PRELIMINARY HYDROLOGY REPORT

For

Stirling – SCLA Bldg 19
PLN17-00028

PROJECT LOCATION

Southwest Corner of Phantom West and Nevada Ave
City of Victorville, CA

CITY OF VICTORVILLE
ENGINEERING DEPT.
DATE 10/05/17
APPROVED BY ADL

DEVELOPER

Stirling Capital Investment/Lot 19 LLC
27422 Portola Parkway, Suite 300
Foothill Ranch, CA 92610

949-462-0909

PREPARED BY

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REGISTERED PROFESSIONAL ENGINEER
MANUEL J. GONZALES
No. 65195
Expiration
09/30/19
CIVIL
STATE OF CALIFORNIA

Manuel Gonzales, P.E.
C65195, Exp 09/30/2019

PREPARATION DATE

May 2, 2017
Revised September 11, 2017

HZ PROJECT NUMBER

R307180.01

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Introduction

This preliminary hydrology report has been prepared for the Stirling Development SCLA Lot 19. The project is a new development of an industrial warehouse facility located on the southwest corner of Phantom West and Nevada Avenue, within the George Airforce Base area now known as the Southern California Logistics Centre in City of Victorville, California. The proposed building is approximately 974,540 square feet in size on approximately 44.7 acres of vacant land and will require a WQMP.

The developer of this project is Stirling Capital Investment/Lot 19 LLC located at 27422 Portola Parkway, Suite 300 Foothill Ranch, CA 92610. The contact number is (949) 462-0909. The engineer who prepared this report is Manny Gonzales, PE from Huitt-Zollars, Inc which is located at 3990 Concours, Suite 330 Ontario, CA 91764. The contact number is (909) 941-7799.

The purpose of this report is to present the drainage concept for the project and to determine the approximate design flow rates and storm drain sizes as well as determining the required basin sizes that will be needed for the project site. The hydrology maps and calculations reflect the tributary areas and 100-year storm event runoff flows.

Existing Site Discussion

The existing site grades range from a maximum elevation of 2877 feet in the southwest region of the site to a minimum elevation of 2858 feet in the northeast region of the site. The site slopes downward towards the north at a gradient that ranges from 0.5 to 1.8 percent. The site is vacant and is surrounded by industrial zoning to the west, east and south and the airport to the north. Although the site is vacant, there is evidence that the site has been graded and disturbed. The site is considered 100 percent pervious in its current condition, but will change to 10% pervious in the post developed condition.

A draft master drainage plan for the SCLA area was prepared by others, but never completed or approved by the City and therefore cannot be relied on for planning or design purposes.

Rainfall Data

A hydrologic analysis was prepared using the methodology outlined in the San Bernardino County Flood Control District (SBCFCD) Hydrology Manual. A rational method & unit hydrograph analysis were completed for the existing & proposed 10-year and 100-year storm events using Civild software. An on-site hydrology map for this project is included in Appendix B of this report.

The rainfall rates were taken from the isohyetal maps in the County of San Bernardino Hydrology Manual. The hydrologic soils type for the site is "C" and was taken from the soil map in the Hydrology Manual (see Appendix E for reference maps). A "commercial" land use designation was used with an AMC of III for the 100-year storm and an AMC of II for the 10-year storm.

Onsite Site Discussion

The runoff from the existing site sheet flows from south to north and discharges to Phantom West. The proposed drainage pattern will be consistent with the existing drainage pattern.

The proposed building will have a roofline that drains roughly half of the roof runoff to the south and the other half to the north. The runoff directed to the south will be intercepted by catch basins located outside of the loading dock area. The intercepted flow will be conveyed in a proposed

storm drain pipe directing the flows to the proposed basin. The northerly building half along with the westerly parking area will surface flow to the north. Catch basins will be strategically located at the low points along the northerly curbs to intercept the runoff from the building and parking areas. The intercepted flow will be conveyed by pipe directly into the basin at three separate inlet points.

The combined flow in the basin will exit from the basin in two ways. The equivalent of the design captured volume (generated by a 2-year storm) will infiltrate through the bottom of the basin. The higher flows will be discharged through a controlled four foot by three foot outlet structure located two feet above the basin bottom at elevation 2860. The controlled discharge will assure that no more than 90% of the historic flow amount leaves the basin.

Basin routing calculations have been prepared for the 10-year and 100-year storm events and are included in this report. Three proposed 18-inch storm drain pipes will connect the outlet structure to the back of an existing catch basin that discharges north of Phantom West into an existing earthen channel.

Offsite Runoff

Approximately 2.6 acres generating 5.4 cfs from the south will also be collected in the proposed onsite storm drain pipe. This area will be tributary in an interim condition, until the site to the south develops. An earthen swale will be graded directing the offsite flow to two separate drop inlets.

Stormwater Treatment

The onsite runoff will be directed to an infiltration and detention basin at the north side of the project site where it can provide up to approximately 116,250 CF of treatment. Catch basin filters will be installed to provide pre-treatment of the rain water. However, an alternative to the pre-treatment may be installing a forebay at each basin inlet location. Said forebay would consist of adding a 12-inch concrete curb around the grouted riprap area with two inch weep holes equally spaced near the invert. An infiltration rate of 6.4 in/hr will be used which represents less than half of the test results average. In addition, a safety factor of three will be applied.

Phase II of the Mojave River Watershed requires that we demonstrate that a 10-year 24-hour 85 Percentile storm will not result in hydromodifications. Basin routing calculations were prepared for the 10-year 24-hour storm and demonstrate that the peak outlet discharge will be less than the existing peak storm discharge. The proposed basin will detain the difference in the pre-developed unit hydrograph volume and the post developed volume. The basin routing and detention mechanics will also increase the time of concentration.

Conclusion

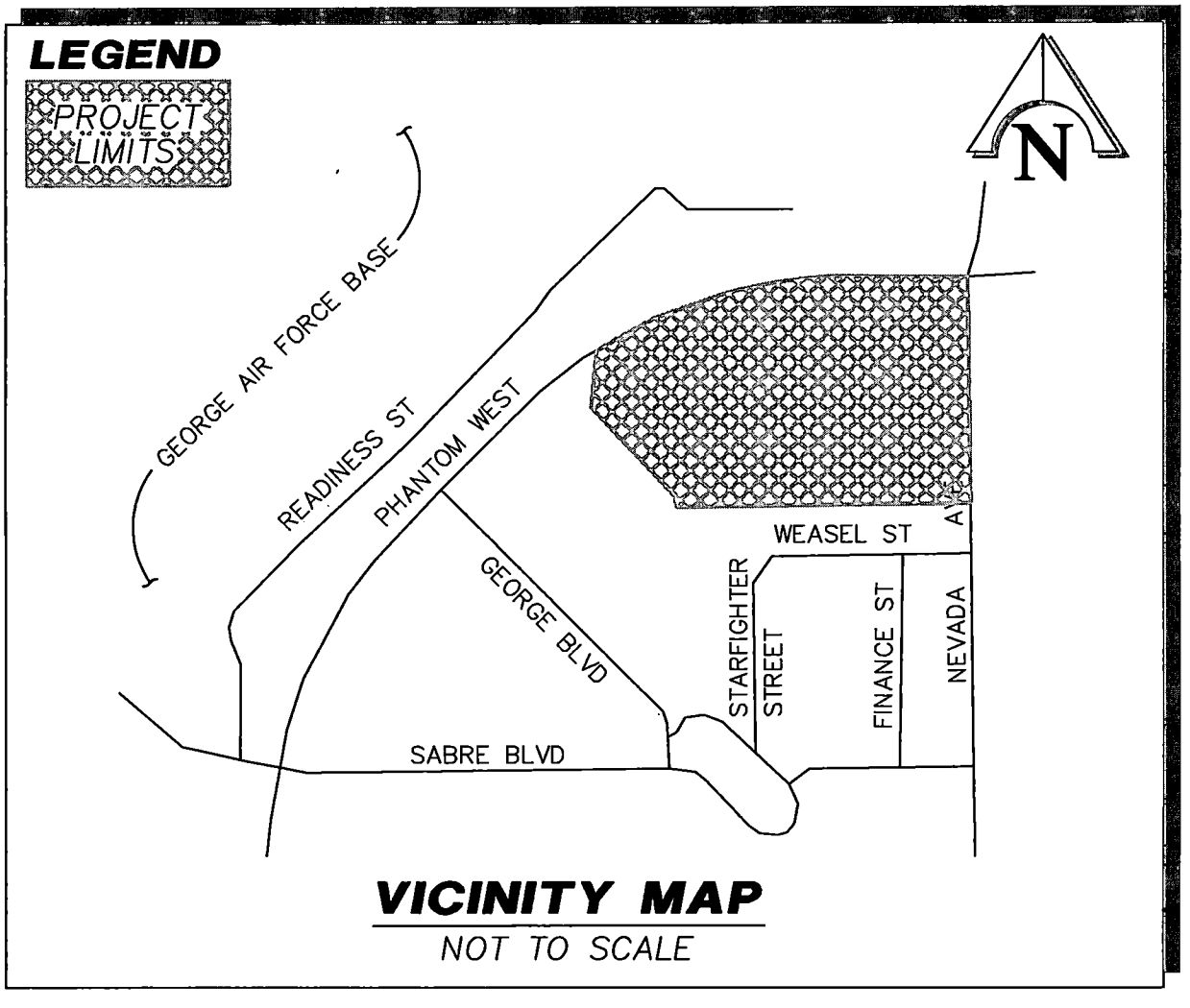
The proposed infiltration/detention basin will provide storm water detention capacity while reducing the overall outflow of storm water from the project site during all storm events. A basin routing analysis was prepared and resulted in a discharge of 59.2 CFS during the 100-year event with maximum water ponding depth of 3.4 feet. The maximum allowable discharge from the existing unit hydrograph is 65.5 CFS (90% of 72.8 cfs). The proposed discharge will be approximately 19% less than the existing flow. See summary table below.

The project basin will provide peak storm mitigation and meet Phase II Mojave River Watershed WQMP requirements. All proposed drainage and storm drain facilities are sized adequately for the 100-year storm event. Additional calculations will be provided in the final Drainage Report including storm drain hydraulics and final catch basin sizing.

Summary Table

	*Q_{10} (CFS)	Basin Outlet 10 yr (CFS)	*Q_{100} (CFS)	Basin Outlet 100 yr (CFS)
Existing	41.8	-	72.8	-
Proposed	72.2	37.1	114.1	59.2

*Based on unit hydrograph



VICINITY MAP

NOT TO SCALE

List of Appendices

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	Proposed Condition
Appendix B	Existing & Proposed Condition Preliminary Hydrology Map
Appendix C	Unit Hydrograph Analysis
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	Proposed Condition
Appendix D	Routing Analysis
Appendix E	Soil Group Map and Isohyetal Map
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Appendix A
100-year Rational Method Hydrologic Analysis

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 09/08/17

SCLA - 19
10 YEAR STORM EVENT - EXISTING CONDITION
7180QEX10
R307180.01

Program License Serial Number 6145

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

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Rational hydrology study storm event year is    10.0
Computed rainfall intensity:
Storm year =    10.00   1 hour rainfall =     0.750 (In.)
Slope used for rainfall intensity curve b =  0.7000
Soil antecedent moisture condition (AMC) = 2


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Process from Point/Station        1.000 to Point/Station        2.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 91.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.174(In/Hr)
Initial subarea data:
Initial area flow distance =   626.000(Ft.)
Top (of initial area) elevation =  2874.100(Ft.)
Bottom (of initial area) elevation =  2870.500(Ft.)
Difference in elevation =     3.600(Ft.)
Slope =    0.00575  s(%)=       0.58
TC = k(0.465)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.147 min.
Rainfall intensity =      1.802(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.813
Subarea runoff =     14.071(CFS)
Total initial stream area =        9.600(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.174(In/Hr)


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Process from Point/Station        2.000 to Point/Station        3.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =  2870.500(Ft.)
Downstream point elevation =  2863.400(Ft.)
Channel length thru subarea  =   822.000(Ft.)
Channel base width  =  500.000(Ft.)
Slope or 'Z' of left channel bank = 100.000
Slope or 'Z' of right channel bank = 100.000
Estimated mean flow rate at midpoint of channel =     15.058(CFS)
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Manning's 'N'    = 0.030
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =     15.058(CFS)
Depth of flow =   0.049(Ft.), Average velocity =   0.611(Ft/s)
Channel flow top width =  509.763(Ft.)
Flow Velocity =    0.61(Ft/s)
Travel time  =   22.42 min.
Time of concentration =   39.57 min.
Critical depth =      0.030(Ft.)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 91.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.174(In/Hr)
Rainfall intensity =      1.004(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.744
Subarea runoff =      1.913(CFS) for   11.800(Ac.)
Total runoff =     15.984(CFS)
Effective area this stream =       21.40(Ac.)
Total Study Area (Main Stream No. 1) =       21.40(Ac.)
Area averaged Fm value =    0.174(In/Hr)
Depth of flow =   0.051(Ft.), Average velocity =   0.626(Ft/s)
Critical depth =      0.032(Ft.)


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Process from Point/Station       3.000 to Point/Station       4.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =  2863.400(Ft.)
End of street segment elevation =  2861.000(Ft.)
Length of street segment  =   792.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  40.000(Ft.)
Distance from crown to crossfall grade break  =  20.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  21.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     15.988(CFS)
Depth of flow =   0.656(Ft.), Average velocity =   2.239(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  26.486(Ft.)
Flow velocity =   2.24(Ft/s)
Travel time =    5.90 min.     TC =   45.47  min.
 Adding area flow to street
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.055(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     14.201(CFS)
therefore the upstream flow rate of Q =     15.984(CFS) is being used
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Rainfall intensity =      0.911(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.728
Subarea runoff =      0.000(CFS) for    0.010(Ac.)
Total runoff =     15.984(CFS)
Effective area this stream =       21.41(Ac.)
Total Study Area (Main Stream No. 1) =       21.41(Ac.)
Area averaged Fm value =    0.174(In/Hr)
Street flow at end of street =     15.984(CFS)
Half street flow at end of street =     15.984(CFS)
Depth of flow =   0.656(Ft.), Average velocity =   2.238(Ft/s)
Flow width (from curb towards crown)=  26.484(Ft.)


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Process from Point/Station        1.000 to Point/Station        4.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     21.410(Ac.)
Runoff from this stream =     15.984(CFS)
Time of concentration =   45.47 min.
Rainfall intensity =     0.911(In/Hr)
Area averaged loss rate (Fm) =    0.1737(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9996


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Process from Point/Station        4.100 to Point/Station        4.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 91.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.174(In/Hr)
Initial subarea data:
Initial area flow distance =   613.000(Ft.)
Top (of initial area) elevation =  2877.400(Ft.)
Bottom (of initial area) elevation =  2869.900(Ft.)
Difference in elevation =     7.500(Ft.)
Slope =    0.01223  s(%)=       1.22
TC = k(0.465)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.621 min.
Rainfall intensity =      2.015(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.822
Subarea runoff =      7.789(CFS)
Total initial stream area =        4.700(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.174(In/Hr)


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Process from Point/Station        4.200 to Point/Station        4.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =  2869.900(Ft.)
Downstream point elevation =  2861.000(Ft.)
Channel length thru subarea  =   933.000(Ft.)
Channel base width  =  100.000(Ft.)
Slope or 'Z' of left channel bank = 100.000
Slope or 'Z' of right channel bank = 100.000
Estimated mean flow rate at midpoint of channel =     10.860(CFS)
Manning's 'N'    = 0.030
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Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =     10.860(CFS)
Depth of flow =   0.100(Ft.), Average velocity =   0.985(Ft/s)
Channel flow top width =  120.044(Ft.)
Flow Velocity =    0.98(Ft/s)
Travel time  =   15.79 min.
Time of concentration =   30.41 min.
Critical depth =      0.070(Ft.)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 91.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.174(In/Hr)
Rainfall intensity =      1.207(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.770
Subarea runoff =      6.065(CFS) for   10.200(Ac.)
Total runoff =     13.854(CFS)
Effective area this stream =       14.90(Ac.)
Total Study Area (Main Stream No. 1) =       36.31(Ac.)
Area averaged Fm value =    0.174(In/Hr)
Depth of flow =   0.116(Ft.), Average velocity =   1.075(Ft/s)
Critical depth =      0.082(Ft.)


