.4686	0.0606
11	1.5257	0.0571
12	1.5797	0.0540
13	1.6352	0.0555
14	1.6883	0.0531
15	1.7392	0.0510
16	1.7883	0.0491
17	1.8357	0.0474
18	1.8815	0.0458
19	1.9258	0.0444
20	1.9689	0.0431
21	2.0108	0.0419
22	2.0515	0.0407
23	2.0912	0.0397
24	2.1299	0.0387
25	2.1677	0.0378
26	2.2047	0.0370
27	2.2409	0.0362
28	2.2763	0.0354
29	2.3110	0.0347
30	2.3450	0.0340
31	2.3784	0.0334
32	2.4112	0.0328
33	2.4434	0.0322
34	2.4750	0.0317
35	2.5061	0.0311
36	2.5368	0.0306
37	2.5669	0.0301
38	2.5966	0.0297
39	2.6258	0.0292
40	2.6546	0.0288
41	2.6830	0.0284
42	2.7110	0.0280
43	2.7386	0.0276
44	2.7659	0.0273
45	2.7928	0.0269
46	2.8194	0.0266
47	2.8457	0.0263
48	2.8716	0.0259
49	2.8972	0.0256
50	2.9226	0.0253
51	2.9476	0.0251
52	2.9724	0.0248
53	2.9969	0.0245
54	3.0212	0.0242
55	3.0451	0.0240
56	3.0689	0.0237
57	3.0924	0.0235
58	3.1156	0.0233
59	3.1387	0.0230
60	3.1615	0.0228
61	3.1841	0.0226
62	3.2065	0.0224
63	3.2287	0.0222

64	3.2507	0.0220
65	3.2725	0.0218
66	3.2941	0.0216
67	3.3155	0.0214
68	3.3367	0.0212
69	3.3578	0.0211
70	3.3787	0.0209
71	3.3994	0.0207
72	3.4200	0.0206
73	3.4408	0.0208
74	3.4614	0.0206
75	3.4819	0.0205
76	3.5022	0.0203
77	3.5224	0.0202
78	3.5424	0.0200
79	3.5623	0.0199
80	3.5821	0.0197
81	3.6017	0.0196
82	3.6212	0.0195
83	3.6405	0.0193
84	3.6597	0.0192
85	3.6788	0.0191
86	3.6978	0.0190
87	3.7166	0.0188
88	3.7353	0.0187
89	3.7539	0.0186
90	3.7724	0.0185
91	3.7908	0.0184
92	3.8090	0.0183
93	3.8272	0.0181
94	3.8452	0.0180
95	3.8631	0.0179
96	3.8809	0.0178
97	3.8986	0.0177
98	3.9163	0.0176
99	3.9338	0.0175
100	3.9512	0.0174
101	3.9685	0.0173
102	3.9857	0.0172
103	4.0029	0.0171
104	4.0199	0.0170
105	4.0368	0.0169
106	4.0537	0.0169
107	4.0705	0.0168
108	4.0871	0.0167
109	4.1037	0.0166
110	4.1202	0.0165
111	4.1367	0.0164
112	4.1530	0.0163
113	4.1693	0.0163
114	4.1854	0.0162
115	4.2015	0.0161
116	4.2175	0.0160
117	4.2335	0.0159
118	4.2494	0.0159
119	4.2651	0.0158
120	4.2809	0.0157
121	4.2965	0.0156
122	4.3121	0.0156

123	4.3276	0.0155
124	4.3430	0.0154
125	4.3584	0.0154
126	4.3737	0.0153
127	4.3889	0.0152
128	4.4040	0.0152
129	4.4191	0.0151
130	4.4342	0.0150
131	4.4491	0.0150
132	4.4640	0.0149
133	4.4788	0.0148
134	4.4936	0.0148
135	4.5083	0.0147
136	4.5230	0.0146
137	4.5376	0.0146
138	4.5521	0.0145
139	4.5666	0.0145
140	4.5810	0.0144
141	4.5953	0.0144
142	4.6096	0.0143
143	4.6239	0.0142
144	4.6380	0.0142
145	4.6522	0.0141
146	4.6662	0.0141
147	4.6803	0.0140
148	4.6942	0.0140
149	4.7082	0.0139
150	4.7220	0.0139
151	4.7358	0.0138
152	4.7496	0.0138
153	4.7633	0.0137
154	4.7770	0.0137
155	4.7906	0.0136
156	4.8041	0.0136
157	4.8176	0.0135
158	4.8311	0.0135
159	4.8445	0.0134
160	4.8579	0.0134
161	4.8712	0.0133
162	4.8845	0.0133
163	4.8977	0.0132
164	4.9109	0.0132
165	4.9240	0.0131
166	4.9371	0.0131
167	4.9502	0.0131
168	4.9632	0.0130
169	4.9761	0.0130
170	4.9891	0.0129
171	5.0019	0.0129
172	5.0148	0.0128
173	5.0276	0.0128
174	5.0403	0.0128
175	5.0530	0.0127
176	5.0657	0.0127
177	5.0783	0.0126
178	5.0909	0.0126
179	5.1035	0.0126
180	5.1160	0.0125
181	5.1285	0.0125

182	5.1409	0.0124
183	5.1533	0.0124
184	5.1657	0.0124
185	5.1780	0.0123
186	5.1903	0.0123
187	5.2025	0.0122
188	5.2147	0.0122
189	5.2269	0.0122
190	5.2390	0.0121
191	5.2511	0.0121
192	5.2632	0.0121
193	5.2752	0.0120
194	5.2872	0.0120
195	5.2992	0.0120
196	5.3111	0.0119
197	5.3230	0.0119
198	5.3349	0.0119
199	5.3467	0.0118
200	5.3585	0.0118
201	5.3702	0.0118
202	5.3820	0.0117
203	5.3937	0.0117
204	5.4053	0.0117
205	5.4170	0.0116
206	5.4286	0.0116
207	5.4401	0.0116
208	5.4517	0.0115
209	5.4632	0.0115
210	5.4746	0.0115
211	5.4861	0.0114
212	5.4975	0.0114
213	5.5089	0.0114
214	5.5202	0.0114
215	5.5316	0.0113
216	5.5429	0.0113
217	5.5541	0.0113
218	5.5654	0.0112
219	5.5766	0.0112
220	5.5877	0.0112
221	5.5989	0.0111
222	5.6100	0.0111
223	5.6211	0.0111
224	5.6322	0.0111
225	5.6432	0.0110
226	5.6542	0.0110
227	5.6652	0.0110
228	5.6762	0.0110
229	5.6871	0.0109
230	5.6980	0.0109
231	5.7089	0.0109