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Process from Point/Station        4.100 to Point/Station        4.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     14.900(Ac.)
Runoff from this stream =     13.854(CFS)
Time of concentration =   30.41 min.
Rainfall intensity =     1.207(In/Hr)
Area averaged loss rate (Fm) =    0.1738(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000


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Process from Point/Station        5.100 to Point/Station        5.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 91.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.174(In/Hr)
Initial subarea data:
Initial area flow distance =   762.000(Ft.)
Top (of initial area) elevation =  2875.000(Ft.)
Bottom (of initial area) elevation =  2869.000(Ft.)
Difference in elevation =     6.000(Ft.)
Slope =    0.00787  s(%)=       0.79
TC = k(0.465)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.420 min.
Rainfall intensity =      1.783(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.812
Subarea runoff =      8.832(CFS)
Total initial stream area =        6.100(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.174(In/Hr)


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Process from Point/Station        5.200 to Point/Station        4.000
**** IMPROVED CHANNEL TRAVEL TIME ****
____________________________________________________________________
Upstream point elevation =  2869.000(Ft.)
Downstream point elevation =  2861.000(Ft.)
Channel length thru subarea  =   828.000(Ft.)
Channel base width  =   20.000(Ft.)
Slope or 'Z' of left channel bank = 100.000
Slope or 'Z' of right channel bank =  30.000
Estimated mean flow rate at midpoint of channel =     10.030(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =     10.030(CFS)
Depth of flow =   0.214(Ft.), Average velocity =   1.384(Ft/s)
Channel flow top width =   47.790(Ft.)
Flow Velocity =    1.38(Ft/s)
Travel time  =    9.97 min.
Time of concentration =   27.39 min.
Critical depth =      0.164(Ft.)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 91.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.174(In/Hr)
Rainfall intensity =      1.299(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.780
Subarea runoff =      2.303(CFS) for    4.900(Ac.)
Total runoff =     11.135(CFS)
Effective area this stream =       11.00(Ac.)
Total Study Area (Main Stream No. 1) =       47.31(Ac.)
Area averaged Fm value =    0.174(In/Hr)
Depth of flow =   0.225(Ft.), Average velocity =   1.425(Ft/s)
Critical depth =      0.174(Ft.)


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Process from Point/Station        5.100 to Point/Station        4.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =     11.000(Ac.)
Runoff from this stream =     11.135(CFS)
Time of concentration =   27.39 min.
Rainfall intensity =     1.299(In/Hr)
Area averaged loss rate (Fm) =    0.1738(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)    (Ac.)       (min) (In/Hr)     (In/Hr)


1     15.98    21.410     45.47    0.174      0.911
2     13.85    14.900     30.41    0.174      1.207
3     11.14    11.000     27.39    0.174      1.299
Qmax(1) =
          1.000 *    1.000 *    15.984) +
          0.713 *    1.000 *    13.854) +
          0.655 *    1.000 *    11.135) + =      33.161
Qmax(2) =
          1.402 *    0.669 *    15.984) +
          1.000 *    1.000 *    13.854) +
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          0.918 *    1.000 *    11.135) + =      39.068
Qmax(3) =
          1.526 *    0.602 *    15.984) +
          1.089 *    0.901 *    13.854) +
          1.000 *    1.000 *    11.135) + =      39.416

Total of 3 streams to confluence:
Flow rates before confluence point:
      15.984      13.854      11.135
Maximum flow rates at confluence using above data:
       33.161       39.068       39.416
Area of streams before confluence:
       21.410       14.900       11.000
Effective area values after confluence:
       47.310       40.219       37.317
Results of confluence:
Total flow rate =     39.416(CFS)
Time of concentration =    27.389 min.
Effective stream area after confluence =     37.317(Ac.)
Study area average Pervious fraction(Ap) =  1.000
Study area average soil loss rate(Fm) =    0.174(In/Hr)
Study area total (this main stream) =      47.31(Ac.)
End of computations, Total Study Area =           47.31 (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) = 1.000
Area averaged SCS curve number =  91.0
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San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 09/08/17

SCLA - 19
100 YEAR STORM EVENT - EXISTING CONDITION
7180QEX
R307180.01

Program License Serial Number 6145

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

```
Rational hydrology study storm event year is   100.0
Computed rainfall intensity:
Storm year =   100.00   1 hour rainfall =     1.150 (In.)
Slope used for rainfall intensity curve b =  0.7000
Soil antecedent moisture condition (AMC) = 3


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Process from Point/Station        1.000 to Point/Station        2.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 91.00
Adjusted SCS curve number for AMC 3 = 98.20
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.036(In/Hr)
Initial subarea data:
Initial area flow distance =   626.000(Ft.)
Top (of initial area) elevation =  2874.100(Ft.)
Bottom (of initial area) elevation =  2870.500(Ft.)
Difference in elevation =     3.600(Ft.)
Slope =    0.00575  s(%)=       0.58
TC = k(0.465)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   17.147 min.
Rainfall intensity =      2.764(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.888
Subarea runoff =     23.569(CFS)
Total initial stream area =        9.600(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.036(In/Hr)


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Process from Point/Station        2.000 to Point/Station        3.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =  2870.500(Ft.)
Downstream point elevation =  2863.400(Ft.)
Channel length thru subarea  =   822.000(Ft.)
Channel base width  =  500.000(Ft.)
Slope or 'Z' of left channel bank = 100.000
Slope or 'Z' of right channel bank = 100.000
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Estimated mean flow rate at midpoint of channel =     27.699(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =     27.699(CFS)
Depth of flow =   0.070(Ft.), Average velocity =   0.777(Ft/s)
Channel flow top width =  514.062(Ft.)
Flow Velocity =    0.78(Ft/s)
Travel time  =   17.63 min.
Time of concentration =   34.78 min.
Critical depth =      0.045(Ft.)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 91.00
Adjusted SCS curve number for AMC 3 = 98.20
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.036(In/Hr)
Rainfall intensity =      1.685(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 =      8.187(CFS) for   11.800(Ac.)
Total runoff =     31.756(CFS)
Effective area this stream =       21.40(Ac.)
Total Study Area (Main Stream No. 1) =       21.40(Ac.)
Area averaged Fm value =    0.036(In/Hr)
Depth of flow =   0.076(Ft.), Average velocity =   0.820(Ft/s)
Critical depth =      0.050(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        4.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =  2863.400(Ft.)
End of street segment elevation =  2861.000(Ft.)
Length of street segment  =   792.000(Ft.)
Height of curb above gutter flowline  =    8.0(In.)
Width of half street (curb to crown)  =  40.000(Ft.)
Distance from crown to crossfall grade break  =  20.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  21.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =     31.763(CFS)
Depth of flow =   0.827(Ft.), Average velocity =   2.434(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    8.04(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  35.037(Ft.)
Flow velocity =   2.43(Ft/s)
Travel time =    5.42 min.     TC =   40.20  min.
 Adding area flow to street
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
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Adjusted SCS curve number for AMC 3 = 86.20
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.026(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     28.640(CFS)
therefore the upstream flow rate of Q =     31.756(CFS) is being used
Rainfall intensity =      1.522(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.879
Subarea runoff =      0.000(CFS) for    0.010(Ac.)
Total runoff =     31.756(CFS)
Effective area this stream =       21.41(Ac.)
Total Study Area (Main Stream No. 1) =       21.41(Ac.)
Area averaged Fm value =    0.036(In/Hr)
Street flow at end of street =     31.756(CFS)
Half street flow at end of street =     31.756(CFS)
Depth of flow =   0.827(Ft.), Average velocity =   2.434(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    8.03(Ft.)
Flow width (from curb towards crown)=  35.034(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        4.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     21.410(Ac.)
Runoff from this stream =     31.756(CFS)
Time of concentration =   40.20 min.
Rainfall intensity =     1.522(In/Hr)
Area averaged loss rate (Fm) =    0.0357(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9996


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.100 to Point/Station        4.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 91.00
Adjusted SCS curve number for AMC 3 = 98.20
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.036(In/Hr)
Initial subarea data:
Initial area flow distance =   613.000(Ft.)
Top (of initial area) elevation =  2877.400(Ft.)
Bottom (of initial area) elevation =  2869.900(Ft.)
Difference in elevation =     7.500(Ft.)
Slope =    0.01223  s(%)=       1.22
TC = k(0.465)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   14.621 min.
Rainfall intensity =      3.090(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.890
Subarea runoff =     12.919(CFS)
Total initial stream area =        4.700(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.036(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.200 to Point/Station        4.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
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Upstream point elevation =  2869.900(Ft.)
Downstream point elevation =  2861.000(Ft.)
Channel length thru subarea  =   933.000(Ft.)
Channel base width  =  100.000(Ft.)
Slope or 'Z' of left channel bank = 100.000
Slope or 'Z' of right channel bank = 100.000
Estimated mean flow rate at midpoint of channel =     19.606(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =     19.606(CFS)
Depth of flow =   0.141(Ft.), Average velocity =   1.215(Ft/s)
Channel flow top width =  128.281(Ft.)
Flow Velocity =    1.21(Ft/s)
Travel time  =   12.80 min.
Time of concentration =   27.42 min.
Critical depth =      0.103(Ft.)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 91.00
Adjusted SCS curve number for AMC 3 = 98.20
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.036(In/Hr)
Rainfall intensity =      1.989(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.884
Subarea runoff =     13.281(CFS) for   10.200(Ac.)
Total runoff =     26.199(CFS)
Effective area this stream =       14.90(Ac.)
Total Study Area (Main Stream No. 1) =       36.31(Ac.)
Area averaged Fm value =    0.036(In/Hr)
Depth of flow =   0.167(Ft.), Average velocity =   1.343(Ft/s)
Critical depth =      0.123(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.100 to Point/Station        4.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     14.900(Ac.)
Runoff from this stream =     26.199(CFS)
Time of concentration =   27.42 min.
Rainfall intensity =     1.989(In/Hr)
Area averaged loss rate (Fm) =    0.0357(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.100 to Point/Station        5.200
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 91.00
Adjusted SCS curve number for AMC 3 = 98.20
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.036(In/Hr)
Initial subarea data:
Initial area flow distance =   762.000(Ft.)
Top (of initial area) elevation =  2875.000(Ft.)
Bottom (of initial area) elevation =  2869.000(Ft.)
Difference in elevation =     6.000(Ft.)
Slope =    0.00787  s(%)=       0.79
TC = k(0.465)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   17.420 min.
Rainfall intensity =      2.733(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.888
Subarea runoff =     14.809(CFS)
Total initial stream area =        6.100(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.036(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.200 to Point/Station        4.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =  2869.000(Ft.)
Downstream point elevation =  2861.000(Ft.)
Channel length thru subarea  =   828.000(Ft.)
Channel base width  =   20.000(Ft.)
Slope or 'Z' of left channel bank = 100.000
Slope or 'Z' of right channel bank =  30.000
Estimated mean flow rate at midpoint of channel =     17.490(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    1.000(Ft.)
Flow(q) thru subarea =     17.490(CFS)
Depth of flow =   0.282(Ft.), Average velocity =   1.615(Ft/s)
Channel flow top width =   56.713(Ft.)
Flow Velocity =    1.61(Ft/s)
Travel time  =    8.55 min.
Time of concentration =   25.97 min.
Critical depth =      0.225(Ft.)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 91.00
Adjusted SCS curve number for AMC 3 = 98.20
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.036(In/Hr)
Rainfall intensity =      2.067(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.884
Subarea runoff =      5.299(CFS) for    4.900(Ac.)
Total runoff =     20.108(CFS)
Effective area this stream =       11.00(Ac.)
Total Study Area (Main Stream No. 1) =       47.31(Ac.)
Area averaged Fm value =    0.036(In/Hr)
Depth of flow =   0.302(Ft.), Average velocity =   1.677(Ft/s)
Critical depth =      0.242(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.100 to Point/Station        4.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =     11.000(Ac.)
Runoff from this stream =     20.108(CFS)
Time of concentration =   25.97 min.
Rainfall intensity =     2.067(In/Hr)
Area averaged loss rate (Fm) =    0.0357(In/Hr)
Area averaged Pervious ratio (Ap) = 1.0000
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)    (Ac.)       (min) (In/Hr)      (In/Hr)
```

```
1      31.76     21.410      40.20     0.036       1.522
2      26.20     14.900      27.42     0.036       1.989
3      20.11     11.000      25.97     0.036       2.067
Qmax(1) =
          1.000 *     1.000 *     31.756) +
          0.761 *     1.000 *     26.199) +
          0.732 *     1.000 *     20.108) + =       66.402
Qmax(2) =
          1.314 *     0.682 *     31.756) +
          1.000 *     1.000 *     26.199) +
          0.962 *     1.000 *     20.108) + =       74.014
Qmax(3) =
          1.367 *     0.646 *     31.756) +
          1.040 *     0.947 *     26.199) +
          1.000 *     1.000 *     20.108) + =       73.930

Total of 3 streams to confluence:
Flow rates before confluence point:
      31.756       26.199       20.108
Maximum flow rates at confluence using above data:
       66.402       74.014       73.930
Area of streams before confluence:
       21.410       14.900       11.000
Effective area values after confluence:
       47.310       40.504       38.938
Results of confluence:
Total flow rate =      74.014(CFS)
Time of concentration =     27.422 min.
Effective stream area after confluence =      40.504(Ac.)
Study area average Pervious fraction(Ap) =  1.000
Study area average soil loss rate(Fm) =     0.036(In/Hr)
Study area total (this main stream) =       47.31(Ac.)
End of computations, Total Study Area =            47.31 (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) = 1.000
Area averaged SCS curve number =  91.0
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 09/06/17

SCLA LOT 19
10 YEAR STORM EVENT - PROPOSED CONDITION
7180Q10
R307180.01

Program License Serial Number 6145

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

```
Rational hydrology study storm event year is    10.0
Computed rainfall intensity:
Storm year =    10.00   1 hour rainfall =     0.750 (In.)
Slope used for rainfall intensity curve b =  0.7000
Soil antecedent moisture condition (AMC) = 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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 = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.055(In/Hr)
Initial subarea data:
Initial area flow distance =   400.000(Ft.)
Top (of initial area) elevation =  2872.500(Ft.)
Bottom (of initial area) elevation =  2868.500(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.01000  s(%)=       1.00
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.389 min.
Rainfall intensity =      2.973(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.883
Subarea runoff =     11.818(CFS)
Total initial stream area =        4.500(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.055(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        2.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
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```
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 86.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.265(In/Hr)
Time of concentration =     8.39 min.
Rainfall intensity =      2.973(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.870
Subarea runoff =      2.924(CFS) for    1.200(Ac.)
Total runoff =     14.743(CFS)
Effective area this stream =        5.70(Ac.)
Total Study Area (Main Stream No. 1) =        5.70(Ac.)
Area averaged Fm value =    0.099(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  2864.300(Ft.)
Downstream point/station elevation =  2862.700(Ft.)
Pipe length  =   533.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    14.743(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    14.743(CFS)
Normal flow depth in pipe =   19.45(In.)
Flow top width inside pipe =   24.23(In.)
Critical Depth =   16.05(In.)
Pipe flow velocity =      4.81(Ft/s)
Travel time through pipe =    1.85 min.
Time of concentration (TC) =    10.24 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        3.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.055(In/Hr)
Time of concentration =    10.24 min.
Rainfall intensity =      2.586(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.873
Subarea runoff =      8.951(CFS) for    4.800(Ac.)
Total runoff =     23.694(CFS)
Effective area this stream =       10.50(Ac.)
Total Study Area (Main Stream No. 1) =       10.50(Ac.)
Area averaged Fm value =    0.079(In/Hr)


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Process from Point/Station        3.000 to Point/Station        4.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  2862.700(Ft.)
Downstream point/station elevation =  2860.800(Ft.)
Pipe length  =   650.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    23.694(CFS)
Nearest computed pipe diameter  =     33.00(In.)
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Calculated individual pipe flow  =    23.694(CFS)
Normal flow depth in pipe =   22.92(In.)
Flow top width inside pipe =   30.40(In.)
Critical Depth =   19.31(In.)
Pipe flow velocity =      5.38(Ft/s)
Travel time through pipe =    2.01 min.
Time of concentration (TC) =    12.25 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        4.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.055(In/Hr)
Time of concentration =    12.25 min.
Rainfall intensity =      2.281(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.873
Subarea runoff =     11.137(CFS) for    7.000(Ac.)
Total runoff =     34.831(CFS)
Effective area this stream =       17.50(Ac.)
Total Study Area (Main Stream No. 1) =       17.50(Ac.)
Area averaged Fm value =    0.069(In/Hr)


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Process from Point/Station        4.000 to Point/Station        4.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 86.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.265(In/Hr)
Time of concentration =    12.25 min.
Rainfall intensity =      2.281(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.867
Subarea runoff =      2.540(CFS) for    1.400(Ac.)
Total runoff =     37.371(CFS)
Effective area this stream =       18.90(Ac.)
Total Study Area (Main Stream No. 1) =       18.90(Ac.)
Area averaged Fm value =    0.084(In/Hr)


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Process from Point/Station        4.000 to Point/Station        5.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  2860.800(Ft.)
Downstream point/station elevation =  2859.200(Ft.)
Pipe length  =   536.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    37.371(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    37.371(CFS)
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Normal flow depth in pipe =   27.09(In.)
Flow top width inside pipe =   35.92(In.)
Critical Depth =   23.31(In.)
Pipe flow velocity =      6.08(Ft/s)
Travel time through pipe =    1.47 min.
Time of concentration (TC) =    13.72 min.


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Process from Point/Station        5.000 to Point/Station        5.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.055(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     36.629(CFS)
therefore the upstream flow rate of Q =     37.371(CFS) is being used
Time of concentration =    13.72 min.
Rainfall intensity =      2.107(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.865
Subarea runoff =      0.000(CFS) for    1.200(Ac.)
Total runoff =     37.371(CFS)
Effective area this stream =       20.10(Ac.)
Total Study Area (Main Stream No. 1) =       20.10(Ac.)
Area averaged Fm value =    0.082(In/Hr)


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Process from Point/Station        5.000 to Point/Station        6.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  2859.200(Ft.)
Downstream point/station elevation =  2858.100(Ft.)
Pipe length  =   373.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    37.371(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    37.371(CFS)
Normal flow depth in pipe =   27.19(In.)
Flow top width inside pipe =   35.84(In.)
Critical Depth =   23.31(In.)
Pipe flow velocity =      6.05(Ft/s)
Travel time through pipe =    1.03 min.
Time of concentration (TC) =    14.75 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station        6.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.055(In/Hr)
The area added to the existing stream causes a
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a lower flow rate of Q =     36.152(CFS)
therefore the upstream flow rate of Q =     37.371(CFS) is being used
Time of concentration =    14.75 min.
Rainfall intensity =      2.003(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.864
Subarea runoff =      0.000(CFS) for    0.800(Ac.)
Total runoff =     37.371(CFS)
Effective area this stream =       20.90(Ac.)
Total Study Area (Main Stream No. 1) =       20.90(Ac.)
Area averaged Fm value =    0.081(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station        7.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =  2858.100(Ft.)
Downstream point elevation =  2858.000(Ft.)
Channel length thru subarea  =   224.000(Ft.)
Channel base width  =  100.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Manning's 'N'    = 0.015
Maximum depth of channel  =    4.000(Ft.)
Flow(q) thru subarea =     37.371(CFS)
Depth of flow =   0.355(Ft.), Average velocity =   1.041(Ft/s)
Channel flow top width =  102.130(Ft.)
Flow Velocity =    1.04(Ft/s)
Travel time  =    3.58 min.
Time of concentration =   18.33 min.
Critical depth =      0.162(Ft.)


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Process from Point/Station        1.000 to Point/Station        7.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     20.900(Ac.)
Runoff from this stream =     37.371(CFS)
Time of concentration =   18.33 min.
Rainfall intensity =     1.720(In/Hr)
Area averaged loss rate (Fm) =    0.0810(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2120


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        7.100
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.055(In/Hr)
Initial subarea data:
Initial area flow distance =   749.000(Ft.)
Top (of initial area) elevation =  2872.500(Ft.)
Bottom (of initial area) elevation =  2865.500(Ft.)
Difference in elevation =     7.000(Ft.)
```

```
Slope =    0.00935  s(%)=       0.93
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.928 min.
Rainfall intensity =      2.471(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.880
Subarea runoff =     10.219(CFS)
Total initial stream area =        4.700(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.055(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        7.100 to Point/Station        7.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  2861.300(Ft.)
Downstream point/station elevation =  2859.900(Ft.)
Pipe length  =   354.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.219(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    10.219(CFS)
Normal flow depth in pipe =   15.05(In.)
Flow top width inside pipe =   23.21(In.)
Critical Depth =   13.74(In.)
Pipe flow velocity =      4.93(Ft/s)
Travel time through pipe =    1.20 min.
Time of concentration (TC) =    12.13 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        7.200 to Point/Station        7.200
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.055(In/Hr)
Time of concentration =    12.13 min.
Rainfall intensity =      2.297(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.879
Subarea runoff =      7.540(CFS) for    4.100(Ac.)
Total runoff =     17.759(CFS)
Effective area this stream =        8.80(Ac.)
Total Study Area (Main Stream No. 1) =       29.70(Ac.)
Area averaged Fm value =    0.055(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        7.200 to Point/Station        7.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  2859.900(Ft.)
Downstream point/station elevation =  2858.100(Ft.)
Pipe length  =   256.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.759(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    17.759(CFS)
Normal flow depth in pipe =   18.42(In.)
Flow top width inside pipe =   20.27(In.)
```

```
Critical Depth =   18.21(In.)
Pipe flow velocity =      6.86(Ft/s)
Travel time through pipe =    0.62 min.
Time of concentration (TC) =    12.75 min.


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Process from Point/Station        7.300 to Point/Station        7.300
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.055(In/Hr)
Time of concentration =    12.75 min.
Rainfall intensity =      2.218(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.878
Subarea runoff =     13.392(CFS) for    7.200(Ac.)
Total runoff =     31.151(CFS)
Effective area this stream =       16.00(Ac.)
Total Study Area (Main Stream No. 1) =       36.90(Ac.)
Area averaged Fm value =    0.055(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        7.300 to Point/Station        7.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =  2858.100(Ft.)
Downstream point elevation =  2858.000(Ft.)
Channel length thru subarea  =   635.000(Ft.)
Channel base width  =   40.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =     31.196(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    4.000(Ft.)
Flow(q) thru subarea =     31.196(CFS)
Depth of flow =   0.749(Ft.), Average velocity =   0.987(Ft/s)
Channel flow top width =   44.491(Ft.)
Flow Velocity =    0.99(Ft/s)
Travel time  =   10.73 min.
Time of concentration =   23.48 min.
Critical depth =      0.266(Ft.)
 Adding area flow to channel
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 79.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.387(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     22.903(CFS)
therefore the upstream flow rate of Q =     31.151(CFS) is being used
Rainfall intensity =      1.447(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.833
Subarea runoff =      0.000(CFS) for    3.000(Ac.)
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```
Total runoff =     31.151(CFS)
Effective area this stream =       19.00(Ac.)
Total Study Area (Main Stream No. 1) =       39.90(Ac.)
Area averaged Fm value =    0.107(In/Hr)
Depth of flow =   0.748(Ft.), Average velocity =   0.986(Ft/s)
Critical depth =      0.266(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        7.000 to Point/Station        7.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.055(In/Hr)
Time of concentration =    23.48 min.
Rainfall intensity =      1.447(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.842
Subarea runoff =      1.022(CFS) for    7.400(Ac.)
Total runoff =     32.172(CFS)
Effective area this stream =       26.40(Ac.)
Total Study Area (Main Stream No. 1) =       47.30(Ac.)
Area averaged Fm value =    0.093(In/Hr)


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Process from Point/Station        7.000 to Point/Station        7.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     26.400(Ac.)
Runoff from this stream =     32.172(CFS)
Time of concentration =   23.48 min.
Rainfall intensity =     1.447(In/Hr)
Area averaged loss rate (Fm) =    0.0925(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2023
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)    (Ac.)        (min)  (In/Hr)      (In/Hr)


1     37.37    20.900     18.33    0.081      1.720
2     32.17    26.400     23.48    0.093      1.447
Qmax(1) =
          1.000 *    1.000 *    37.371) +
          1.202 *    0.781 *    32.172) + =      67.567
Qmax(2) =
          0.833 *    1.000 *    37.371) +
          1.000 *    1.000 *    32.172) + =      63.310

Total of 2 streams to confluence:
Flow rates before confluence point:
      37.371      32.172
Maximum flow rates at confluence using above data:
       67.567       63.310
Area of streams before confluence:
       20.900       26.400
```

```
Effective area values after confluence:
       41.516       47.300
Results of confluence:
Total flow rate =     67.567(CFS)
Time of concentration =    18.332 min.
Effective stream area after confluence =     41.516(Ac.)
Study area average Pervious fraction(Ap) =  0.207
Study area average soil loss rate(Fm) =    0.087(In/Hr)
Study area total (this main stream) =      47.30(Ac.)
End of computations, Total Study Area =           47.30 (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) = 0.207
Area averaged SCS curve number =  70.6
```

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 09/08/17

SCLA - 19
100 YEAR STORM EVENT - EXISTING CONDITION
7180Q100
R307180.01

Program License Serial Number 6145

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

```
Rational hydrology study storm event year is   100.0
Computed rainfall intensity:
Storm year =   100.00   1 hour rainfall =     1.150 (In.)
Slope used for rainfall intensity curve b =  0.7000
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 = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Adjusted SCS curve number for AMC 3 = 86.20
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.026(In/Hr)
Initial subarea data:
Initial area flow distance =   400.000(Ft.)
Top (of initial area) elevation =  2872.500(Ft.)
Bottom (of initial area) elevation =  2868.500(Ft.)
Difference in elevation =     4.000(Ft.)
Slope =    0.01000  s(%)=       1.00
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.389 min.
Rainfall intensity =      4.558(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
Subarea runoff =     18.356(CFS)
Total initial stream area =        4.500(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.026(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       2.000 to Point/Station       2.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 86.00
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Adjusted SCS curve number for AMC 3 = 97.20
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.055(In/Hr)
Time of concentration =     8.39 min.
Rainfall intensity =      4.558(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 =      4.863(CFS) for    1.200(Ac.)
Total runoff =     23.219(CFS)
Effective area this stream =        5.70(Ac.)
Total Study Area (Main Stream No. 1) =        5.70(Ac.)
Area averaged Fm value =    0.032(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  2864.300(Ft.)
Downstream point/station elevation =  2862.700(Ft.)
Pipe length  =   533.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    23.219(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    23.219(CFS)
Normal flow depth in pipe =   22.36(In.)
Flow top width inside pipe =   30.85(In.)
Critical Depth =   19.13(In.)
Pipe flow velocity =      5.42(Ft/s)
Travel time through pipe =    1.64 min.
Time of concentration (TC) =    10.03 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        3.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Adjusted SCS curve number for AMC 3 = 86.20
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.026(In/Hr)
Time of concentration =    10.03 min.
Rainfall intensity =      4.023(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.893
Subarea runoff =     14.522(CFS) for    4.800(Ac.)
Total runoff =     37.741(CFS)
Effective area this stream =       10.50(Ac.)
Total Study Area (Main Stream No. 1) =       10.50(Ac.)
Area averaged Fm value =    0.029(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        4.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  2862.700(Ft.)
Downstream point/station elevation =  2860.800(Ft.)
Pipe length  =   650.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    37.741(CFS)
Nearest computed pipe diameter  =     39.00(In.)
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Calculated individual pipe flow  =    37.741(CFS)
Normal flow depth in pipe =   27.52(In.)
Flow top width inside pipe =   35.55(In.)
Critical Depth =   23.43(In.)
Pipe flow velocity =      6.04(Ft/s)
Travel time through pipe =    1.79 min.
Time of concentration (TC) =    11.82 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        4.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Adjusted SCS curve number for AMC 3 = 86.20
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.026(In/Hr)
Time of concentration =    11.82 min.
Rainfall intensity =      3.585(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.893
Subarea runoff =     18.283(CFS) for    7.000(Ac.)
Total runoff =     56.024(CFS)
Effective area this stream =       17.50(Ac.)
Total Study Area (Main Stream No. 1) =       17.50(Ac.)
Area averaged Fm value =    0.028(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        4.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 86.00
Adjusted SCS curve number for AMC 3 = 97.20
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.055(In/Hr)
Time of concentration =    11.82 min.
Rainfall intensity =      3.585(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 =      4.448(CFS) for    1.400(Ac.)
Total runoff =     60.472(CFS)
Effective area this stream =       18.90(Ac.)
Total Study Area (Main Stream No. 1) =       18.90(Ac.)
Area averaged Fm value =    0.030(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        4.000 to Point/Station        5.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  2860.800(Ft.)
Downstream point/station elevation =  2859.200(Ft.)
Pipe length  =   536.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    60.472(CFS)
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Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =    60.472(CFS)
Normal flow depth in pipe =   33.84(In.)
Flow top width inside pipe =   38.86(In.)
Critical Depth =   28.65(In.)
Pipe flow velocity =      6.78(Ft/s)
Travel time through pipe =    1.32 min.
Time of concentration (TC) =    13.14 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.000 to Point/Station        5.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Adjusted SCS curve number for AMC 3 = 86.20
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.026(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     59.693(CFS)
therefore the upstream flow rate of Q =     60.472(CFS) is being used
Time of concentration =    13.14 min.
Rainfall intensity =      3.330(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 =      0.000(CFS) for    1.200(Ac.)
Total runoff =     60.472(CFS)
Effective area this stream =       20.10(Ac.)
Total Study Area (Main Stream No. 1) =       20.10(Ac.)
Area averaged Fm value =    0.030(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.000 to Point/Station        6.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  2859.200(Ft.)
Downstream point/station elevation =  2858.100(Ft.)
Pipe length  =   373.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    60.472(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =    60.472(CFS)
Normal flow depth in pipe =   34.03(In.)
Flow top width inside pipe =   38.64(In.)
Critical Depth =   28.65(In.)
Pipe flow velocity =      6.75(Ft/s)
Travel time through pipe =    0.92 min.
Time of concentration (TC) =    14.06 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station        6.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
```

```
SCS curve number for soil(AMC 2)  = 69.00
Adjusted SCS curve number for AMC 3 = 86.20
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.026(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     59.170(CFS)
therefore the upstream flow rate of Q =     60.472(CFS) is being used
Time of concentration =    14.06 min.
Rainfall intensity =      3.175(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 =      0.000(CFS) for    0.800(Ac.)
Total runoff =     60.472(CFS)
Effective area this stream =       20.90(Ac.)
Total Study Area (Main Stream No. 1) =       20.90(Ac.)
Area averaged Fm value =    0.030(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station        7.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =  2858.100(Ft.)
Downstream point elevation =  2858.000(Ft.)
Channel length thru subarea  =   224.000(Ft.)
Channel base width  =  100.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Manning's 'N'    = 0.015
Maximum depth of channel  =    4.000(Ft.)
Flow(q) thru subarea =     60.472(CFS)
Depth of flow =   0.474(Ft.), Average velocity =   1.259(Ft/s)
Channel flow top width =  102.842(Ft.)
Flow Velocity =    1.26(Ft/s)
Travel time  =    2.97 min.
Time of concentration =   17.03 min.
Critical depth =      0.225(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        7.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     20.900(Ac.)
Runoff from this stream =     60.472(CFS)
Time of concentration =   17.03 min.
Rainfall intensity =     2.777(In/Hr)
Area averaged loss rate (Fm) =    0.0298(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2120


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        7.100
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Adjusted SCS curve number for AMC 3 = 86.20
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.026(In/Hr)
```

```
Initial subarea data:
Initial area flow distance =   749.000(Ft.)
Top (of initial area) elevation =  2872.500(Ft.)
Bottom (of initial area) elevation =  2865.500(Ft.)
Difference in elevation =     7.000(Ft.)
Slope =    0.00935  s(%)=       0.93
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.928 min.
Rainfall intensity =      3.788(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.894
Subarea runoff =     15.913(CFS)
Total initial stream area =        4.700(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.026(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        7.100 to Point/Station        7.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  2861.300(Ft.)
Downstream point/station elevation =  2859.900(Ft.)
Pipe length  =   354.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.913(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    15.913(CFS)
Normal flow depth in pipe =   18.56(In.)
Flow top width inside pipe =   25.03(In.)
Critical Depth =   16.69(In.)
Pipe flow velocity =      5.46(Ft/s)
Travel time through pipe =    1.08 min.
Time of concentration (TC) =    12.01 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        7.200 to Point/Station        7.200
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Adjusted SCS curve number for AMC 3 = 86.20
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.026(In/Hr)
Time of concentration =    12.01 min.
Rainfall intensity =      3.546(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.893
Subarea runoff =     11.966(CFS) for    4.100(Ac.)
Total runoff =     27.879(CFS)
Effective area this stream =        8.80(Ac.)
Total Study Area (Main Stream No. 1) =       29.70(Ac.)
Area averaged Fm value =    0.026(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        7.200 to Point/Station        7.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =  2859.900(Ft.)
Downstream point/station elevation =  2858.100(Ft.)
```

```
Pipe length  =   256.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    27.879(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    27.879(CFS)
Normal flow depth in pipe =   20.48(In.)
Flow top width inside pipe =   27.92(In.)
Critical Depth =   21.59(In.)
Pipe flow velocity =      7.80(Ft/s)
Travel time through pipe =    0.55 min.
Time of concentration (TC) =    12.55 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        7.300 to Point/Station        7.300
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Adjusted SCS curve number for AMC 3 = 86.20
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.026(In/Hr)
Time of concentration =    12.55 min.
Rainfall intensity =      3.437(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.893
Subarea runoff =     21.243(CFS) for    7.200(Ac.)
Total runoff =     49.122(CFS)
Effective area this stream =       16.00(Ac.)
Total Study Area (Main Stream No. 1) =       36.90(Ac.)
Area averaged Fm value =    0.026(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        7.300 to Point/Station        7.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =  2858.100(Ft.)
Downstream point elevation =  2858.000(Ft.)
Channel length thru subarea  =   635.000(Ft.)
Channel base width  =   40.000(Ft.)
Slope or 'Z' of left channel bank =   3.000
Slope or 'Z' of right channel bank =   3.000
Estimated mean flow rate at midpoint of channel =     49.158(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    4.000(Ft.)
Flow(q) thru subarea =     49.158(CFS)
Depth of flow =   0.980(Ft.), Average velocity =   1.168(Ft/s)
Channel flow top width =   45.880(Ft.)
Flow Velocity =    1.17(Ft/s)
Travel time  =    9.06 min.
Time of concentration =   21.61 min.
Critical depth =      0.359(Ft.)
 Adding area flow to channel
UNDEVELOPED (average cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 79.00
Adjusted SCS curve number for AMC 3 = 93.40
```