232	5.7197	0.0108
233	5.7305	0.0108
234	5.7413	0.0108
235	5.7521	0.0108
236	5.7628	0.0107
237	5.7736	0.0107
238	5.7843	0.0107
239	5.7949	0.0107
240	5.8056	0.0106

241	5.8162	0.0106
242	5.8268	0.0106
243	5.8374	0.0106
244	5.8479	0.0105
245	5.8584	0.0105
246	5.8689	0.0105
247	5.8794	0.0105
248	5.8899	0.0105
249	5.9003	0.0104
250	5.9107	0.0104
251	5.9211	0.0104
252	5.9314	0.0104
253	5.9418	0.0103
254	5.9521	0.0103
255	5.9624	0.0103
256	5.9726	0.0103
257	5.9829	0.0102
258	5.9931	0.0102
259	6.0033	0.0102
260	6.0135	0.0102
261	6.0236	0.0102
262	6.0338	0.0101
263	6.0439	0.0101
264	6.0540	0.0101
265	6.0640	0.0101
266	6.0741	0.0100
267	6.0841	0.0100
268	6.0941	0.0100
269	6.1041	0.0100
270	6.1140	0.0100
271	6.1240	0.0099
272	6.1339	0.0099
273	6.1438	0.0099
274	6.1537	0.0099
275	6.1636	0.0099
276	6.1734	0.0098
277	6.1832	0.0098
278	6.1930	0.0098
279	6.2028	0.0098
280	6.2126	0.0098
281	6.2223	0.0097
282	6.2320	0.0097
283	6.2417	0.0097
284	6.2514	0.0097
285	6.2611	0.0097
286	6.2707	0.0096
287	6.2804	0.0096
288	6.2900	0.0096

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0096	0.0005	0.0091
2	0.0096	0.0005	0.0091
3	0.0097	0.0005	0.0092
4	0.0097	0.0005	0.0092
5	0.0097	0.0005	0.0092
6	0.0097	0.0005	0.0092
7	0.0098	0.0005	0.0093
8	0.0098	0.0005	0.0093
9	0.0098	0.0005	0.0093
10	0.0099	0.0005	0.0093
11	0.0099	0.0005	0.0094
12	0.0099	0.0005	0.0094
13	0.0100	0.0005	0.0094
14	0.0100	0.0005	0.0095
15	0.0100	0.0005	0.0095
16	0.0100	0.0005	0.0095
17	0.0101	0.0005	0.0096
18	0.0101	0.0005	0.0096
19	0.0102	0.0005	0.0096
20	0.0102	0.0005	0.0096
21	0.0102	0.0005	0.0097
22	0.0102	0.0005	0.0097
23	0.0103	0.0005	0.0097
24	0.0103	0.0005	0.0098
25	0.0104	0.0005	0.0098
26	0.0104	0.0005	0.0098
27	0.0104	0.0005	0.0099
28	0.0105	0.0005	0.0099
29	0.0105	0.0006	0.0099
30	0.0105	0.0006	0.0100
31	0.0106	0.0006	0.0100
32	0.0106	0.0006	0.0100
33	0.0106	0.0006	0.0101
34	0.0107	0.0006	0.0101
35	0.0107	0.0006	0.0102
36	0.0107	0.0006	0.0102
37	0.0108	0.0006	0.0102
38	0.0108	0.0006	0.0103
39	0.0109	0.0006	0.0103
40	0.0109	0.0006	0.0103
41	0.0110	0.0006	0.0104
42	0.0110	0.0006	0.0104
43	0.0110	0.0006	0.0105
44	0.0111	0.0006	0.0105
45	0.0111	0.0006	0.0105
46	0.0111	0.0006	0.0106
47	0.0112	0.0006	0.0106
48	0.0112	0.0006	0.0106
49	0.0113	0.0006	0.0107
50	0.0113	0.0006	0.0107
51	0.0114	0.0006	0.0108
52	0.0114	0.0006	0.0108
53	0.0115	0.0006	0.0109
54	0.0115	0.0006	0.0109
55	0.0116	0.0006	0.0110
56	0.0116	0.0006	0.0110
57	0.0117	0.0006	0.0111
58	0.0117	0.0006	0.0111
59	0.0118	0.0006	0.0111
60	0.0118	0.0006	0.0112
61	0.0119	0.0006	0.0112
62	0.0119	0.0006	0.0113
63	0.0120	0.0006	0.0113
64	0.0120	0.0006	0.0114
65	0.0121	0.0006	0.0114

66	0.0121	0.0006	0.0115
67	0.0122	0.0006	0.0115
68	0.0122	0.0006	0.0116
69	0.0123	0.0006	0.0116
70	0.0123	0.0006	0.0117
71	0.0124	0.0007	0.0117
72	0.0124	0.0007	0.0118
73	0.0125	0.0007	0.0119
74	0.0126	0.0007	0.0119
75	0.0126	0.0007	0.0120
76	0.0127	0.0007	0.0120
77	0.0128	0.0007	0.0121
78	0.0128	0.0007	0.0121
79	0.0129	0.0007	0.0122
80	0.0129	0.0007	0.0122
81	0.0130	0.0007	0.0123
82	0.0131	0.0007	0.0124
83	0.0131	0.0007	0.0124
84	0.0132	0.0007	0.0125
85	0.0133	0.0007	0.0126
86	0.0133	0.0007	0.0126
87	0.0134	0.0007	0.0127
88	0.0135	0.0007	0.0128
89	0.0136	0.0007	0.0128
90	0.0136	0.0007	0.0129
91	0.0137	0.0007	0.0130
92	0.0138	0.0007	0.0130
93	0.0139	0.0007	0.0131
94	0.0139	0.0007	0.0132
95	0.0140	0.0007	0.0133
96	0.0141	0.0007	0.0133
97	0.0142	0.0007	0.0134
98	0.0142	0.0007	0.0135
99	0.0144	0.0008	0.0136
100	0.0144	0.0008	0.0137
101	0.0145	0.0008	0.0138
102	0.0146	0.0008	0.0138
103	0.0147	0.0008	0.0139
104	0.0148	0.0008	0.0140
105	0.0149	0.0008	0.0141
106	0.0150	0.0008	0.0142
107	0.0151	0.0008	0.0143
108	0.0152	0.0008	0.0144
109	0.0153	0.0008	0.0145
110	0.0154	0.0008	0.0146
111	0.0155	0.0008	0.0147
112	0.0156	0.0008	0.0148
113	0.0157	0.0008	0.0149
114	0.0158	0.0008	0.0150
115	0.0159	0.0008	0.0151
116	0.0160	0.0008	0.0152
117	0.0162	0.0008	0.0153
118	0.0163	0.0009	0.0154