```
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.129(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     39.462(CFS)
therefore the upstream flow rate of Q =     49.122(CFS) is being used
Rainfall intensity =      2.350(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.884
Subarea runoff =      0.000(CFS) for    3.000(Ac.)
Total runoff =     49.122(CFS)
Effective area this stream =       19.00(Ac.)
Total Study Area (Main Stream No. 1) =       39.90(Ac.)
Area averaged Fm value =    0.042(In/Hr)
Depth of flow =   0.980(Ft.), Average velocity =   1.168(Ft/s)
Critical depth =      0.359(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        7.000 to Point/Station        7.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Adjusted SCS curve number for AMC 3 = 86.20
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.026(In/Hr)
Time of concentration =    21.61 min.
Rainfall intensity =      2.350(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.886
Subarea runoff =      5.817(CFS) for    7.400(Ac.)
Total runoff =     54.940(CFS)
Effective area this stream =       26.40(Ac.)
Total Study Area (Main Stream No. 1) =       47.30(Ac.)
Area averaged Fm value =    0.038(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        7.000 to Point/Station        7.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     26.400(Ac.)
Runoff from this stream =     54.940(CFS)
Time of concentration =   21.61 min.
Rainfall intensity =     2.350(In/Hr)
Area averaged loss rate (Fm) =    0.0378(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2023
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)    (Ac.)       (min) (In/Hr)      (In/Hr)

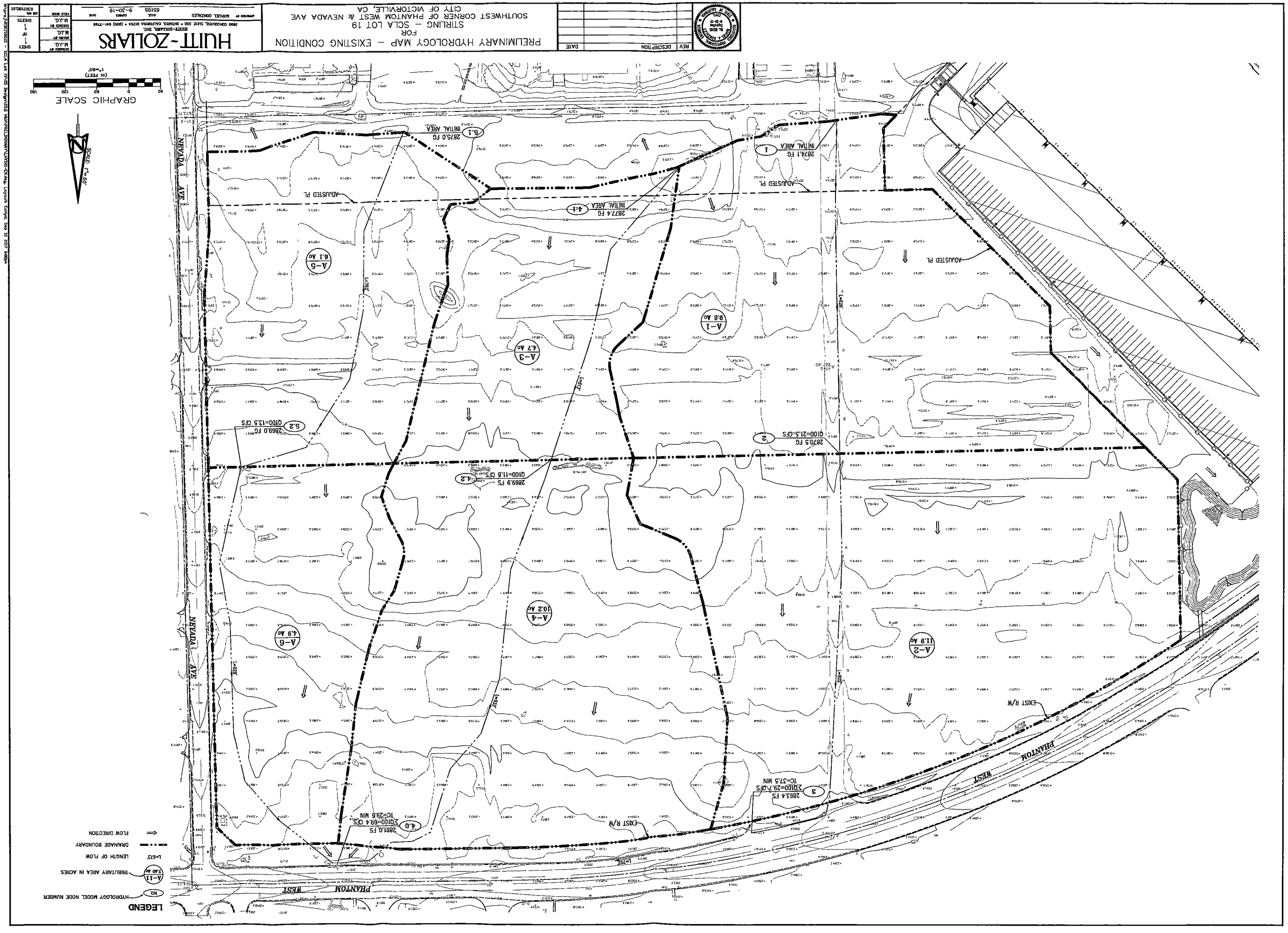

1     60.47    20.900     17.03    0.030      2.777
2     54.94    26.400     21.61    0.038      2.350
Qmax(1) =
         1.000 *    1.000 *    60.472) +
         1.185 *    0.788 *    54.940) + =     111.745
Qmax(2) =
         0.845 *    1.000 *    60.472) +
```

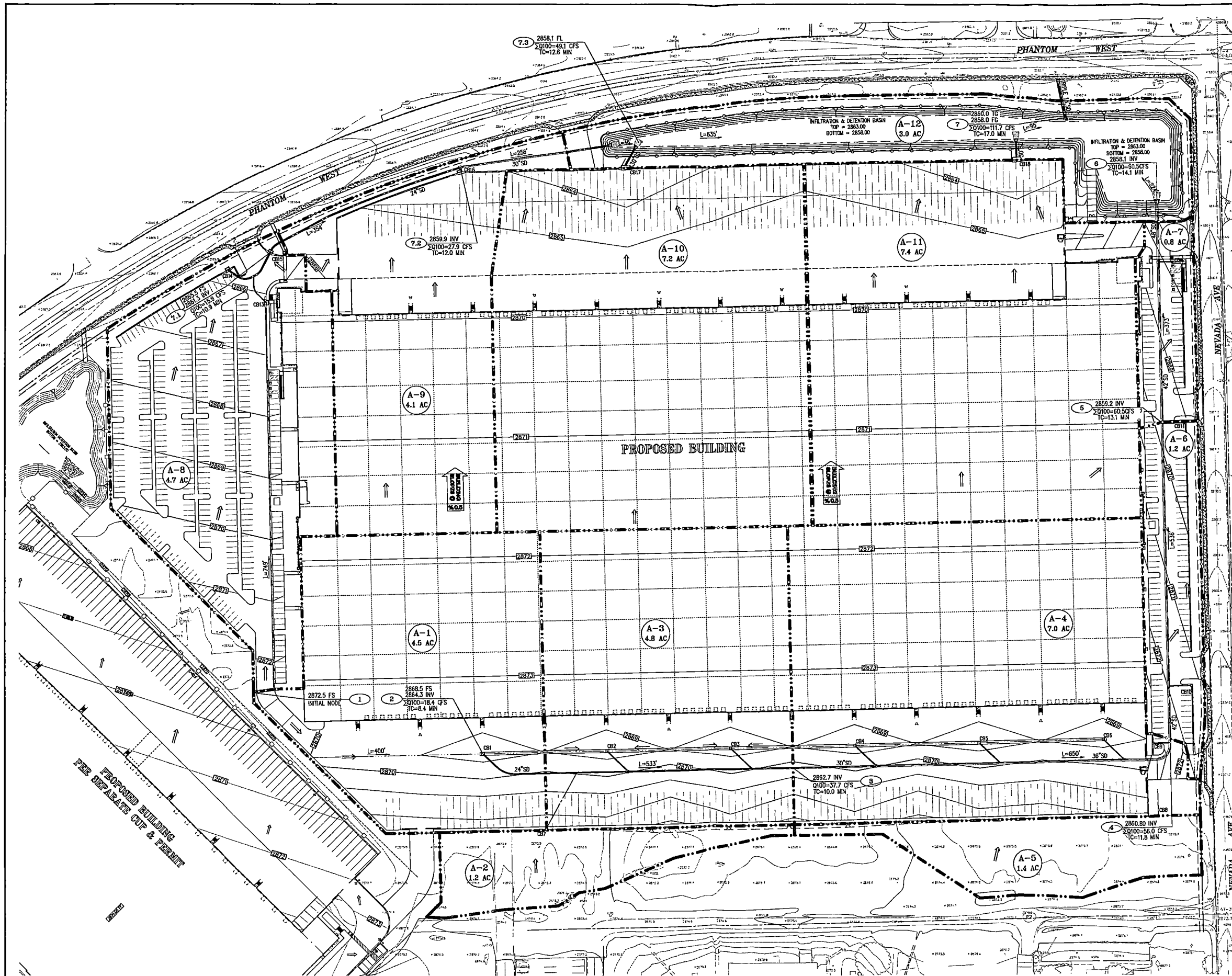
```
          1.000 *    1.000 *    54.940) + =     106.008