119	0.0164	0.0009	0.0156
120	0.0165	0.0009	0.0156
121	0.0167	0.0009	0.0158
122	0.0168	0.0009	0.0159
123	0.0169	0.0009	0.0161
124	0.0170	0.0009	0.0161

125	0.0172	0.0009	0.0163
126	0.0173	0.0009	0.0164
127	0.0175	0.0009	0.0166
128	0.0176	0.0009	0.0167
129	0.0178	0.0009	0.0169
130	0.0179	0.0009	0.0170
131	0.0181	0.0010	0.0172
132	0.0183	0.0010	0.0173
133	0.0185	0.0010	0.0175
134	0.0186	0.0010	0.0176
135	0.0188	0.0010	0.0178
136	0.0190	0.0010	0.0180
137	0.0192	0.0010	0.0182
138	0.0193	0.0010	0.0183
139	0.0196	0.0010	0.0186
140	0.0197	0.0010	0.0187
141	0.0200	0.0011	0.0190
142	0.0202	0.0011	0.0191
143	0.0205	0.0011	0.0194
144	0.0206	0.0011	0.0196
145	0.0206	0.0011	0.0195
146	0.0207	0.0011	0.0196
147	0.0211	0.0011	0.0200
148	0.0212	0.0011	0.0201
149	0.0216	0.0011	0.0205
150	0.0218	0.0011	0.0207
151	0.0222	0.0012	0.0210
152	0.0224	0.0012	0.0212
153	0.0228	0.0012	0.0216
154	0.0230	0.0012	0.0218
155	0.0235	0.0012	0.0223
156	0.0237	0.0012	0.0225
157	0.0242	0.0013	0.0230
158	0.0245	0.0013	0.0232
159	0.0251	0.0013	0.0237
160	0.0253	0.0013	0.0240
161	0.0259	0.0014	0.0246
162	0.0263	0.0014	0.0249
163	0.0269	0.0014	0.0255
164	0.0273	0.0014	0.0258
165	0.0280	0.0015	0.0265
166	0.0284	0.0015	0.0269
167	0.0292	0.0015	0.0277
168	0.0297	0.0016	0.0281
169	0.0306	0.0016	0.0290
170	0.0311	0.0016	0.0295
171	0.0322	0.0017	0.0305
172	0.0328	0.0017	0.0311
173	0.0340	0.0018	0.0322
174	0.0347	0.0018	0.0329
175	0.0362	0.0019	0.0343
176	0.0370	0.0019	0.0350
177	0.0387	0.0020	0.0367
178	0.0397	0.0021	0.0376
179	0.0419	0.0022	0.0397
180	0.0431	0.0023	0.0408
181	0.0458	0.0024	0.0434
182	0.0474	0.0025	0.0449
183	0.0510	0.0027	0.0483

184	0.0531	0.0028	0.0503
185	0.0540	0.0028	0.0512
186	0.0571	0.0030	0.0541
187	0.0648	0.0034	0.0614
188	0.0699	0.0037	0.0662
189	0.0842	0.0044	0.0798
190	0.0950	0.0045	0.0906
191	0.1358	0.0045	0.1314
192	0.1868	0.0045	0.1823
193	0.5847	0.0045	0.5802
194	0.1107	0.0045	0.1062
195	0.0761	0.0040	0.0721
196	0.0606	0.0032	0.0574
197	0.0555	0.0029	0.0526
198	0.0491	0.0026	0.0465
199	0.0444	0.0023	0.0420
200	0.0407	0.0021	0.0386
201	0.0378	0.0020	0.0358
202	0.0354	0.0019	0.0336
203	0.0334	0.0018	0.0316
204	0.0317	0.0017	0.0300
205	0.0301	0.0016	0.0286
206	0.0288	0.0015	0.0273
207	0.0276	0.0015	0.0262
208	0.0266	0.0014	0.0252
209	0.0256	0.0013	0.0243
210	0.0248	0.0013	0.0235
211	0.0240	0.0013	0.0227
212	0.0233	0.0012	0.0220
213	0.0226	0.0012	0.0214
214	0.0220	0.0012	0.0208
215	0.0214	0.0011	0.0203
216	0.0209	0.0011	0.0198
217	0.0208	0.0011	0.0197
218	0.0203	0.0011	0.0193
219	0.0199	0.0010	0.0188
220	0.0195	0.0010	0.0185
221	0.0191	0.0010	0.0181
222	0.0187	0.0010	0.0177
223	0.0184	0.0010	0.0174
224	0.0180	0.0009	0.0171
225	0.0177	0.0009	0.0168
226	0.0174	0.0009	0.0165
227	0.0171	0.0009	0.0162
228	0.0169	0.0009	0.0160
229	0.0166	0.0009	0.0157
230	0.0163	0.0009	0.0155
231	0.0161	0.0008	0.0153
232	0.0159	0.0008	0.0150
233	0.0156	0.0008	0.0148
234	0.0154	0.0008	0.0146
235	0.0152	0.0008	0.0144
236	0.0150	0.0008	0.0142
237	0.0148	0.0008	0.0141
238	0.0146	0.0008	0.0139
239	0.0145	0.0008	0.0137
240	0.0143	0.0008	0.0135
241	0.0141	0.0007	0.0134
242	0.0140	0.0007	0.0132

243	0.0138	0.0007	0.0131
244	0.0137	0.0007	0.0129
245	0.0135	0.0007	0.0128
246	0.0134	0.0007	0.0127
247	0.0132	0.0007	0.0125
248	0.0131	0.0007	0.0124
249	0.0130	0.0007	0.0123
250	0.0128	0.0007	0.0122
251	0.0127	0.0007	0.0120
252	0.0126	0.0007	0.0119
253	0.0125	0.0007	0.0118
254	0.0124	0.0006	0.0117
255	0.0122	0.0006	0.0116
256	0.0121	0.0006	0.0115
257	0.0120	0.0006	0.0114
258	0.0119	0.0006	0.0113
259	0.0118	0.0006	0.0112
260	0.0117	0.0006	0.0111
261	0.0116	0.0006	0.0110
262	0.0115	0.0006	0.0109
263	0.0114	0.0006	0.0108
264	0.0114	0.0006	0.0108
265	0.0113	0.0006	0.0107
266	0.0112	0.0006	0.0106
267	0.0111	0.0006	0.0105
268	0.0110	0.0006	0.0104
269	0.0109	0.0006	0.0104
270	0.0108	0.0006	0.0103
271	0.0108	0.0006	0.0102
272	0.0107	0.0006	0.0101
273	0.0106	0.0006	0.0101
274	0.0105	0.0006	0.0100
275	0.0105	0.0005	0.0099
276	0.0104	0.0005	0.0099
277	0.0103	0.0005	0.0098
278	0.0103	0.0005	0.0097
279	0.0102	0.0005	0.0097
280	0.0101	0.0005	0.0096
281	0.0101	0.0005	0.0095
282	0.0100	0.0005	0.0095
283	0.0099	0.0005	0.0094
284	0.0099	0.0005	0.0094
285	0.0098	0.0005	0.0093
286	0.0098	0.0005	0.0092
287	0.0097	0.0005	0.0092
288	0.0096	0.0005	0.0091

Total soil rain loss = 0.29(In)
Total effective rainfall = 6.00(In)
Peak flow rate in flood hydrograph = 19.47(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	0.0008	0.11	Q				
0+10	0.0034	0.39	Q				
0+15	0.0064	0.43	Q				
0+20	0.0093	0.43	Q				
0+25	0.0123	0.43	Q				
0+30	0.0152	0.43	Q				
0+35	0.0182	0.43	Q				
0+40	0.0212	0.43	Q				
0+45	0.0242	0.43	Q				
0+50	0.0272	0.44	Q				
0+55	0.0302	0.44	Q				
1+ 0	0.0332	0.44	Q				
1+ 5	0.0362	0.44	Q				
1+10	0.0393	0.44	Q				
1+15	0.0423	0.44	Q				
1+20	0.0454	0.44	Q				
1+25	0.0484	0.44	QV				
1+30	0.0515	0.45	QV				
1+35	0.0546	0.45	QV				
1+40	0.0577	0.45	QV				
1+45	0.0608	0.45	QV				
1+50	0.0639	0.45	QV				
1+55	0.0670	0.45	QV				
2+ 0	0.0701	0.46	QV				
2+ 5	0.0733	0.46	QV				
2+10	0.0764	0.46	QV				
2+15	0.0796	0.46	QV				
2+20	0.0828	0.46	QV				
2+25	0.0860	0.46	QV				
2+30	0.0892	0.46	QV				
2+35	0.0924	0.47	QV				
2+40	0.0956	0.47	QV				
2+45	0.0988	0.47	Q V				
2+50	0.1021	0.47	Q V				
2+55	0.1053	0.47	Q V				
3+ 0	0.1086	0.47	Q V				
3+ 5	0.1119	0.48	Q V				
3+10	0.1152	0.48	Q V				
3+15	0.1185	0.48	Q V				
3+20	0.1218	0.48	Q V				
3+25	0.1251	0.48	Q V				
3+30	0.1284	0.48	Q V				
3+35	0.1318	0.49	Q V				
3+40	0.1351	0.49	Q V				
3+45	0.1385	0.49	Q V				
3+50	0.1419	0.49	Q V				
3+55	0.1453	0.49	Q V				
4+ 0	0.1487	0.50	Q V				
4+ 5	0.1522	0.50	Q V				
4+10	0.1556	0.50	Q V				
4+15	0.1590	0.50	|Q V				
4+20	0.1625	0.50	|Q V				
4+25	0.1660	0.51	|Q V				
4+30	0.1695	0.51	|Q V				
4+35	0.1730	0.51	|Q V				
4+40	0.1765	0.51	|Q V				
4+45	0.1801	0.51	|Q V				

4+50	0.1836	0.52	|Q V				
4+55	0.1872	0.52	|Q V				
5+ 0	0.1908	0.52	|Q V				
5+ 5	0.1944	0.52	|Q V				
5+10	0.1980	0.52	|Q V				
5+15	0.2016	0.53	|Q V				
5+20	0.2053	0.53	|Q V				
5+25	0.2089	0.53	|Q V				
5+30	0.2126	0.53	|Q V				
5+35	0.2163	0.54	|Q V				
5+40	0.2200	0.54	|Q V				
5+45	0.2237	0.54	|Q V				
5+50	0.2275	0.54	|Q V				
5+55	0.2312	0.55	|Q V				
6+ 0	0.2350	0.55	|Q V				
6+ 5	0.2388	0.55	|Q V				
6+10	0.2426	0.55	|Q V				
6+15	0.2464	0.56	|Q V				
6+20	0.2503	0.56	|Q V				
6+25	0.2541	0.56	|Q V				
6+30	0.2580	0.56	|Q V				
6+35	0.2619	0.57	|Q V				
6+40	0.2659	0.57	|Q V				
6+45	0.2698	0.57	|Q V				
6+50	0.2738	0.58	|Q V				
6+55	0.2777	0.58	|Q V				
7+ 0	0.2817	0.58	|Q V				
7+ 5	0.2858	0.58	|Q V				
7+10	0.2898	0.59	|Q V				
7+15	0.2939	0.59	|Q V				
7+20	0.2980	0.59	|Q V				
7+25	0.3021	0.60	|Q V				
7+30	0.3062	0.60	|Q V				
7+35	0.3104	0.60	|Q V				
7+40	0.3145	0.61	|Q V				
7+45	0.3187	0.61	|Q V				
7+50	0.3230	0.61	|Q V				
7+55	0.3272	0.62	|Q V				
8+ 0	0.3315	0.62	|Q V				
8+ 5	0.3358	0.62	|Q V				
8+10	0.3401	0.63	|Q V				
8+15	0.3444	0.63	|Q V				
8+20	0.3488	0.64	|Q V				
8+25	0.3532	0.64	|Q V				
8+30	0.3576	0.64	|Q V				
8+35	0.3621	0.65	|Q V				
8+40	0.3666	0.65	|Q V				
8+45	0.3711	0.65	|Q V				
8+50	0.3756	0.66	|Q V				
8+55	0.3802	0.66	|Q V				
9+ 0	0.3848	0.67	|Q V				
9+ 5	0.3894	0.67	|Q V				
9+10	0.3941	0.68	|Q V				
9+15	0.3988	0.68	|Q V				
9+20	0.4035	0.69	|Q V				
9+25	0.4082	0.69	|Q V				
9+30	0.4130	0.70	|Q V				
9+35	0.4178	0.70	|Q V				
9+40	0.4227	0.71	|Q V				

9+45	0.4276	0.71	|Q V |	|	|	|
9+50	0.4325	0.72	|Q V |	|	|	|
9+55	0.4375	0.72	|Q V|	|	|	|
10+ 0	0.4425	0.73	|Q V|	|	|	|
10+ 5	0.4475	0.73	|Q V|	|	|	|
10+10	0.4526	0.74	|Q V|	|	|	|
10+15	0.4577	0.74	|Q V|	|	|	|
10+20	0.4629	0.75	|Q V|	|	|	|
10+25	0.4681	0.76	|Q V|	|	|	|
10+30	0.4733	0.76	|Q V|	|	|	|
10+35	0.4786	0.77	|Q V|	|	|	|
10+40	0.4840	0.78	|Q V |	|	|	|
10+45	0.4894	0.78	|Q V |	|	|	|
10+50	0.4948	0.79	|Q V |	|	|	|
10+55	0.5003	0.80	|Q V |	|	|	|
11+ 0	0.5058	0.80	|Q V |	|	|	|