Total of 2 streams to confluence:
Flow rates before confluence point:
      60.472      54.940
Maximum flow rates at confluence using above data:
      111.745      106.008
Area of streams before confluence:
       20.900       26.400
Effective area values after confluence:
       41.696       47.300
Results of confluence:
Total flow rate =    111.745(CFS)
Time of concentration =    17.026 min.
Effective stream area after confluence =     41.696(Ac.)
Study area average Pervious fraction(Ap) =  0.207
Study area average soil loss rate(Fm) =    0.034(In/Hr)
Study area total (this main stream) =      47.30(Ac.)
End of computations, Total Study Area =           47.30 (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) = 0.207
Area averaged SCS curve number =  70.6
```

Appendix B
Existing & Proposed Condition Preliminary Hydrology Map


PRELIMINARY HYDROLOGY MAP – EXISTING CONDITION
FOR
STRLING – SCLA LOT 19
SOUTHWEST CORNER OF PHANTOM WEST & NEVADA AVE
CITY OF VICTORVILLE, CA
HUITT-ZOLLARS
HUITT-ZOLLARS, INC.
3990 CONCOURSE, SUITE 320 • ONTARIO, CALIFORNIA 91764 • (909) 941-7798
DESIGNED BY M.J.G.
DRAWN BY M.J.G.
CHECKED BY M.J.G.
SHEET 1 OF 1 SHEETS
JOB NO. R2070.01
AWARDED BY MANUEL GONZALES
R.C.E. 65195 9-30-19
REV DESCRIPTION DATE
LEGEND
NO. HYDROLOGY MODEL NODE NUMBER
A-11 740 Ac TRIBUTARY AREA IN ACRES
L=675' LENGTH OF FLOW
DRAINAGE BOUNDARY
FLOW DIRECTION
PHANTOM WEST
NEVADA AVE.
EXIST R/W
ADJUSTED PL
SCALE 1"=60'
GRAPHIC SCALE
(IN FEET)
1"=60'
A-1 9.8 Ac
A-2 11.9 Ac
A-3 4.7 Ac
A-4 10.2 Ac
A-5 6.1 Ac
A-6 4.9 Ac
2874.4 FG INITIAL AREA 4.1
2870.5 FG INITIAL AREA 1
2870.0 FG INITIAL AREA 5.1
2870.5 FG Q100=21.5 CFS 2
2869.9 FG Q100=13.5 CFS 5.2
2869.9 FS Q100=11.8 CFS 4.2
2866.0 FS Q100=69.4 CFS TC=29.6 MIN 4.0
2863.4 FS Q100=29.7 CFS TC=37.5 MIN 3



LEGEND

- NO. — HYDROLOGY MODEL NODE NUMBER
- A-11 / 7.40 AC — TRIBUTARY AREA IN ACRES
- 673' — LENGTH OF FLOW
- DRAINAGE BOUNDARY
- DRAINAGE INLET/CATCH BASIN (CB)
- SD — PROPOSED STORM DRAIN
- FLOW DIRECTION
- CB — CATCH BASIN

NOTE:
PIPE SIZES SHOWN HEREON ARE APPROXIMATE. FINAL SIZES WILL BE DETERMINED WITH THE FINAL HYDROLOGY REPORT USING THE WSPG HYDRAULIC SOFTWARE.

REV	DESCRIPTION	DATE

REGISTERED PROFESSIONAL ENGINEER — M. GONZALES — No. 65195 — Exp. 9-30-19 — CIVIL — STATE OF CALIFORNIA

PRELIMINARY HYDROLOGY MAP – PROPOSED CONDITION
FOR
STIRLING – SCLA LOT 19
SOUTHWEST CORNER OF PHANTOM WEST & NEVADA AVE
CITY OF VICTORVILLE, CA

HUITT-ZOLLARS
HUITT-ZOLLARS, INC.
3890 CONCOURSE, SUITE 330 • ONTARIO, CALIFORNIA 91764 • (909) 941-7799

APPROVED BY MANUEL GONZALES — R.C.E. 65195 — EXPIRES 9-30-19 — DATE

DESIGNED BY M.J.G. — DRAWN BY M.J.G. — CHECKED BY M.J.G. — FIELD BOOK

SHEET 1 OF 1 SHEETS

JOB NO. R307180.01

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TENTATIVE PARCEL MAP NO. 19772

IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

LEGAL DESCRIPTION:

TENTATIVE PARCEL MAP NO. 19772

BEING A SUBDIVISION OF PARCELS 12, 13, 14, 15, 16 AND 17 OF PARCEL MAP NO. 18158, IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 217, PAGES 22 THROUGH 32 INCLUSIVE OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

TOGETHER WITH EAGLE STREET AS DEDICATED ON SAID PARCEL MAP NO. 18158.

TOGETHER WITH THAT PORTION OF SECTION 26, TOWNSHIP 6 NORTH, RANGE 5 WEST, SAN BERNARDINO MERIDIAN, DESCRIBED AS FOLLOWS:

COMMENCING AT THE CENTERLINE INTERSECTION OF EAGLE AND GEORGE BOULEVARD AS SHOWN ON SAID PARCEL MAP NO. 18158; THENCE SOUTH 45°49'30"EAST, 128.28 FEET ALONG SAID CENTERLINE OF GEORGE BOULEVARD; THENCE NORTH 44°10'30"EAST, 30.00 FEET TO A POINT IN THE NORTHEASTERLY LINE OF SAID GEORGE BOULEVARD, SAID POINT BEING THE POINT OF BEGINNING; THENCE NORTH 00°22'17"WEST, 42.73 FEET; THENCE NORTH 44°37'43"EAST, 421.91 FEET TO A POINT IN THE SOUTHEASTERLY LINE OF SAID EAGLE; THENCE SOUTHWESTERLY ALONG THE SOUTHEASTERLY LINE OF SAID EAGLE TO SAID NORTHEASTERLY LINE OF GEORGE BOULEVARD; THENCE SOUTHEASTERLY ALONG SAID NORTHEASTERLY LINE TO THE POINT OF BEGINNING.

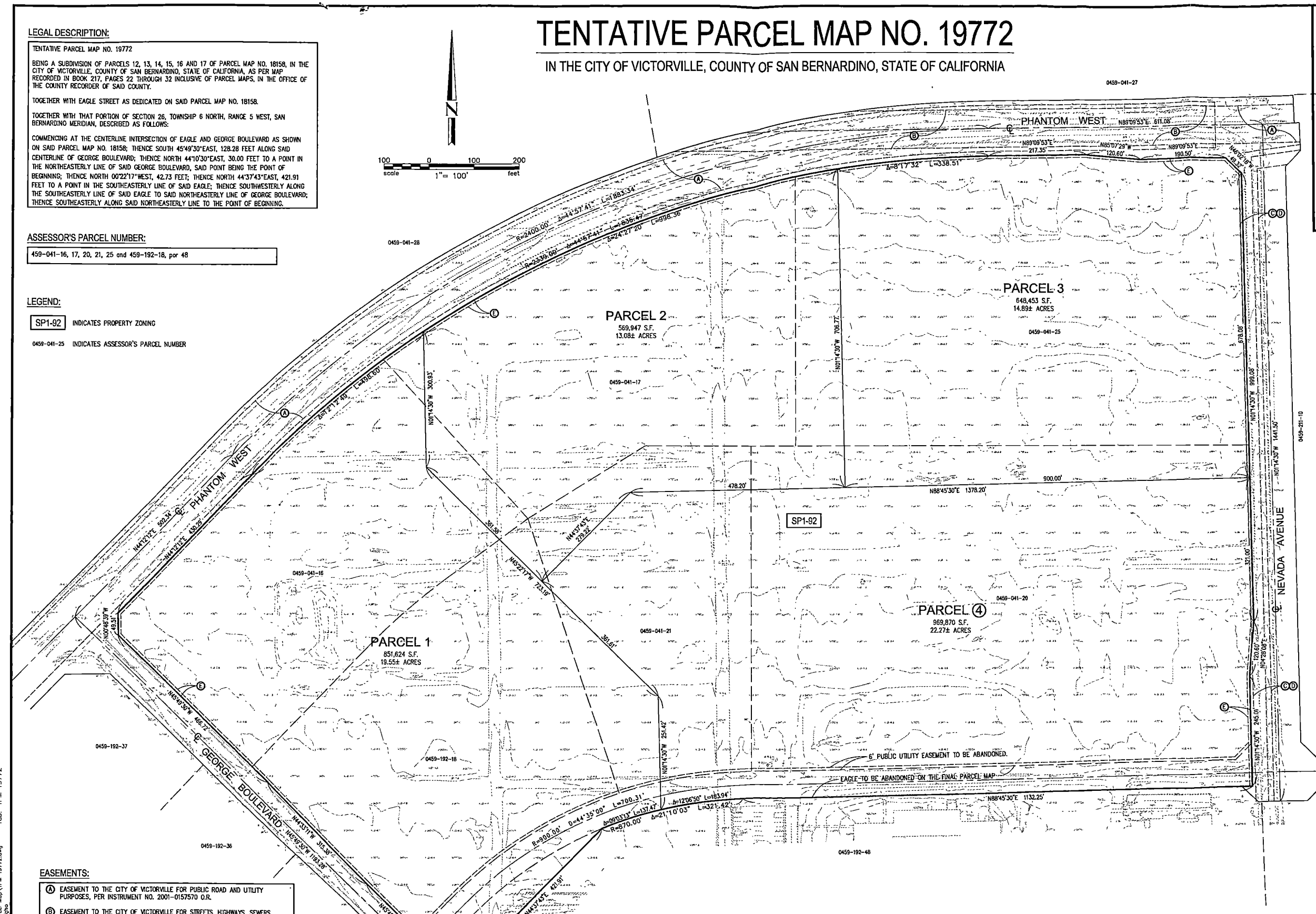
ASSESSOR'S PARCEL NUMBER:

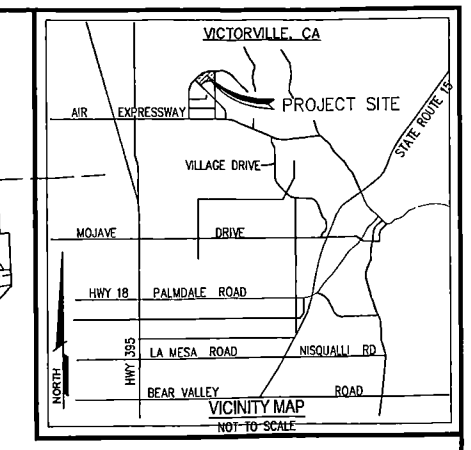
459-041-16, 17, 20, 21, 25 and 459-192-18, por 48

LEGEND:

SP1-92 INDICATES PROPERTY ZONING

0459-041-25 INDICATES ASSESSOR'S PARCEL NUMBER





OWNER/APPLICANT:

STIRLING DEVELOPMENT, ATTN: JASON HUBER
27422 PORTOLA PARKWAY, SUITE 300
FOOTHILL RANCH, CA 92610
PHONE: (949) 588-2270

CIVIL ENGINEER/REPRESENTATIVE:

DAVID EVANS & ASSOCIATES, INC. ATTN: WILL HOFF
14297 CAJON AVENUE, SUITE 101
VICTORVILLE, CA 92392
PHONE: (760) 524-9126
FAX: (760) 524-9101

BASIS OF BEARING:

BEARINGS FOR THIS SURVEY ARE BASED ON THE CALIFORNIA COORDINATE SYSTEM (CCS83) ZONE V, NAD 1983 (1992.88 EPOCH) BASED ON SAN BERNARDINO COUNTY HORIZONTAL CONTROL STATION GPS NO. 21338 AND GPS NO. 21342 BEING NORTH 45°45'04" WEST.

BENCHMARK:

Y-747
ELEVATION=2905.312
8"x 8" CONCRETE MONUMENT WITH 4" IRON CAP STAMPED "USC&GS BM Y-747, 1945"
41' SOUTH OF AIR EXPRESSWAY AND 93' WEST OF NEVADA AVENUE EXTENTION

AREAS:

	SQUARE FEET	ACRES
PARCEL 1	851,624	19.55±
PARCEL 2	569,947	13.08±
PARCEL 3	648,453	14.89±
PARCEL 4	969,870	22.27±
TOTAL	3,039,894	69.79±

GENERAL NOTES:

1. PER CITY OF VICTORVILLE PLANNING DEPARTMENT, SUBJECT PROPERTY IS ZONED: SP1-92
2. EXISTING LAND USE: VACANT
3. PROPOSED LAND USE:

EASEMENTS:

(A) EASEMENT TO THE CITY OF VICTORVILLE FOR PUBLIC ROAD AND UTILITY PURPOSES, PER INSTRUMENT NO. 2001-0157570 O.R.

(B) EASEMENT TO THE CITY OF VICTORVILLE FOR STREETS, HIGHWAYS, SEWERS, DRAINAGE, PUBLIC UTILITIES, AND PUBLIC ACCESS PURPOSES, PER INSTRUMENT NO. 2000-135328 O.R.

(C) EASEMENT TO HIGH DESERT POWER TRUST FOR WATER PIPELINES OR PIPELINES, PER INSTRUMENT NO. 2003-238344 O.R.

(D) EASEMENT TO HIGH DESERT POWER TRUST FOR WATER PIPELINES OR PIPELINES, PER INSTRUMENT NO. 2001-258013 O.R.

(E) EASEMENT TO THE CITY OF VICTORVILLE FOR PUBLIC UTILITY PURPOSES, PER PARCEL MAP NO. 18158, P.M.B. 217/22-32.

NO.	DESCRIPTION	DATE	BY

REVISIONS

PROFESSIONAL LAND SURVEYOR — WILLIAM G. HOFF — No. 6585 — Exp. 6/30/18 — STATE OF CALIFORNIA

DAVID EVANS AND ASSOCIATES INC.
14297 Cajon Avenue, Suite 101
Victorville, California 92392
Phone: (760) 524-9100

PREPARED UNDER MY DIRECTION:
Will A. Hoff 7/27/16
DATE

DRAWN BY: WGH
DESIGNED BY: WGH
CHECKED BY: WGH

CITY OF VICTORVILLE

TENTATIVE PARCEL MAP NO. 19772

STIRLING DEVELOPMENT PROJECT

APPROVED BY: DATE

DATE: 7/21/2016
SCALE: AS NOTED
PROJECT NO.: SCIL0000-0001
SHT NO.: 1 OF 1

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Last Opened: Jul 27, 2016 - 3:15pm by: Wgho
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Tax Rate Area
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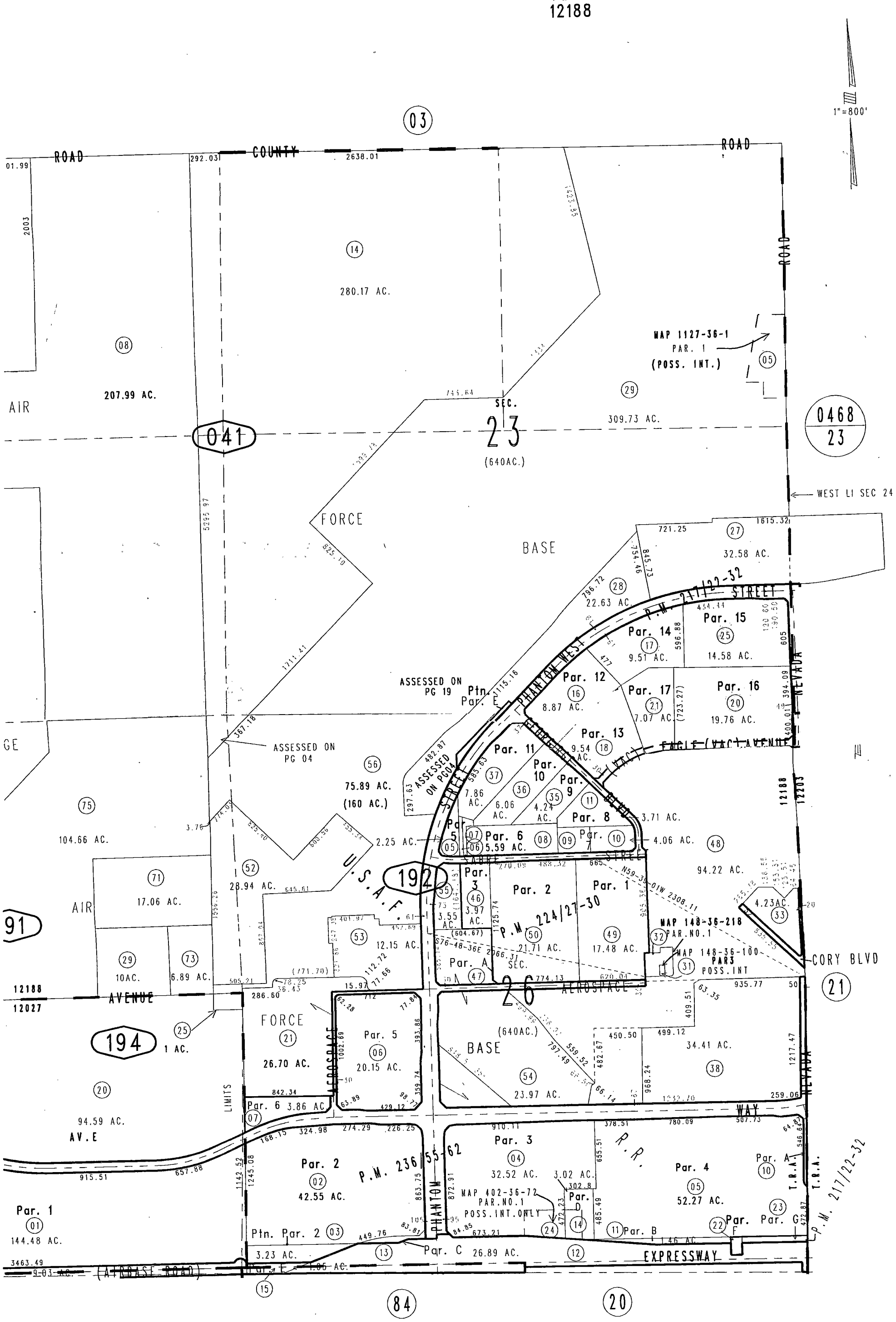
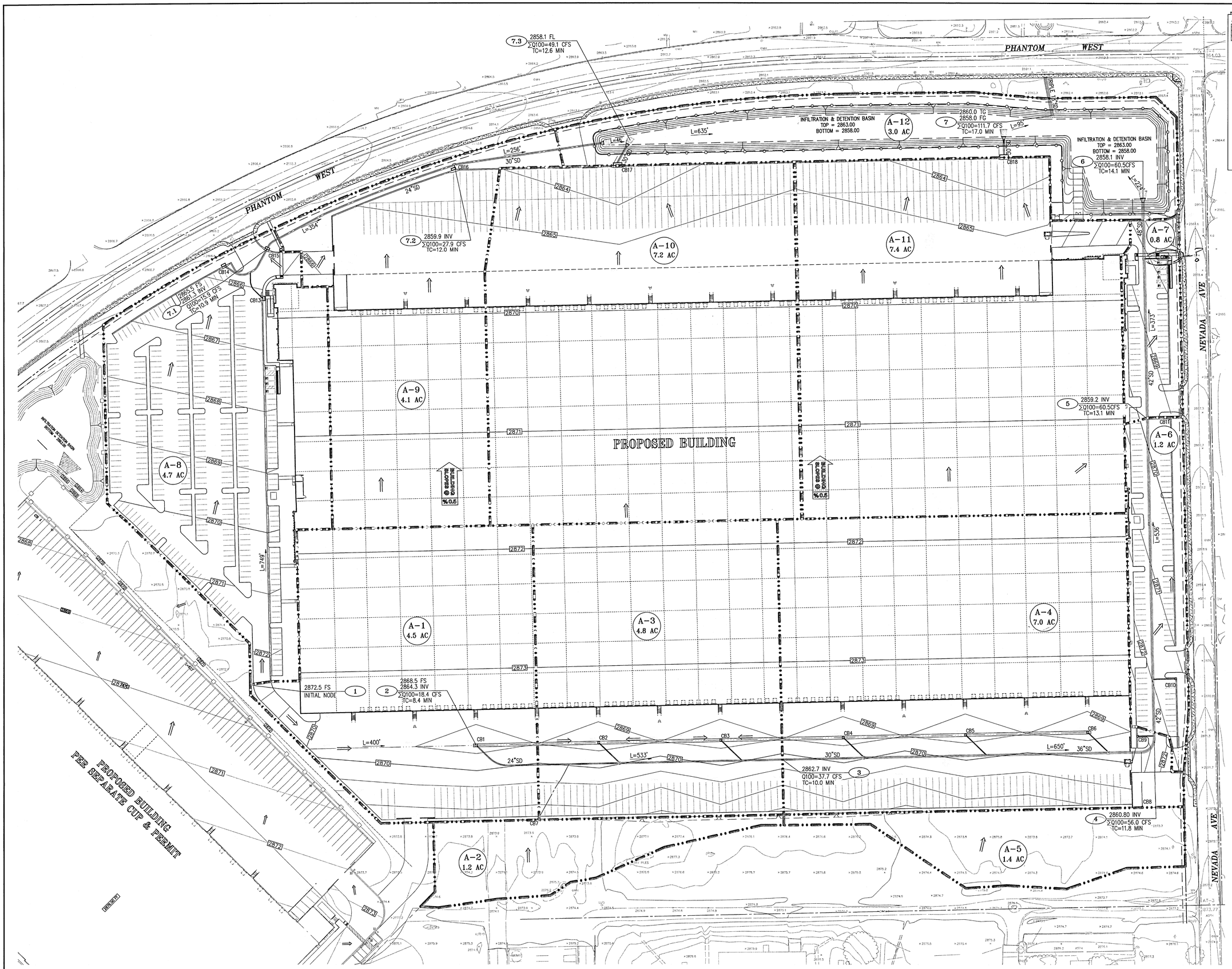
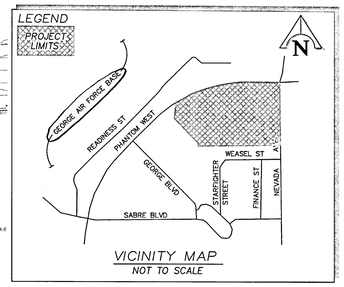


REVISED
12/09/15 BK-MC
04/26/17 KC
09/13/17 KC

Assessor's Map
Book 0459 Page 19
San Bernardino County

-32





LEGEND

- NO. — HYDROLOGY MODEL NODE NUMBER
- A-11 / 7.40 AC — TRIBUTARY AREA IN ACRES
- 673' — LENGTH OF FLOW
- DRAINAGE BOUNDARY
- DRAINAGE INLET/CATCH BASIN (CB)
- SD — PROPOSED STORM DRAIN
- FLOW DIRECTION
- CB — CATCH BASIN

NOTE:

PIPE SIZES SHOWN HEREON ARE APPROXIMATE. FINAL SIZES WILL BE DETERMINED WITH THE FINAL HYDROLOGY REPORT USING THE WSPG HYDRAULIC SOFTWARE.

REGISTERED PROFESSIONAL ENGINEER MANUEL J. GONZALES No. 65195 Expiration 9-30-19 CIVIL STATE OF CALIFORNIA

REV	DESCRIPTION	DATE

PRELIMINARY HYDROLOGY MAP – PROPOSED CONDITION
FOR
STIRLING – SCLA LOT 19
SOUTHWEST CORNER OF PHANTOM WEST & NEVADA AVE
CITY OF VICTORVILLE, CA

HUITT~ZOLLARS
HUITT-ZOLLARS, INC.
3990 CONCOURSE, SUITE 330 • ONTARIO, CALIFORNIA 91764 • (909) 941-7799

APPROVED BY MANUEL GONZALES R.C.E. 65195 EXPIRES 9-30-19 DATE

DESIGNED BY M.J.G.
DRAWN BY M.J.G.
CHECKED BY M.J.G.
FIELD BOOK
JOB NO. R307180.01
SHEET 1 OF 1 SHEETS

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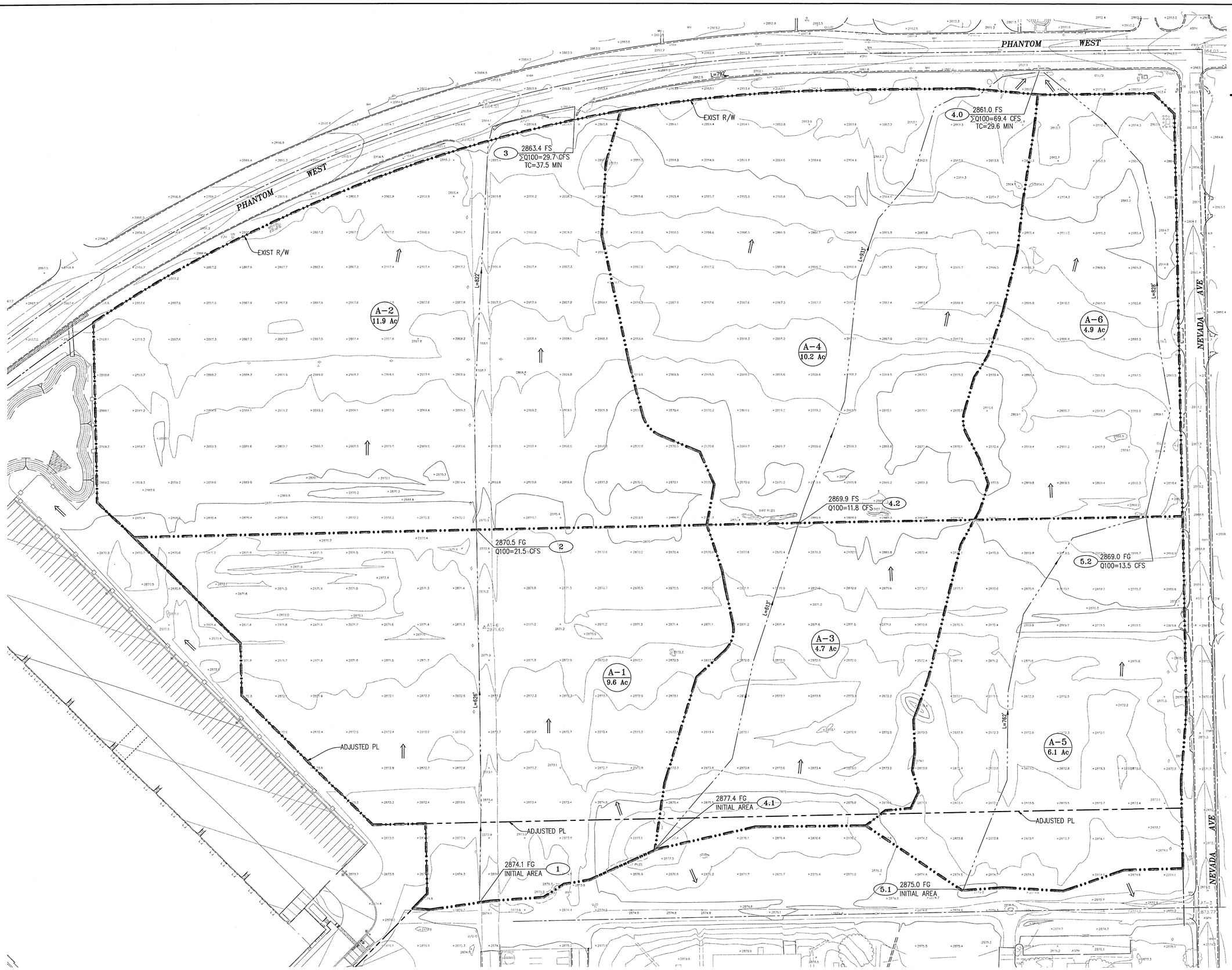

LEGEND

NO.	HYDROLOGY MODEL NODE NUMBER
A-11 7.40 Ac	TRIBUTARY AREA IN ACRES
L=673'	LENGTH OF FLOW
	DRAINAGE BOUNDARY
	FLOW DIRECTION

REGISTERED PROFESSIONAL ENGINEER
MANUEL A. GONZALES
No. 65195
Expiration 9-30-19
CIVIL
STATE OF CALIFORNIA

REV	DESCRIPTION	DATE

PRELIMINARY HYDROLOGY MAP – EXISTING CONDITION
FOR
STIRLING – SCLA LOT 19
SOUTHWEST CORNER OF PHANTOM WEST & NEVADA AVE
CITY OF VICTORVILLE, CA

HUITT-ZOLLARS
HUITT-ZOLLARS, INC.
3990 CONCOURSE, SUITE 330 • ONTARIO, CALIFORNIA 91764 • (909) 941-7799

APPROVED BY MANUEL GONZALES R.C.E. 65195 EXPIRES 9-30-19 DATE

DESIGNED BY M.J.G.
DRAWN BY M.J.G.
CHECKED BY M.J.G.
FIELD BOOK

SHEET 1 OF 1 SHEETS
JOB NO. R307180.01

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Appendix C
Unit Hydrograph Analysis

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 - 2004, Version 7.0

Study date 09/08/17

++

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

Program License Serial Number 6145

SCLA LOT 19
UNIT HYDROGRAPH - 10 YEAR EXISTING CONDITION
7180UHEX10

Storm Event Year = 10

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
44.70	1	0.75
Rainfall data for year 2		
44.70	6	0.70
Rainfall data for year 2		
44.70	24	1.00
Rainfall data for year 100		
44.70	1	1.15
Rainfall data for year 100		
44.70	6	1.80
Rainfall data for year 100		
44.70	24	3.00

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
91.0	91.0	44.70	1.000	0.174	1.000	0.174

Area-averaged adjusted loss rate Fm (In/Hr) = 0.174

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
44.70	1.000	91.0	91.0	0.99	0.554

Area-averaged catchment yield fraction, Y = 0.554
Area-averaged low loss fraction, Yb = 0.446
Direct entry of lag time by user
++
Watershed area = 44.70(Ac.)
Catchment Lag time = 0.365 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 22.8311
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.174(In/Hr)
Average low loss rate fraction (Yb) = 0.446 (decimal)
VALLEY UNDEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.356(In)
Computed peak 30-minute rainfall = 0.609(In)
Specified peak 1-hour rainfall = 0.750(In)
Computed peak 3-hour rainfall = 0.976(In)
Specified peak 6-hour rainfall = 1.153(In)
Specified peak 24-hour rainfall = 1.823(In)

Rainfall depth area reduction factors:
Using a total area of 44.70(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.355(In)
30-minute factor = 0.998 Adjusted rainfall = 0.608(In)
1-hour factor = 0.998 Adjusted rainfall = 0.748(In)
3-hour factor = 1.000 Adjusted rainfall = 0.976(In)
6-hour factor = 1.000 Adjusted rainfall = 1.152(In)
24-hour factor = 1.000 Adjusted rainfall = 1.823(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 = 540.59 (CFS))	
1	2.068	11.181
2	8.590	35.257
3	20.072	62.069
4	35.553	83.689
5	51.124	84.178
6	61.949	58.518
7	68.925	37.711
8	73.610	25.326
9	77.103	18.884
10	80.023	15.783
11	82.472	13.243
12	84.605	11.530
13	86.448	9.961
14	87.990	8.341
15	89.363	7.420
16	90.651	6.962

17	91.675	5.538
18	92.648	5.260
19	93.416	4.150
20	94.145	3.939
21	94.841	3.765
22	95.525	3.698
23	96.101	3.115
24	96.604	2.715
25	97.068	2.511
26	97.479	2.224
27	97.867	2.094
28	98.190	1.747
29	98.497	1.659
30	98.735	1.289
31	98.963	1.234
32	99.192	1.234
33	99.420	1.234
34	99.648	1.234
35	99.877	1.234
36	100.000	0.666

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3551	0.3551
2	0.4372	0.0821
3	0.4938	0.0566
4	0.5383	0.0445
5	0.5756	0.0373
6	0.6079	0.0324
7	0.6367	0.0288
8	0.6627	0.0260
9	0.6865	0.0238
10	0.7086	0.0220
11	0.7291	0.0206
12	0.7484	0.0193
13	0.7630	0.0146
14	0.7768	0.0138
15	0.7899	0.0130
16	0.8023	0.0124
17	0.8141	0.0118
18	0.8254	0.0113
19	0.8363	0.0108
20	0.8467	0.0104
21	0.8567	0.0100
22	0.8664	0.0097
23	0.8757	0.0093
24	0.8848	0.0090
25	0.8936	0.0088
26	0.9021	0.0085
27	0.9103	0.0083
28	0.9183	0.0080
29	0.9262	0.0078
30	0.9338	0.0076
31	0.9412	0.0074
32	0.9484	0.0072
33	0.9555	0.0071
34	0.9624	0.0069
35	0.9692	0.0068
36	0.9758	0.0066
37	0.9822	0.0064
38	0.9885	0.0063
39	0.9947	0.0062
40	1.0008	0.0061

41	1.0067	0.0059
42	1.0126	0.0058
43	1.0183	0.0057
44	1.0239	0.0056
45	1.0295	0.0055
46	1.0349	0.0054
47	1.0403	0.0054
48	1.0455	0.0053
49	1.0507	0.0052
50	1.0558	0.0051
51	1.0609	0.0050
52	1.0658	0.0050
53	1.0707	0.0049
54	1.0755	0.0048
55	1.0803	0.0047
56	1.0849	0.0047
57	1.0896	0.0046
58	1.0941	0.0046
59	1.0986	0.0045
60	1.1031	0.0044
61	1.1074	0.0044
62	1.1118	0.0043
63	1.1160	0.0043
64	1.1203	0.0042
65	1.1244	0.0042
66	1.1286	0.0041
67	1.1327	0.0041
68	1.1367	0.0040
69	1.1407	0.0040
70	1.1446	0.0039
71	1.1485	0.0039
72	1.1524	0.0039
73	1.1577	0.0053
74	1.1629	0.0052
75	1.1681	0.0052
76	1.1732	0.0051
77	1.1783	0.0051
78	1.1833	0.0050
79	1.1883	0.0050
80	1.1933	0.0050
81	1.1982	0.0049
82	1.2030	0.0049
83	1.2079	0.0048
84	1.2127	0.0048
85	1.2174	0.0048
86	1.2221	0.0047
87	1.2268	0.0047
88	1.2315	0.0046
89	1.2361	0.0046
90	1.2407	0.0046
91	1.2452	0.0045
92	1.2497	0.0045
93	1.2542	0.0045
94	1.2586	0.0044
95	1.2630	0.0044
96	1.2674	0.0044
97	1.2718	0.0044
98	1.2761	0.0043
99	1.2804	0.0043
100	1.2846	0.0043
101	1.2889	0.0042
102	1.2931	0.0042
103	1.2973	0.0042

104	1.3014	0.0042
105	1.3055	0.0041
106	1.3096	0.0041
107	1.3137	0.0041
108	1.3178	0.0040
109	1.3218	0.0040
110	1.3258	0.0040
111	1.3298	0.0040
112	1.3337	0.0040
113	1.3376	0.0039
114	1.3415	0.0039
115	1.3454	0.0039
116	1.3493	0.0039
117	1.3531	0.0038
118	1.3569	0.0038
119	1.3607	0.0038
120	1.3645	0.0038
121	1.3682	0.0038
122	1.3720	0.0037
123	1.3757	0.0037
124	1.3794	0.0037
125	1.3830	0.0037
126	1.3867	0.0036
127	1.3903	0.0036
128	1.3939	0.0036
129	1.3975	0.0036
130	1.4011	0.0036
131	1.4047	0.0036
132	1.4082	0.0035
133	1.4117	0.0035
134	1.4152	0.0035
135	1.4187	0.0035
136	1.4222	0.0035
137	1.4256	0.0035
138	1.4290	0.0034
139	1.4325	0.0034
140	1.4359	0.0034
141	1.4392	0.0034
142	1.4426	0.0034
143	1.4460	0.0034
144	1.4493	0.0033
145	1.4526	0.0033
146	1.4559	0.0033
147	1.4592	0.0033
148	1.4625	0.0033
149	1.4658	0.0033
150	1.4690	0.0032
151	1.4722	0.0032
152	1.4755	0.0032
153	1.4787	0.0032
154	1.4818	0.0032
155	1.4850	0.0032
156	1.4882	0.0032
157	1.4913	0.0031
158	1.4945	0.0031
159	1.4976	0.0031
160	1.5007	0.0031
161	1.5038	0.0031
162	1.5069	0.0031
163	1.5099	0.0031
164	1.5130	0.0031
165	1.5160	0.0030
166	1.5191	0.0030

167	1.5221	0.0030
168	1.5251	0.0030
169	1.5281	0.0030
170	1.5311	0.0030
171	1.5341	0.0030
172	1.5370	0.0030
173	1.5400	0.0029
174	1.5429	0.0029
175	1.5458	0.0029
176	1.5488	0.0029
177	1.5517	0.0029
178	1.5546	0.0029
179	1.5574	0.0029
180	1.5603	0.0029
181	1.5632	0.0029
182	1.5660	0.0029
183	1.5689	0.0028
184	1.5717	0.0028
185	1.5745	0.0028
186	1.5773	0.0028
187	1.5801	0.0028
188	1.5829	0.0028
189	1.5857	0.0028
190	1.5885	0.0028
191	1.5912	0.0028
192	1.5940	0.0028
193	1.5967	0.0027
194	1.5994	0.0027
195	1.6022	0.0027
196	1.6049	0.0027
197	1.6076	0.0027
198	1.6103	0.0027
199	1.6130	0.0027
200	1.6156	0.0027
201	1.6183	0.0027
202	1.6210	0.0027
203	1.6236	0.0026
204	1.6263	0.0026
205	1.6289	0.0026
206	1.6315	0.0026
207	1.6341	0.0026
208	1.6367	0.0026
209	1.6393	0.0026
210	1.6419	0.0026
211	1.6445	0.0026
212	1.6471	0.0026
213	1.6496	0.0026
214	1.6522	0.0026
215	1.6547	0.0025
216	1.6573	0.0025
217	1.6598	0.0025
218	1.6623	0.0025
219	1.6649	0.0025
220	1.6674	0.0025
221	1.6699	0.0025
222	1.6724	0.0025
223	1.6749	0.0025
224	1.6773	0.0025
225	1.6798	0.0025
226	1.6823	0.0025
227	1.6847	0.0025
228	1.6872	0.0025
229	1.6896	0.0024

230	1.6921	0.0024
231	1.6945	0.0024
232	1.6969	0.0024
233	1.6993	0.0024
234	1.7017	0.0024
235	1.7041	0.0024
236	1.7065	0.0024
237	1.7089	0.0024
238	1.7113	0.0024
239	1.7137	0.0024
240	1.7161	0.0024
241	1.7184	0.0024
242	1.7208	0.0024
243	1.7231	0.0023
244	1.7255	0.0023
245	1.7278	0.0023
246	1.7301	0.0023
247	1.7324	0.0023
248	1.7348	0.0023
249	1.7371	0.0023
250	1.7394	0.0023
251	1.7417	0.0023
252	1.7440	0.0023
253	1.7463	0.0023
254	1.7485	0.0023
255	1.7508	0.0023
256	1.7531	0.0023
257	1.7553	0.0023
258	1.7576	0.0023
259	1.7598	0.0023
260	1.7621	0.0022
261	1.7643	0.0022
262	1.7666	0.0022
263	1.7688	0.0022
264	1.7710	0.0022
265	1.7732	0.0022
266	1.7754	0.0022
267	1.7776	0.0022
268	1.7798	0.0022
269	1.7820	0.0022
270	1.7842	0.0022
271	1.7864	0.0022
272	1.7886	0.0022
273	1.7908	0.0022
274	1.7929	0.0022
275	1.7951	0.0022
276	1.7972	0.0022
277	1.7994	0.0022
278	1.8015	0.0021
279	1.8037	0.0021
280	1.8058	0.0021
281	1.8079	0.0021
282	1.8101	0.0021
283	1.8122	0.0021
284	1.8143	0.0021
285	1.8164	0.0021
286	1.8185	0.0021
287	1.8206	0.0021
288	1.8227	0.0021

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)

1	0.0021	0.0009	0.0012
2	0.0021	0.0009	0.0012
3	0.0021	0.0009	0.0012
4	0.0021	0.0009	0.0012
5	0.0021	0.0009	0.0012
6	0.0021	0.0009	0.0012
7	0.0021	0.0010	0.0012
8	0.0021	0.0010	0.0012
9	0.0022	0.0010	0.0012
10	0.0022	0.0010	0.0012
11	0.0022	0.0010	0.0012
12	0.0022	0.0010	0.0012
13	0.0022	0.0010	0.0012
14	0.0022	0.0010	0.0012
15	0.0022	0.0010	0.0012
16	0.0022	0.0010	0.0012
17	0.0022	0.0010	0.0012
18	0.0022	0.0010	0.0012
19	0.0022	0.0010	0.0012
20	0.0022	0.0010	0.0012
21	0.0023	0.0010	0.0013
22	0.0023	0.0010	0.0013
23	0.0023	0.0010	0.0013
24	0.0023	0.0010	0.0013
25	0.0023	0.0010	0.0013
26	0.0023	0.0010	0.0013
27	0.0023	0.0010	0.0013
28	0.0023	0.0010	0.0013
29	0.0023	0.0010	0.0013
30	0.0023	0.0010	0.0013
31	0.0023	0.0010	0.0013
32	0.0024	0.0010	0.0013
33	0.0024	0.0011	0.0013
34	0.0024	0.0011	0.0013
35	0.0024	0.0011	0.0013
36	0.0024	0.0011	0.0013
37	0.0024	0.0011	0.0013
38	0.0024	0.0011	0.0013
39	0.0024	0.0011	0.0013
40	0.0024	0.0011	0.0014
41	0.0025	0.0011	0.0014
42	0.0025	0.0011	0.0014
43	0.0025	0.0011	0.0014
44	0.0025	0.0011	0.0014
45	0.0025	0.0011	0.0014
46	0.0025	0.0011	0.0014
47	0.0025	0.0011	0.0014
48	0.0025	0.0011	0.0014
49	0.0025	0.0011	0.0014
50	0.0025	0.0011	0.0014
51	0.0026	0.0011	0.0014
52	0.0026	0.0011	0.0014
53	0.0026	0.0012	0.0014
54	0.0026	0.0012	0.0014
55	0.0026	0.0012	0.0014
56	0.0026	0.0012	0.0015
57	0.0026	0.0012	0.0015
58	0.0026	0.0012	0.0015
59	0.0027	0.0012	0.0015
60	0.0027	0.0012	0.0015
61	0.0027	0.0012	0.0015
62	0.0027	0.0012	0.0015

63	0.0027	0.0012	0.0015
64	0.0027	0.0012	0.0015
65	0.0028	0.0012	0.0015
66	0.0028	0.0012	0.0015
67	0.0028	0.0012	0.0015
68	0.0028	0.0012	0.0015
69	0.0028	0.0013	0.0016
70	0.0028	0.0013	0.0016
71	0.0028	0.0013	0.0016
72	0.0029	0.0013	0.0016
73	0.0029	0.0013	0.0016
74	0.0029	0.0013	0.0016
75	0.0029	0.0013	0.0016
76	0.0029	0.0013	0.0016
77	0.0029	0.0013	0.0016
78	0.0029	0.0013	0.0016
79	0.0030	0.0013	0.0016
80	0.0030	0.0013	0.0017
81	0.0030	0.0013	0.0017
82	0.0030	0.0013	0.0017
83	0.0030	0.0014	0.0017
84	0.0031	0.0014	0.0017
85	0.0031	0.0014	0.0017
86	0.0031	0.0014	0.0017
87	0.0031	0.0014	0.0017
88	0.0031	0.0014	0.0017
89	0.0032	0.0014	0.0018
90	0.0032	0.0014	0.0018
91	0.0032	0.0014	0.0018
92	0.0032	0.0014	0.0018
93	0.0032	0.0014	0.0018
94	0.0033	0.0015	0.0018
95	0.0033	0.0015	0.0018
96	0.0033	0.0015	0.0018
97	0.0033	0.0015	0.0018
98	0.0034	0.0015	0.0019
99	0.0034	0.0015	0.0019
100	0.0034	0.0015	0.0019
101	0.0034	0.0015	0.0019
102	0.0035	0.0015	0.0019
103	0.0035	0.0016	0.0019
104	0.0035	0.0016	0.0019
105	0.0035	0.0016	0.0020
106	0.0036	0.0016	0.0020
107	0.0036	0.0016	0.0020
108	0.0036	0.0016	0.0020
109	0.0036	0.0016	0.0020
110	0.0037	0.0016	0.0020
111	0.0037	0.0017	0.0021
112	0.0037	0.0017	0.0021
113	0.0038	0.0017	0.0021
114	0.0038	0.0017	0.0021
115	0.0038	0.0017	0.0021
116	0.0039	0.0017	0.0021
117	0.0039	0.0017	0.0022
118	0.0039	0.0018	0.0022
119	0.0040	0.0018	0.0022
120	0.0040	0.0018	0.0022
121	0.0040	0.0018	0.0022
122	0.0041	0.0018	0.0023
123	0.0041	0.0018	0.0023
124	0.0042	0.0019	0.0023
125	0.0042	0.0019	0.0023

126	0.0042	0.0019	0.0023
127	0.0043	0.0019	0.0024
128	0.0043	0.0019	0.0024
129	0.0044	0.0020	0.0024
130	0.0044	0.0020	0.0024
131	0.0045	0.0020	0.0025
132	0.0045	0.0020	0.0025
133	0.0046	0.0020	0.0025
134	0.0046	0.0021	0.0026
135	0.0047	0.0021	0.0026
136	0.0047	0.0021	0.0026
137	0.0048	0.0021	0.0027
138	0.0048	0.0022	0.0027
139	0.0049	0.0022	0.0027
140	0.0050	0.0022	0.0027
141	0.0050	0.0022	0.0028
142	0.0051	0.0023	0.0028
143	0.0052	0.0023	0.0029
144	0.0052	0.0023	0.0029
145	0.0039	0.0017	0.0021
146	0.0039	0.0017	0.0022
147	0.0040	0.0018	0.0022
148	0.0040	0.0018	0.0022
149	0.0041	0.0018	0.0023
150	0.0042	0.0019	0.0023
151	0.0043	0.0019	0.0024
152	0.0043	0.0019	0.0024
153	0.0044	0.0020	0.0025
154	0.0045	0.0020	0.0025
155	0.0046	0.0021	0.0026
156	0.0047	0.0021	0.0026
157	0.0048	0.0021	0.0027
158	0.0049	0.0022	0.0027
159	0.0050	0.0022	0.0028
160	0.0051	0.0023	0.0028
161	0.0053	0.0023	0.0029
162	0.0054	0.0024	0.0030
163	0.0055	0.0025	0.0031
164	0.0056	0.0025	0.0031
165	0.0058	0.0026	0.0032
166	0.0059	0.0027	0.0033
167	0.0062	0.0028	0.0034
168	0.0063	0.0028	0.0035
169	0.0066	0.0029	0.0037
170	0.0068	0.0030	0.0037
171	0.0071	0.0032	0.0039
172	0.0072	0.0032	0.0040
173	0.0076	0.0034	0.0042
174	0.0078	0.0035	0.0043
175	0.0083	0.0037	0.0046
176	0.0085	0.0038	0.0047
177	0.0090	0.0040	0.0050
178	0.0093	0.0042	0.0052
179	0.0100	0.0045	0.0056
180	0.0104	0.0046	0.0058
181	0.0113	0.0050	0.0063
182	0.0118	0.0053	0.0066
183	0.0130	0.0058	0.0072
184	0.0138	0.0061	0.0076
185	0.0193	0.0086	0.0107
186	0.0206	0.0092	0.0114
187	0.0238	0.0106	0.0132
188	0.0260	0.0116	0.0144

189	0.0324	0.0144	0.0179
190	0.0373	0.0145	0.0228
191	0.0566	0.0145	0.0421
192	0.0821	0.0145	0.0676
193	0.3551	0.0145	0.3407
194	0.0445	0.0145	0.0300
195	0.0288	0.0128	0.0159
196	0.0220	0.0098	0.0122
197	0.0146	0.0065	0.0081
198	0.0124	0.0055	0.0069
199	0.0108	0.0048	0.0060
200	0.0097	0.0043	0.0054
201	0.0088	0.0039	0.0049
202	0.0080	0.0036	0.0044
203	0.0074	0.0033	0.0041
204	0.0069	0.0031	0.0038
205	0.0064	0.0029	0.0036
206	0.0061	0.0027	0.0034
207	0.0057	0.0026	0.0032
208	0.0054	0.0024	0.0030
209	0.0052	0.0023	0.0029
210	0.0050	0.0022	0.0027
211	0.0047	0.0021	0.0026
212	0.0046	0.0020	0.0025
213	0.0044	0.0020	0.0024
214	0.0042	0.0019	0.0023
215	0.0041	0.0018	0.0023
216	0.0039	0.0018	0.0022
217	0.0053	0.0023	0.0029
218	0.0051	0.0023	0.0028
219	0.0050	0.0022	0.0028
220	0.0049	0.0022	0.0027
221	0.0048	0.0021	0.0026
222	0.0046	0.0021	0.0026
223	0.0045	0.0020	0.0025
224	0.0044	0.0020	0.0025
225	0.0044	0.0019	0.0024
226	0.0043	0.0019	0.0024
227	0.0042	0.0019	0.0023
228	0.0041	0.0018	0.0023
229	0.0040	0.0018	0.0022
230	0.0040	0.0018	0.0022
231	0.0039	0.0017	0.0022
232	0.0038	0.0017	0.0021
233	0.0038	0.0017	0.0021
234	0.0037	0.0016	0.0020
235	0.0036	0.0016	0.0020
236	0.0036	0.0016	0.0020
237	0.0035	0.0016	0.0020
238	0.0035	0.0015	0.0019
239	0.0034	0.0015	0.0019
240	0.0034	0.0015	0.0019
241	0.0033	0.0015	0.0018
242	0.0033	0.0015	0.0018
243	0.0032	0.0014	0.0018
244	0.0032	0.0014	0.0018
245	0.0031	0.0014	0.0017
246	0.0031	0.0014	0.0017
247	0.0031	0.0014	0.0017
248	0.0030	0.0014	0.0017
249	0.0030	0.0013	0.0017
250	0.0030	0.0013	0.0016
251	0.0029	0.0013	0.0016

252	0.0029	0.0013	0.0016
253	0.0029	0.0013	0.0016
254	0.0028	0.0013	0.0016
255	0.0028	0.0012	0.0016
256	0.0028	0.0012	0.0015
257	0.0027	0.0012	0.0015
258	0.0027	0.0012	0.0015
259	0.0027	0.0012	0.0015
260	0.0027	0.0012	0.0015
261	0.0026	0.0012	0.0015
262	0.0026	0.0012	0.0014
263	0.0026	0.0012	0.0014
264	0.0026	0.0011	0.0014
265	0.0025	0.0011	0.0014
266	0.0025	0.0011	0.0014
267	0.0025	0.0011	0.0014
268	0.0025	0.0011	0.0014
269	0.0024	0.0011	0.0014
270	0.0024	0.0011	0.0013
271	0.0024	0.0011	0.0013
272	0.0024	0.0011	0.0013
273	0.0024	0.0011	0.0013
274	0.0023	0.0010	0.0013
275	0.0023	0.0010	0.0013
276	0.0023	0.0010	0.0013
277	0.0023	0.0010	0.0013
278	0.0023	0.0010	0.0013
279	0.0023	0.0010	0.0012
280	0.0022	0.0010	0.0012
281	0.0022	0.0010	0.0012
282	0.0022	0.0010	0.0012
283	0.0022	0.0010	0.0012
284	0.0022	0.0010	0.0012
285	0.0022	0.0010	0.0012
286	0.0021	0.0010	0.0012
287	0.0021	0.0009	0.0012
288	0.0021	0.0009	0.0012

Total soil rain loss = 0.63(In)
Total effective rainfall = 1.19(In)
Peak flow rate in flood hydrograph = 41.75(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	12.5	25.0	37.5	50.0
0+ 5	0.0001	0.01	Q	|	|	|	|
0+10	0.0005	0.05	Q	|	|	|	|
0+15	0.0013	0.13	Q	|	|	|	|
0+20	0.0029	0.22	Q	|	|	|	|
0+25	0.0051	0.32	Q	|	|	|	|
0+30	0.0078	0.39	Q	|	|	|	|
0+35	0.0108	0.44	Q	|	|	|	|
0+40	0.0140	0.47	Q	|	|	|	|
0+45	0.0174	0.49	Q	|	|	|	|
0+50	0.0209	0.51	Q	|	|	|	|
0+55	0.0246	0.53	Q	|	|	|	|

1+ 0	0.0283	0.54	Q	|	|	|	|
1+ 5	0.0321	0.56	Q	|	|	|	|
1+10	0.0360	0.57	Q	|	|	|	|
1+15	0.0400	0.58	Q	|	|	|	|
1+20	0.0441	0.59	Q	|	|	|	|
1+25	0.0482	0.60	Q	|	|	|	|
1+30	0.0524	0.61	Q	|	|	|	|
1+35	0.0566	0.61	Q	|	|	|	|
1+40	0.0609	0.62	Q	|	|	|	|
1+45	0.0652	0.63	Q	|	|	|	|
1+50	0.0696	0.63	Q	|	|	|	|
1+55	0.0740	0.64	Q	|	|	|	|
2+ 0	0.0784	0.65	Q	|	|	|	|
2+ 5	0.0829	0.65	Q	|	|	|	|
2+10	0.0874	0.66	Q	|	|	|	|
2+15	0.0920	0.66	Q	|	|	|	|
2+20	0.0966	0.67	Q	|	|	|	|
2+25	0.1012	0.67	Q	|	|	|	|
2+30	0.1058	0.67	Q	|	|	|	|
2+35	0.1105	0.68	Q	|	|	|	|
2+40	0.1152	0.68	QV	|	|	|	|
2+45	0.1200	0.69	QV	|	|	|	|
2+50	0.1247	0.69	QV	|	|	|	|
2+55	0.1295	0.70	QV	|	|	|	|
3+ 0	0.1343	0.70	QV	|	|	|	|
3+ 5	0.1392	0.70	QV	|	|	|	|
3+10	0.1440	0.70	QV	|	|	|	|
3+15	0.1489	0.71	QV	|	|	|	|
3+20	0.1538	0.71	QV	|	|	|	|
3+25	0.1587	0.71	QV	|	|	|	|
3+30	0.1636	0.72	QV	|	|	|	|
3+35	0.1686	0.72	QV	|	|	|	|
3+40	0.1736	0.72	QV	|	|	|	|
3+45	0.1786	0.73	QV	|	|	|	|
3+50	0.1836	0.73	QV	|	|	|	|
3+55	0.1886	0.73	QV	|	|	|	|
4+ 0	0.1937	0.74	QV	|	|	|	|
4+ 5	0.1988	0.74	QV	|	|	|	|
4+10	0.2039	0.74	QV	|	|	|	|
4+15	0.2090	0.75	QV	|	|	|	|
4+20	0.2142	0.75	QV	|	|	|	|
4+25	0.2194	0.75	QV	|	|	|	|
4+30	0.2246	0.76	Q V	|	|	|	|
4+35	0.2298	0.76	Q V	|	|	|	|
4+40	0.2351	0.76	Q V	|	|	|	|
4+45	0.2403	0.77	Q V	|	|	|	|
4+50	0.2457	0.77	Q V	|	|	|	|
4+55	0.2510	0.77	Q V	|	|	|	|
5+ 0	0.2563	0.78	Q V	|	|	|	|
5+ 5	0.2617	0.78	Q V	|	|	|	|
5+10	0.2671	0.79	Q V	|	|	|	|
5+15	0.2726	0.79	Q V	|	|	|	|
5+20	0.2780	0.79	Q V	|	|	|	|
5+25	0.2835	0.80	Q V	|	|	|	|
5+30	0.2890	0.80	Q V	|	|	|	|
5+35	0.2946	0.80	Q V	|	|	|	|
5+40	0.3001	0.81	Q V	|	|	|	|
5+45	0.3057	0.81	Q V	|	|	|	|
5+50	0.3114	0.82	Q V	|	|	|	|
5+55	0.3170	0.82	Q V	|	|	|	|
6+ 0	0.3227	0.83	Q V	|	|	|	|
6+ 5	0.3284	0.83	Q V	|	|	|	|
6+10	0.3342	0.83	Q V	|	|	|	|

6+15	0.3400	0.84	Q	V	|	|	|	|
6+20	0.3458	0.84	Q	V	|	|	|	|
6+25	0.3516	0.85	Q	V	|	|	|	|
6+30	0.3575	0.85	Q	V	|	|	|	|
6+35	0.3634	0.86	Q	V	|	|	|	|
6+40	0.3694	0.86	Q	V	|	|	|	|
6+45	0.3753	0.87	Q	V	|	|	|	|
6+50	0.3813	0.87	Q	V	|	|	|	|
6+55	0.3874	0.88	Q	V	|	|	|	|
7+ 0	0.3935	0.88	Q	V	|	|	|	|
7+ 5	0.3996	0.89	Q	V	|	|	|	|
7+10	0.4057	0.89	Q	V	|	|	|	|
7+15	0.4119	0.90	Q	V	|	|	|	|
7+20	0.4182	0.90	Q	V	|	|	|	|
7+25	0.4244	0.91	Q	V	|	|	|	|
7+30	0.4307	0.92	Q	V	|	|	|	|
7+35	0.4371	0.92	Q	V	|	|	|	|
7+40	0.4434	0.93	Q	V	|	|	|	|
7+45	0.4499	0.93	Q	V	|	|	|	|
7+50	0.4563	0.94	Q	V	|	|	|	|
7+55	0.4628	0.94	Q	V	|	|	|	|
8+ 0	0.4694	0.95	Q	V	|	|	|	|
8+ 5	0.4760	0.96	Q	V	|	|	|	|
8+10	0.4826	0.96	Q	V	|	|	|	|
8+15	0.4893	0.97	Q	V	|	|	|	|
8+20	0.4960	0.98	Q	V	|	|	|	|
8+25	0.5028	0.98	Q	V	|	|	|	|
8+30	0.5096	0.99	Q	V	|	|	|	|
8+35	0.5164	1.00	Q	V	|	|	|	|
8+40	0.5233	1.00	Q	V	|	|	|	|
8+45	0.5303	1.01	Q	V	|	|	|	|
8+50	0.5373	1.02	Q	V	|	|	|	|
8+55	0.5444	1.03	Q	V	|	|	|	|
9+ 0	0.5515	1.03	Q	V	|	|	|	|
9+ 5	0.5587	1.04	Q	V	|	|	|	|
9+10	0.5659	1.05	Q	V	|	|	|	|
9+15	0.5731	1.06	Q	V	|	|	|	|
9+20	0.5805	1.06	Q	V	|	|	|	|
9+25	0.5879	1.07	Q	V	|	|	|	|
9+30	0.5953	1.08	Q	V	|	|	|	|
9+35	0.6028	1.09	Q	V	|	|	|	|
9+40	0.6104	1.10	Q	V	|	|	|	|
9+45	0.6180	1.11	Q	V	|	|	|	|
9+50	0.6257	1.12	Q	V	|	|	|	|
9+55	0.6335	1.13	Q	V	|	|	|	|
10+ 0	0.6413	1.14	Q	V	|	|	|	|
10+ 5	0.6492	1.15	Q	V	|	|	|	|
10+10	0.6571	1.16	Q	V	|	|	|	|
10+15	0.6651	1.17	Q	V	|	|	|	|
10+20	0.6732	1.18	Q	V	|	|	|	|
10+25	0.6814	1.19	Q	V	|	|	|	|
10+30	0.6897	1.20	Q	V	|	|	|	|
10+35	0.6980	1.21	Q	V	|	|	|	|
10+40	0.7064	1.22	Q	V	|	|	|	|
10+45	0.7149	1.23	Q	V	|	|	|	|
10+50	0.7234	1.24	Q	V	|	|	|	|
10+55	0.7321	1.26	|Q	V	|	|	|	|
11+ 0	0.7408	1.27	|Q	V	|	|	|	|
11+ 5	0.7496	1.28	|Q	V	|	|	|	|
11+10	0.7586	1.29	|Q	V	|	|	|	|
11+15	0.7676	1.31	|Q	V	|	|	|	|
11+20	0.7767	1.32	|Q	V	|	|	|	|
11+25	0.7859	1.34	|Q	V	|	|	|	|

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11+30        0.7952       1.35  |Q     V  |          |          |          |
11+35        0.8046       1.37  |Q     V  |          |          |          |
11+40        0.8141       1.38  |Q     V  |          |          |          |
11+45        0.8237       1.40  |Q     V  |          |          |          |
11+50        0.8335       1.41  |Q     V  |          |          |          |
11+55        0.8433       1.43  |Q     V  |          |          |          |
12+ 0        0.8533       1.45  |Q     V  |          |          |          |
12+ 5        0.8634       1.46  |Q     V  |          |          |          |
12+10        0.8733       1.45  |Q     V  |          |          |          |
12+15        0.8831       1.42  |Q     V  |          |          |          |
12+20        0.8925       1.37  |Q      V |          |          |          |
12+25        0.9016       1.32  |Q      V |          |          |          |
12+30        0.9105       1.29  |Q      V |          |          |          |
12+35        0.9193       1.28  |Q      V |          |          |          |
12+40        0.9281       1.28  |Q      V |          |          |          |
12+45        0.9370       1.29  |Q      V |          |          |          |
12+50        0.9459       1.29  |Q      V |          |          |          |
12+55        0.9549       1.31  |Q      V |          |          |          |
13+ 0        0.9640       1.32  |Q      V |          |          |          |
13+ 5        0.9732       1.33  |Q      V |          |          |          |
13+10        0.9825       1.35  |Q      V |          |          |          |
13+15        0.9919       1.37  |Q      V |          |          |          |
13+20        1.0015       1.39  |Q       V|          |          |          |
13+25        1.0113       1.42  |Q       V|          |          |          |
13+30        1.0212       1.44  |Q       V|          |          |          |
13+35        1.0313       1.47  |Q       V|          |          |          |
13+40        1.0416       1.50  |Q       V|          |          |          |
13+45        1.0521       1.53  |Q       V|          |          |          |
13+50        1.0629       1.56  |Q       V|          |          |          |
13+55        1.0739       1.60  |Q       V|          |          |          |
14+ 0        1.0851       1.63  |Q       V|          |          |          |
14+ 5        1.0967       1.67  |Q       V|          |          |          |
14+10        1.1085       1.72  |Q       V|          |          |          |
14+15        1.1207       1.77  |Q        V          |          |          |
14+20        1.1332       1.82  |Q        V          |          |          |
14+25        1.1461       1.87  |Q        V          |          |          |
14+30        1.1594       1.93  |Q        V          |          |          |
14+35        1.1732       2.00  |Q        V          |          |          |
14+40        1.1874       2.07  |Q        V          |          |          |
14+45        1.2022       2.14  |Q        V          |          |          |
14+50        1.2175       2.22  |Q        V          |          |          |
14+55        1.2335       2.31  |Q        |V         |          |          |
15+ 0        1.2501       2.41  |Q        |V         |          |          |
15+ 5        1.2675       2.53  | Q       |V         |          |          |
15+10        1.2857       2.65  | Q       |V         |          |          |
15+15        1.3050       2.79  | Q       |V         |          |          |
15+20        1.3253       2.95  | Q       |V         |          |          |
15+25        1.3470       3.16  | Q       | V        |          |          |
15+30        1.3708       3.45  | Q       | V        |          |          |
15+35        1.3972       3.84  |  Q      | V        |          |          |
15+40        1.4271       4.34  |  Q      | V        |          |          |
15+45        1.4611       4.94  |  Q      |  V       |          |          |
15+50        1.5000       5.65  |   Q     |  V       |          |          |
15+55        1.5463       6.71  |    Q    |  V       |          |          |
16+ 0        1.6057       8.63  |     Q   |   V      |          |          |
16+ 5        1.7072      14.73  |         |Q   V     |          |          |
16+10        1.8785      24.88  |         |     V  Q|          |          |
16+15        2.1199      35.04  |         |        V|        Q |          |
16+20        2.4074      41.75  |         |         |V         |  Q       |
16+25        2.6843      40.20  |         |         |   V      | Q        |
16+30        2.8919      30.15  |         |         |   Q V    |          |
16+35        3.0412      21.67  |         |      Q  |      V   |          |
16+40        3.1530      16.24  |         | Q       |       V  |          |
```