11+ 5	0.5114	0.81	|Q V |	|	|	|
11+10	0.5170	0.82	|Q V |	|	|	|
11+15	0.5227	0.82	|Q V |	|	|	|
11+20	0.5284	0.83	|Q V |	|	|	|
11+25	0.5342	0.84	|Q |V |	|	|	|
11+30	0.5401	0.85	|Q |V |	|	|	|
11+35	0.5460	0.86	|Q |V |	|	|	|
11+40	0.5520	0.87	|Q |V |	|	|	|
11+45	0.5580	0.88	|Q |V |	|	|	|
11+50	0.5641	0.89	|Q |V |	|	|	|
11+55	0.5703	0.90	|Q |V |	|	|	|
12+ 0	0.5765	0.91	|Q |V |	|	|	|
12+ 5	0.5828	0.91	|Q | V |	|	|	|
12+10	0.5891	0.91	|Q | V |	|	|	|
12+15	0.5954	0.92	|Q | V |	|	|	|
12+20	0.6018	0.93	|Q | V |	|	|	|
12+25	0.6083	0.94	|Q | V |	|	|	|
12+30	0.6149	0.96	|Q | V |	|	|	|
12+35	0.6216	0.97	|Q | V |	|	|	|
12+40	0.6283	0.98	|Q | V |	|	|	|
12+45	0.6352	0.99	|Q | V |	|	|	|
12+50	0.6421	1.01	| Q | V |	|	|	|
12+55	0.6492	1.02	| Q | V |	|	|	|
13+ 0	0.6564	1.04	| Q | V |	|	|	|
13+ 5	0.6636	1.05	| Q | V |	|	|	|
13+10	0.6710	1.07	| Q | V |	|	|	|
13+15	0.6785	1.09	| Q | V |	|	|	|
13+20	0.6861	1.11	| Q | V |	|	|	|
13+25	0.6939	1.13	| Q | V |	|	|	|
13+30	0.7018	1.15	| Q | V |	|	|	|
13+35	0.7099	1.17	| Q | V |	|	|	|
13+40	0.7181	1.19	| Q | V |	|	|	|
13+45	0.7264	1.21	| Q | V |	|	|	|
13+50	0.7350	1.24	| Q | V |	|	|	|
13+55	0.7437	1.26	| Q | V |	|	|	|
14+ 0	0.7526	1.29	| Q | V |	|	|	|
14+ 5	0.7617	1.32	| Q | V |	|	|	|
14+10	0.7710	1.36	| Q | V |	|	|	|
14+15	0.7806	1.39	| Q | V |	|	|	|
14+20	0.7904	1.43	| Q | V |	|	|	|
14+25	0.8005	1.46	| Q | V |	|	|	|
14+30	0.8109	1.51	| Q | V |	|	|	|
14+35	0.8215	1.55	| Q | V |	|	|	|

14+40	0.8326	1.60	| Q | V |	|	|	|
14+45	0.8440	1.65	| Q | V |	|	|	|
14+50	0.8558	1.72	| Q | V |	|	|	|
14+55	0.8680	1.78	| Q | V |	|	|	|
15+ 0	0.8808	1.86	| Q | V |	|	|	|
15+ 5	0.8941	1.93	| Q | V |	|	|	|
15+10	0.9081	2.03	| Q | V |	|	|	|
15+15	0.9228	2.13	| Q | V|	|	|	|
15+20	0.9384	2.26	| Q | V|	|	|	|
15+25	0.9546	2.35	| Q | V|	|	|	|
15+30	0.9713	2.42	| Q | V |	|	|	|
15+35	0.9892	2.60	| Q | V |	|	|	|
15+40	1.0091	2.89	| Q | V |	|	|	|
15+45	1.0314	3.24	| Q | V |	|	|	|
15+50	1.0576	3.80	| Q | V |	|	|	|
15+55	1.0899	4.69	| Q| V |	|	|	|
16+ 0	1.1352	6.59	| | Q | V |	|	|	|
16+ 5	1.2263	13.23	| | | VQ |	|	|	|
16+10	1.3604	19.47	| | | V |	|	|	Q |
16+15	1.4059	6.59	| | Q | | V|	|	|	|
16+20	1.4288	3.33	| Q | | V|	|	|	|
16+25	1.4473	2.68	| Q | | V |	|	|	|
16+30	1.4638	2.40	| Q | | V |	|	|	|
16+35	1.4786	2.14	| Q | | V |	|	|	|
16+40	1.4919	1.94	| Q | | V |	|	|	|
16+45	1.5042	1.78	| Q | | |V |	|	|	|
16+50	1.5156	1.66	| Q | | |V |	|	|	|
16+55	1.5263	1.55	| Q | | |V |	|	|	|
17+ 0	1.5364	1.46	| Q | | |V |	|	|	|
17+ 5	1.5460	1.39	| Q | | | V |	|	|	|
17+10	1.5551	1.32	| Q | | | V |	|	|	|
17+15	1.5638	1.27	| Q | | | V |	|	|	|
17+20	1.5722	1.21	| Q | | | V |	|	|	|
17+25	1.5802	1.17	| Q | | | V |	|	|	|
17+30	1.5880	1.13	| Q | | | V |	|	|	|
17+35	1.5955	1.09	| Q | | | V |	|	|	|
17+40	1.6027	1.06	| Q | | | V |	|	|	|
17+45	1.6098	1.02	| Q | | | V |	|	|	|
17+50	1.6167	1.00	|Q | | | V |	|	|	|
17+55	1.6233	0.97	|Q | | | V |	|	|	|
18+ 0	1.6298	0.94	|Q | | | V |	|	|	|
18+ 5	1.6362	0.93	|Q | | | V |	|	|	|
18+10	1.6425	0.91	|Q | | | V |	|	|	|
18+15	1.6487	0.90	|Q | | | V |	|	|	|
18+20	1.6547	0.88	|Q | | | V |	|	|	|
18+25	1.6606	0.86	|Q | | | V |	|	|	|
18+30	1.6664	0.84	|Q | | | V |	|	|	|
18+35	1.6721	0.83	|Q | | | V |	|	|	|
18+40	1.6777	0.81	|Q | | | V |	|	|	|
18+45	1.6832	0.80	|Q | | | V |	|	|	|
18+50	1.6885	0.78	|Q | | | V |	|	|	|
18+55	1.6938	0.77	|Q | | | V |	|	|	|
19+ 0	1.6990	0.76	|Q | | | V |	|	|	|
19+ 5	1.7041	0.74	|Q | | | V |	|	|	|
19+10	1.7092	0.73	|Q | | | V |	|	|	|
19+15	1.7142	0.72	|Q | | | V |	|	|	|
19+20	1.7190	0.71	|Q | | | V |	|	|	|
19+25	1.7239	0.70	|Q | | | V |	|	|	|
19+30	1.7286	0.69	|Q | | | V |	|	|	|

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   19+35       1.7333      0.68  |Q        |         |         |    V    |
   19+40       1.7379      0.67  |Q        |         |         |     V   |
   19+45       1.7425      0.66  |Q        |         |         |     V   |
   19+50       1.7470      0.65  |Q        |         |         |     V   |