16+45	3.2429	13.05	
16+50	3.3201	11.21	
16+55	3.3874	9.76	
17+ 0	3.4472	8.68	
17+ 5	3.5004	7.73	
17+10	3.5476	6.85	
17+15	3.5905	6.23	
17+20	3.6303	5.77	
17+25	3.6652	5.08	
17+30	3.6979	4.74	
17+35	3.7268	4.21	
17+40	3.7542	3.97	
17+45	3.7801	3.77	
17+50	3.8048	3.59	
17+55	3.8273	3.27	
18+ 0	3.8481	3.01	
18+ 5	3.8676	2.84	
18+10	3.8860	2.67	
18+15	3.9038	2.58	
18+20	3.9206	2.44	
18+25	3.9370	2.39	
18+30	3.9524	2.24	
18+35	3.9675	2.18	
18+40	3.9822	2.14	
18+45	3.9966	2.09	
18+50	4.0105	2.03	
18+55	4.0239	1.94	
19+ 0	4.0355	1.68	
19+ 5	4.0452	1.41	
19+10	4.0546	1.37	
19+15	4.0638	1.33	
19+20	4.0727	1.30	
19+25	4.0815	1.27	
19+30	4.0901	1.25	
19+35	4.0985	1.22	
19+40	4.1067	1.20	
19+45	4.1149	1.18	
19+50	4.1229	1.16	
19+55	4.1307	1.14	
20+ 0	4.1385	1.12	
20+ 5	4.1461	1.11	
20+10	4.1536	1.09	
20+15	4.1609	1.07	
20+20	4.1682	1.06	
20+25	4.1754	1.04	
20+30	4.1825	1.03	
20+35	4.1894	1.01	
20+40	4.1963	1.00	
20+45	4.2031	0.99	
20+50	4.2098	0.97	
20+55	4.2164	0.96	
21+ 0	4.2229	0.95	
21+ 5	4.2294	0.94	
21+10	4.2357	0.92	
21+15	4.2420	0.91	
21+20	4.2482	0.90	
21+25	4.2544	0.89	
21+30	4.2604	0.88	
21+35	4.2664	0.87	
21+40	4.2723	0.86	
21+45	4.2782	0.85	
21+50	4.2840	0.84	
21+55	4.2897	0.83	