   19+55       1.7515      0.65  |Q        |         |         |     V   |
   20+ 0       1.7559      0.64  |Q        |         |         |     V   |
   20+ 5       1.7602      0.63  |Q        |         |         |     V   |
   20+10       1.7645      0.62  |Q        |         |         |     V   |
   20+15       1.7688      0.62  |Q        |         |         |     V   |
   20+20       1.7730      0.61  |Q        |         |         |     V   |
   20+25       1.7771      0.60  |Q        |         |         |     V   |
   20+30       1.7812      0.60  |Q        |         |         |     V   |
   20+35       1.7853      0.59  |Q        |         |         |      V  |
   20+40       1.7893      0.58  |Q        |         |         |      V  |
   20+45       1.7933      0.58  |Q        |         |         |      V  |
   20+50       1.7972      0.57  |Q        |         |         |      V  |
   20+55       1.8011      0.57  |Q        |         |         |      V  |
   21+ 0       1.8050      0.56  |Q        |         |         |      V  |
   21+ 5       1.8088      0.56  |Q        |         |         |      V  |
   21+10       1.8126      0.55  |Q        |         |         |      V  |
   21+15       1.8164      0.55  |Q        |         |         |      V  |
   21+20       1.8201      0.54  |Q        |         |         |      V  |
   21+25       1.8238      0.54  |Q        |         |         |      V  |
   21+30       1.8275      0.53  |Q        |         |         |      V  |
   21+35       1.8311      0.53  |Q        |         |         |      V  |
   21+40       1.8347      0.52  |Q        |         |         |       V |
   21+45       1.8383      0.52  |Q        |         |         |       V |
   21+50       1.8418      0.51  |Q        |         |         |       V |
   21+55       1.8453      0.51  |Q        |         |         |       V |
   22+ 0       1.8488      0.51  |Q        |         |         |       V |
   22+ 5       1.8522      0.50  |Q        |         |         |       V |
   22+10       1.8557      0.50  Q         |         |         |       V |
   22+15       1.8591      0.49  Q         |         |         |       V |
   22+20       1.8624      0.49  Q         |         |         |       V |
   22+25       1.8658      0.49  Q         |         |         |       V |
   22+30       1.8691      0.48  Q         |         |         |       V |
   22+35       1.8724      0.48  Q         |         |         |       V |
   22+40       1.8757      0.48  Q         |         |         |       V |
   22+45       1.8789      0.47  Q         |         |         |       V |
   22+50       1.8822      0.47  Q         |         |         |        V|
   22+55       1.8854      0.47  Q         |         |         |        V|
   23+ 0       1.8886      0.46  Q         |         |         |        V|
   23+ 5       1.8917      0.46  Q         |         |         |        V|
   23+10       1.8949      0.46  Q         |         |         |        V|
   23+15       1.8980      0.45  Q         |         |         |        V|
   23+20       1.9011      0.45  Q         |         |         |        V|
   23+25       1.9042      0.45  Q         |         |         |        V|
   23+30       1.9073      0.44  Q         |         |         |        V|
   23+35       1.9103      0.44  Q         |         |         |        V|
   23+40       1.9133      0.44  Q         |         |         |        V|
   23+45       1.9163      0.44  Q         |         |         |        V|
   23+50       1.9193      0.43  Q         |         |         |        V|
   23+55       1.9223      0.43  Q         |         |         |        V|
   24+ 0       1.9252      0.43  Q         |         |         |        V|
   24+ 5       1.9274      0.31  Q         |         |         |        V|
   24+10       1.9277      0.04  Q         |         |         |         V