22+ 0	4.2954	0.82	Q	|	|	|	V |
22+ 5	4.3010	0.81	Q	|	|	|	V |
22+10	4.3065	0.81	Q	|	|	|	V |
22+15	4.3120	0.80	Q	|	|	|	V |
22+20	4.3175	0.79	Q	|	|	|	V |
22+25	4.3229	0.78	Q	|	|	|	V |
22+30	4.3282	0.77	Q	|	|	|	V |
22+35	4.3335	0.77	Q	|	|	|	V |
22+40	4.3387	0.76	Q	|	|	|	V|
22+45	4.3439	0.75	Q	|	|	|	V|
22+50	4.3490	0.75	Q	|	|	|	V|
22+55	4.3541	0.74	Q	|	|	|	V|
23+ 0	4.3592	0.73	Q	|	|	|	V|
23+ 5	4.3642	0.73	Q	|	|	|	V|
23+10	4.3691	0.72	Q	|	|	|	V|
23+15	4.3741	0.71	Q	|	|	|	V|
23+20	4.3789	0.71	Q	|	|	|	V|
23+25	4.3838	0.70	Q	|	|	|	V|
23+30	4.3886	0.70	Q	|	|	|	V|
23+35	4.3933	0.69	Q	|	|	|	V|
23+40	4.3980	0.69	Q	|	|	|	V|
23+45	4.4027	0.68	Q	|	|	|	V|
23+50	4.4074	0.67	Q	|	|	|	V|
23+55	4.4120	0.67	Q	|	|	|	V|
24+ 0	4.4165	0.66	Q	|	|	|	V|
24+ 5	4.4210	0.65	Q	|	|	|	V|
24+10	4.4251	0.60	Q	|	|	|	V|
24+15	4.4287	0.52	Q	|	|	|	V|
24+20	4.4316	0.42	Q	|	|	|	V|
24+25	4.4339	0.32	Q	|	|	|	V|
24+30	4.4356	0.25	Q	|	|	|	V|
24+35	4.4370	0.21	Q	|	|	|	V|
24+40	4.4382	0.18	Q	|	|	|	V|
24+45	4.4393	0.15	Q	|	|	|	V|
24+50	4.4402	0.13	Q	|	|	|	V|
24+55	4.4410	0.12	Q	|	|	|	V|
25+ 0	4.4417	0.10	Q	|	|	|	V|
25+ 5	4.4423	0.09	Q	|	|	|	V|
25+10	4.4429	0.08	Q	|	|	|	V|
25+15	4.4434	0.07	Q	|	|	|	V|
25+20	4.4438	0.06	Q	|	|	|	V|
25+25	4.4442	0.06	Q	|	|	|	V|
25+30	4.4445	0.05	Q	|	|	|	V|
25+35	4.4448	0.04	Q	|	|	|	V|
25+40	4.4451	0.04	Q	|	|	|	V|
25+45	4.4453	0.03	Q	|	|	|	V|
25+50	4.4455	0.03	Q	|	|	|	V|
25+55	4.4457	0.03	Q	|	|	|	V|
26+ 0	4.4458	0.02	Q	|	|	|	V|
26+ 5	4.4460	0.02	Q	|	|	|	V|
26+10	4.4461	0.02	Q	|	|	|	V|
26+15	4.4462	0.01	Q	|	|	|	V|
26+20	4.4462	0.01	Q	|	|	|	V|
26+25	4.4463	0.01	Q	|	|	|	V|
26+30	4.4464	0.01	Q	|	|	|	V|
26+35	4.4464	0.01	Q	|	|	|	V|
26+40	4.4465	0.01	Q	|	|	|	V|
26+45	4.4465	0.00	Q	|	|	|	V|
26+50	4.4465	0.00	Q	|	|	|	V|
26+55	4.4465	0.00	Q	|	|	|	V|