-------------------------------------------------------------------------
```

EXCERPTS

NOAA Atlas 14, Volume 6, Version 2
Location name: San Bernardino, California, USA*
Latitude: 34.1348°, Longitude: -117.3138°
Elevation: 1191.48 ft**
* source: ESRI Maps
** source: USGS

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_&_aerials

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	**0.122** (0.102–0.148)	**0.160** (0.133–0.195)	**0.212** (0.176–0.258)	**0.255** (0.210–0.314)	**0.317** (0.251–0.403)	**0.366** (0.284–0.476)	**0.418** (0.317–0.557)	**0.473** (0.348–0.649)	**0.552** (0.390–0.790)	**0.616** (0.420–0.914)
10-min	**0.175** (0.146–0.213)	**0.230** (0.191–0.279)	**0.304** (0.252–0.370)	**0.366** (0.301–0.450)	**0.454** (0.360–0.578)	**0.525** (0.408–0.682)	**0.599** (0.454–0.798)	**0.678** (0.499–0.931)	**0.791** (0.558–1.13)	**0.883** (0.602–1.31)
15-min	**0.212** (0.176–0.257)	**0.278** (0.231–0.338)	**0.367** (0.304–0.448)	**0.443** (0.364–0.544)	**0.549** (0.436–0.699)	**0.634** (0.493–0.825)	**0.724** (0.549–0.965)	**0.820** (0.604–1.13)	**0.957** (0.675–1.37)	**1.07** (0.728–1.58)
30-min	**0.315** (0.262–0.383)	**0.414** (0.344–0.503)	**0.547** (0.453–0.667)	**0.659** (0.542–0.811)	**0.818** (0.649–1.04)	**0.945** (0.734–1.23)	**1.08** (0.817–1.44)	**1.22** (0.899–1.68)	**1.43** (1.00–2.04)	**1.59** (1.08–2.36)
60-min	**0.462** (0.384–0.561)	**0.606** (0.503–0.737)	**0.801** (0.664–0.977)	**0.966** (0.793–1.19)	**1.20** (0.951–1.52)	**1.38** (1.08–1.80)	**1.58** (1.20–2.11)	**1.79** (1.32–2.46)	**2.09** (1.47–2.99)	**2.33** (1.59–3.46)
2-hr	**0.671** (0.558–0.814)	**0.862** (0.716–1.05)	**1.12** (0.926–1.36)	**1.33** (1.09–1.64)	**1.63** (1.29–2.07)	**1.86** (1.44–2.42)	**2.10** (1.59–2.80)	**2.35** (1.73–3.23)	**2.71** (1.91–3.87)	**2.99** (2.04–4.43)
3-hr	**0.826** (0.687–1.00)	**1.05** (0.876–1.28)	**1.36** (1.12–1.65)	**1.61** (1.32–1.98)	**1.95** (1.55–2.48)	**2.22** (1.73–2.89)	**2.50** (1.89–3.33)	**2.79** (2.05–3.83)	**3.19** (2.25–4.57)	**3.51** (2.39–5.20)
6-hr	**1.17** (0.972–1.42)	**1.48** (1.23–1.80)	**1.90** (1.57–2.31)	**2.24** (1.84–2.75)	**2.70** (2.14–3.43)	**3.05** (2.37–3.97)	**3.42** (2.59–4.56)	**3.80** (2.80–5.21)	**4.31** (3.04–6.17)	**4.72** (3.21–6.99)
12-hr	**1.55** (1.29–1.88)	**1.98** (1.65–2.41)	**2.54** (2.10–3.10)	**3.00** (2.46–3.68)	**3.61** (2.87–4.59)	**4.08** (3.17–5.30)	**4.56** (3.45–6.07)	**5.05** (3.72–6.92)	**5.71** (4.03–8.17)	**6.22** (4.24–9.22)
24-hr	**2.07** (1.83–2.38)	**2.68** (2.37–3.09)	**3.47** (3.06–4.01)	**4.11** (3.60–4.79)	**4.97** (4.21–5.99)	**5.63** (4.67–6.92)	**6.29** (5.09–7.92)	**6.96** (5.49–9.02)	**7.87** (5.96–10.6)	**8.57** (6.27–12.0)
2-day	**2.52** (2.23–2.91)	**3.32** (2.94–3.83)	**4.37** (3.86–5.06)	**5.22** (4.57–6.09)	**6.38** (5.40–7.68)	**7.26** (6.02–8.93)	**8.16** (6.61–10.3)	**9.08** (7.16–11.8)	**10.3** (7.82–13.9)	**11.3** (8.26–15.8)
3-day	**2.70** (2.39–3.11)	**3.61** (3.19–4.17)	**4.81** (4.25–5.57)	**5.80** (5.08–6.76)	**7.15** (6.06–8.62)	**8.20** (6.81–10.1)	**9.28** (7.51–11.7)	**10.4** (8.19–13.5)	**11.9** (9.01–16.1)	**13.1** (9.59–18.3)
4-day	**2.87** (2.54–3.31)	**3.88** (3.43–4.47)	**5.21** (4.60–6.03)	**6.32** (5.53–7.37)	**7.84** (6.64–9.45)	**9.03** (7.49–11.1)	**10.3** (8.31–12.9)	**11.5** (9.09–14.9)	**13.3** (10.1–17.9)	**14.7** (10.7–20.5)
7-day	**3.25** (2.87–3.74)	**4.43** (3.92–5.11)	**6.01** (5.30–6.96)	**7.33** (6.42–8.55)	**9.16** (7.76–11.0)	**10.6** (8.79–13.0)	**12.1** (9.79–15.2)	**13.7** (10.8–17.7)	**15.8** (12.0–21.3)	**17.5** (12.8–24.5)
10-day	**3.54** (3.14–4.08)	**4.86** (4.30–5.61)	**6.64** (5.86–7.68)	**8.13** (7.11–9.48)	**10.2** (8.64–12.3)	**11.8** (9.82–14.6)	**13.5** (11.0–17.1)	**15.3** (12.1–19.9)	**17.8** (13.5–24.1)	**19.8** (14.5–27.7)
20-day	**4.36** (3.86–5.03)	**6.06** (5.36–6.99)	**8.36** (7.37–9.67)	**10.3** (9.00–12.0)	**13.0** (11.0–15.7)	**15.2** (12.6–18.6)	**17.4** (14.1–21.9)	**19.8** (15.6–25.6)	**23.2** (17.5–31.2)	**25.9** (18.9–36.1)
30-day	**5.15** (4.56–5.93)	**7.16** (6.33–8.26)	**9.90** (8.73–11.4)	**12.2** (10.7–14.2)	**15.4** (13.1–18.6)	**18.0** (15.0–22.2)	**20.8** (16.8–26.1)	**23.6** (18.6–30.6)	**27.7** (21.0–37.4)	**31.0** (22.7–43.2)
45-day	**6.17** (5.47–7.11)	**8.55** (7.56–9.87)	**11.8** (10.4–13.6)	**14.5** (12.7–16.9)	**18.4** (15.6–22.1)	**21.4** (17.8–26.4)	**24.7** (20.0–31.1)	**28.1** (22.1–36.4)	**33.0** (24.9–44.4)	**36.9** (27.0–51.4)
60-day	**7.20** (6.38–8.30)	**9.90** (8.76–11.4)	**13.6** (12.0–15.7)	**16.7** (14.6–19.4)	**21.0** (17.8–25.3)	**24.5** (20.3–30.1)	**28.2** (22.8–35.5)	**32.1** (25.3–41.5)	**37.6** (28.4–50.6)	**42.0** (30.7–58.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

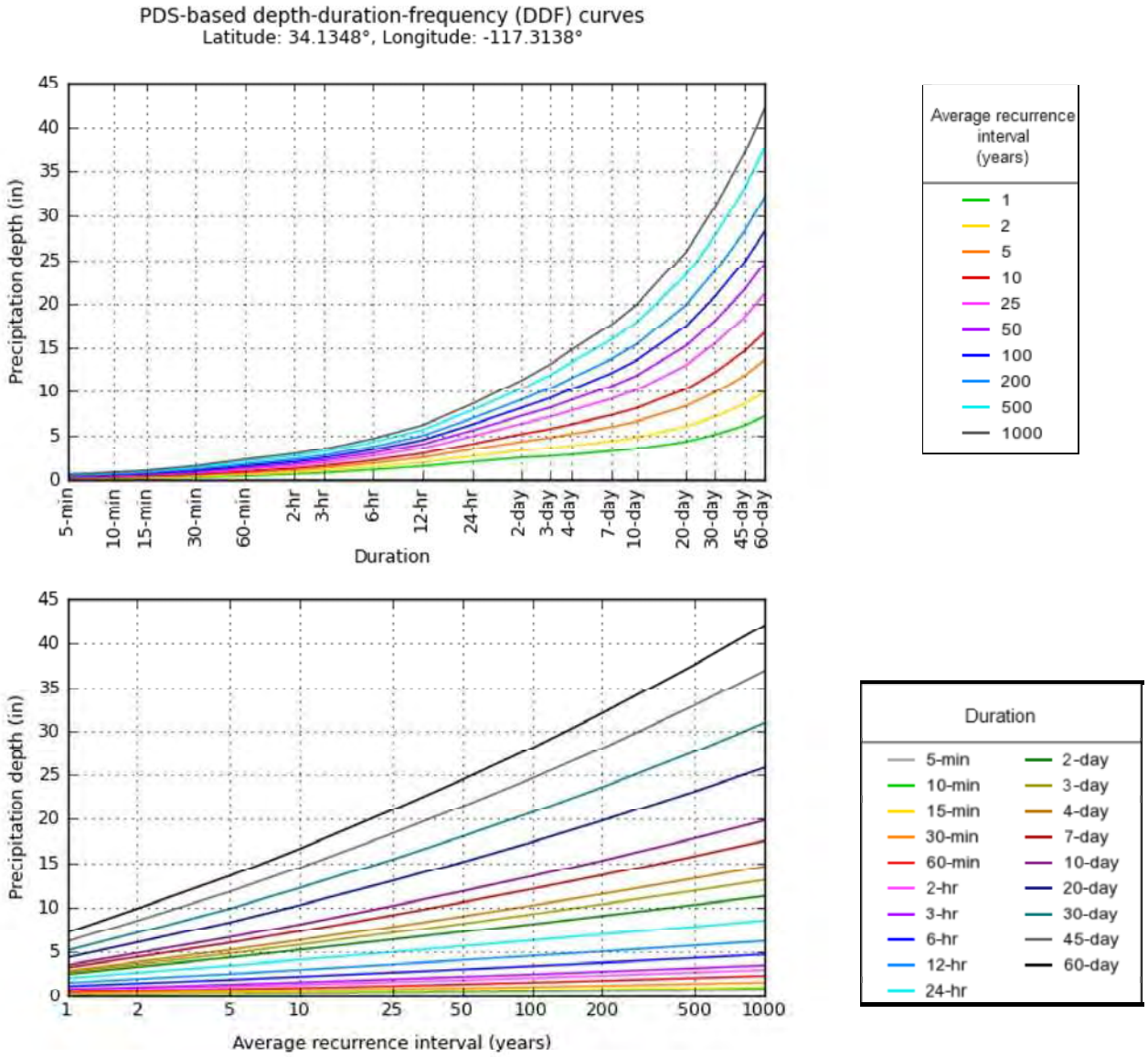
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper 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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EXCERPT 1 NOAA ATLAS 14 RAINFALL

PF graphical



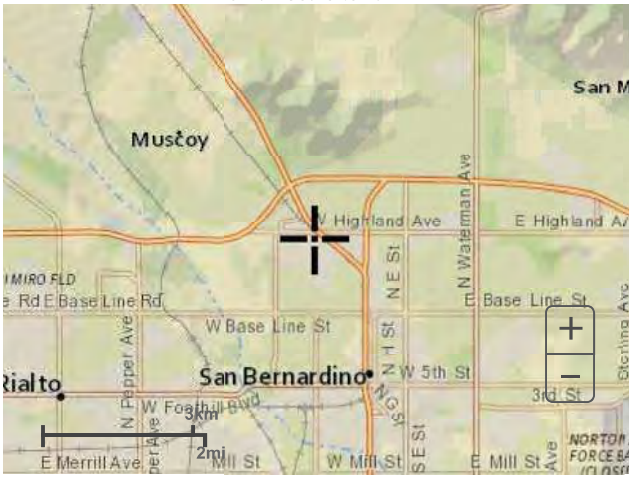
NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Mon Oct 7 01:32:00 2019

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Maps & aerials

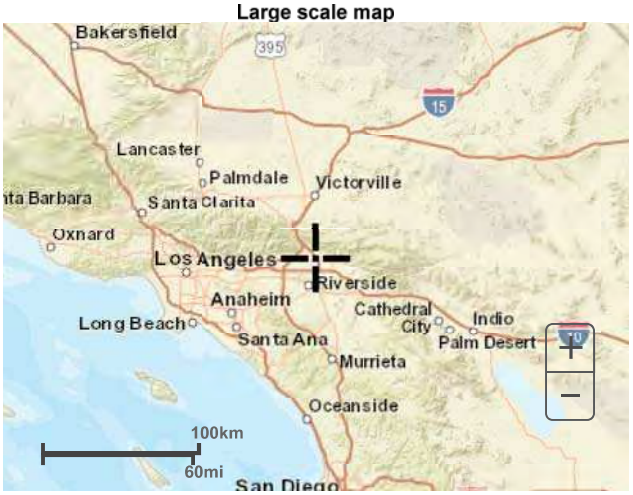
Small scale terrain



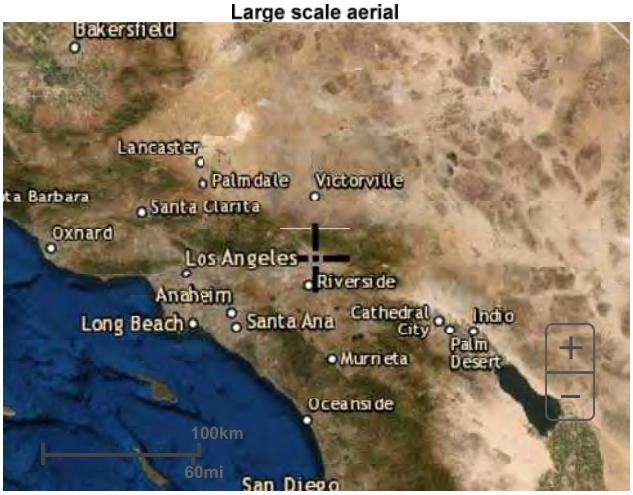
Large scale terrain



Large scale map



Large scale aerial

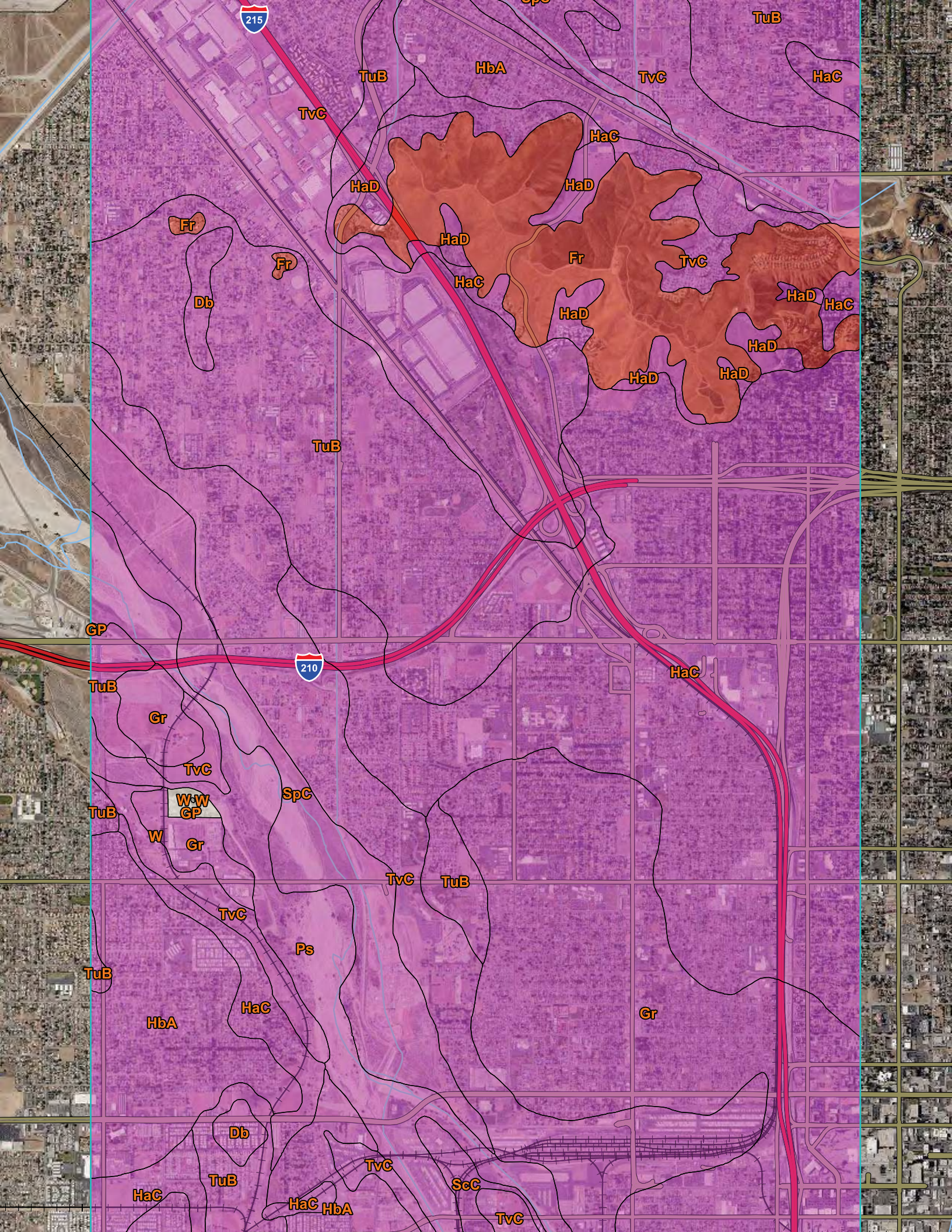


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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

EXCERPT 2 NRCS HYDROLOGICAL SOILS


215
210
TuB
HbA
TvC
HaC
HaD
Fr
Db
GP
W
Gr
SpC
Ps
ScC

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

Soil Survey Area: San Bernardino County Southwestern Part, California
Survey Area Data: Version 11, Sep 16, 2019

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

Date(s) aerial images were photographed: Apr 1, 2018—Jun 30, 2018

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Db	Delhi fine sand	A	66.4	0.6%
Fr	Friant-Rock outcrop complex	D	793.5	6.9%
GP	Quarries and Pits soils		15.0	0.1%
Gr	Grangeville fine sandy loam, warm MAAT, MLRA 19	A	1,393.7	12.1%
HaC	Hanford coarse sandy loam, 2 to 9 percent slopes	A	2,495.2	21.6%
HaD	Hanford coarse sandy loam, 9 to 15 percent slopes	A	200.0	1.7%
HbA	Hanford sandy loam, 0 to 2 percent slopes	A	791.2	6.8%
Ps	Psamments, Fluvents and Frequently flooded soils	A	471.0	4.1%
ScC	San Emigdio fine sandy loam, 2 to 9 percent slopes	A	50.6	0.4%
SpC	Soboba stony loamy sand, 2 to 9 percent slopes	A	581.1	5.0%
TuB	Tujunga loamy sand, 0 to 5 percent slopes	A	1,897.7	16.4%
TvC	Tujunga gravelly loamy sand, 0 to 9 percent slopes	A	2,796.4	24.2%
W	Water		1.3	0.0%
Totals for Area of Interest			**11,553.2**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

EXHIBITS

EXHIBIT A: UNIT HYDROGRAPH HYDROLOGY MAPS

SHEET 1 OF 1

BNSF ONO LEAD TRACK EXTENSION PROJECT

IN THE CITY OF SAN BERNARDINO STATE OF CALIFORNIA

UNIT HYDROGRAPH HYDROLOGY MAP





GRAPHIC SCALE
400' 0 200' 400' 800'
1" = 400'

LEGEND

- EXISTING COMMERCIAL
- EXISTING RESIDENTIAL
- EXISTING STREET TO PERVIOUS AREA
- EXISTING STREET TO RAIL
- EXISTING STREET TO PROPOSED STREET
- EXISTING STREET
- UNDEVELOPED AREA
- EXISTING RAIL
- PROPOSED STREET
- DRAINAGE BOUDNARY AREA
- SOUNDWALL
- XXX / X.X — DRAINAGE AREA / ACRES

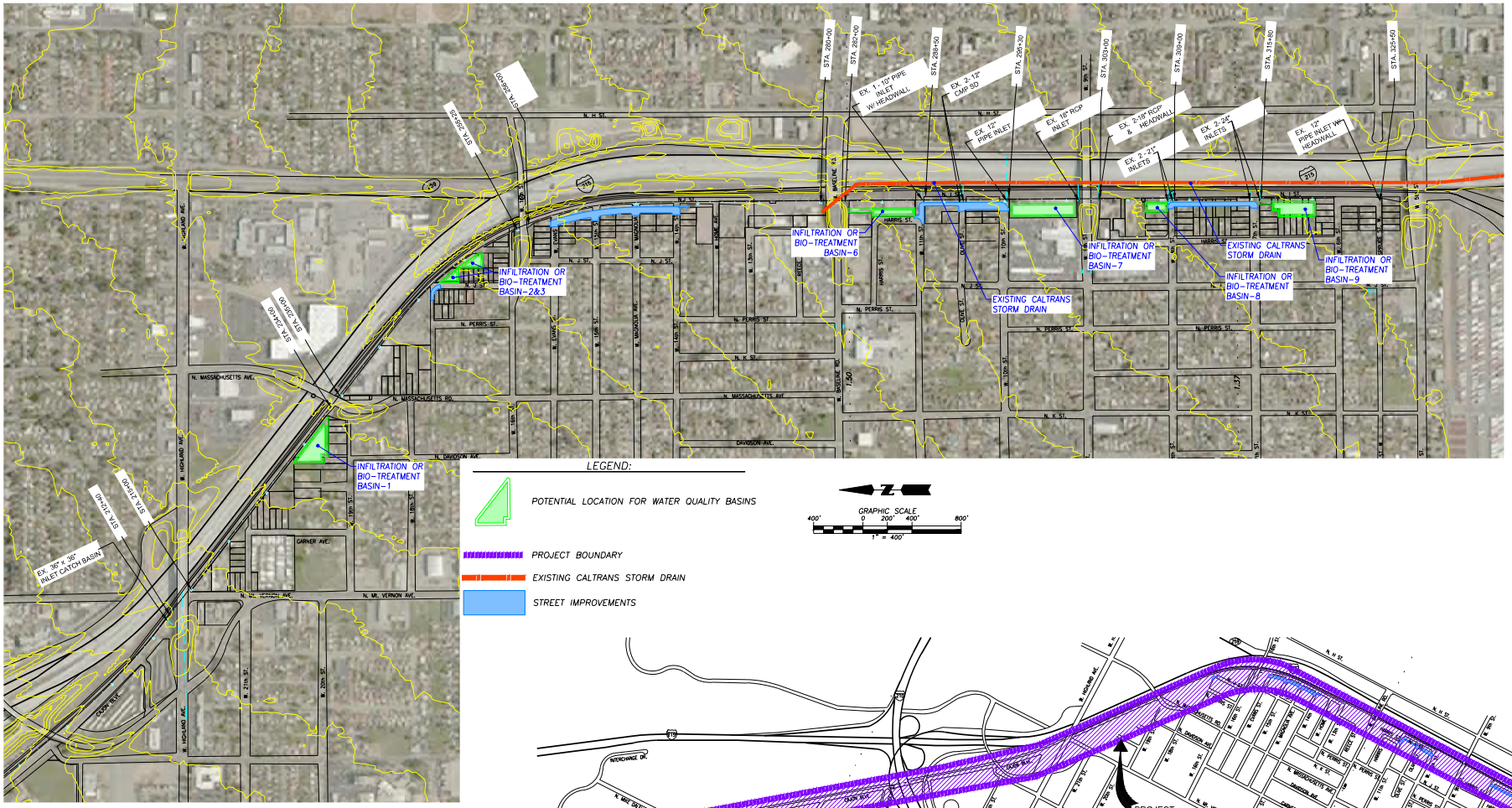
EXHIBIT A

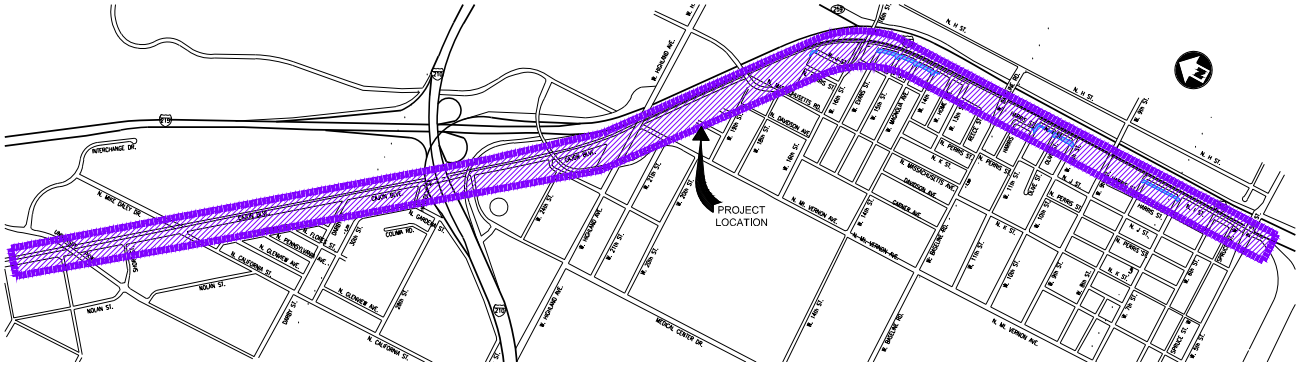
JLC Engineering & Consulting, Inc.
41660 IVY STREET, SUITE A
MURRIETA, CA 92562
PH. 951.304.9552 FAX 951.304.3568

BNSF ONO LEAD TRACK

UNIT HYDROGPAPH HYDROLOGY MAP

EXHIBIT B: WATER QUALITY BASIN MAP





N.T.S.

BNSF ONO LEAD TRACK EXTENSION PROJECT

COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

EXHIBIT B
POTENTIAL LOCATIONS FOR WATER QUALITY BASINS

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BNSF ONO LEAD TRACK EXTENSION

EXHIBIT B: POTENTIAL WATER QUALITY BASIN LOCATIONS