Unit Hydrograph Analysis

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Study date 09/08/17

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

Program License Serial Number 6145

SCLA LOT 19
UNIT HYDROGRAPH - 100 YEAR EXISTING CONDITION
7180UNIHYDEX

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		
44.70	1	1.15
Rainfall data for year 100		
44.70	6	1.80
Rainfall data for year 100		
44.70	24	3.00

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******** 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)
91.0	98.2	44.70	1.000	0.036	1.000	0.036

Area-averaged adjusted loss rate Fm (In/Hr) = 0.036

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
44.70	1.000	91.0	98.2	0.18	0.930

Area-averaged catchment yield fraction, Y = 0.930
Area-averaged low loss fraction, Yb = 0.070

Direct entry of lag time by user
++
Watershed area = 44.70(Ac.)
Catchment Lag time = 0.365 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 22.8311
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.036(In/Hr)
Average low loss rate fraction (Yb) = 0.070 (decimal)
VALLEY UNDEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.546(In)
Computed peak 30-minute rainfall = 0.934(In)
Specified peak 1-hour rainfall = 1.150(In)
Computed peak 3-hour rainfall = 1.514(In)
Specified peak 6-hour rainfall = 1.800(In)
Specified peak 24-hour rainfall = 3.000(In)

Rainfall depth area reduction factors:
Using a total area of 44.70(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.545(In)
30-minute factor = 0.998 Adjusted rainfall = 0.932(In)
1-hour factor = 0.998 Adjusted rainfall = 1.148(In)
3-hour factor = 1.000 Adjusted rainfall = 1.513(In)
6-hour factor = 1.000 Adjusted rainfall = 1.800(In)
24-hour factor = 1.000 Adjusted rainfall = 3.000(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 = 540.59 (CFS))		
1	2.068	11.181
2	8.590	35.257
3	20.072	62.069
4	35.553	83.689
5	51.124	84.178
6	61.949	58.518
7	68.925	37.711
8	73.610	25.326
9	77.103	18.884
10	80.023	15.783
11	82.472	13.243
12	84.605	11.530
13	86.448	9.961
14	87.990	8.341
15	89.363	7.420
16	90.651	6.962
17	91.675	5.538
18	92.648	5.260
19	93.416	4.150
20	94.145	3.939
21	94.841	3.765
22	95.525	3.698
23	96.101	3.115
24	96.604	2.715
25	97.068	2.511
26	97.479	2.224
27	97.867	2.094

28	98.190	1.747
29	98.497	1.659
30	98.735	1.289
31	98.963	1.234
32	99.192	1.234
33	99.420	1.234
34	99.648	1.234
35	99.877	1.234
36	100.000	0.666

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5445	0.5445
2	0.6704	0.1259
3	0.7571	0.0867
4	0.8254	0.0682
5	0.8825	0.0571
6	0.9321	0.0496
7	0.9763	0.0441
8	1.0162	0.0399
9	1.0527	0.0365
10	1.0865	0.0338
11	1.1180	0.0315
12	1.1476	0.0296
13	1.1709	0.0234
14	1.1930	0.0220
15	1.2139	0.0209
16	1.2338	0.0199
17	1.2527	0.0190
18	1.2709	0.0182
19	1.2883	0.0174
20	1.3051	0.0167
21	1.3212	0.0161
22	1.3367	0.0156
23	1.3518	0.0150
24	1.3663	0.0146
25	1.3805	0.0141
26	1.3942	0.0137
27	1.4075	0.0133
28	1.4204	0.0129
29	1.4330	0.0126
30	1.4453	0.0123
31	1.4573	0.0120
32	1.4690	0.0117
33	1.4804	0.0114
34	1.4915	0.0112
35	1.5025	0.0109
36	1.5132	0.0107
37	1.5236	0.0104
38	1.5338	0.0102
39	1.5438	0.0100
40	1.5536	0.0098
41	1.5632	0.0096
42	1.5727	0.0095
43	1.5820	0.0093
44	1.5911	0.0091
45	1.6001	0.0090
46	1.6089	0.0088
47	1.6176	0.0087
48	1.6261	0.0085
49	1.6345	0.0084
50	1.6428	0.0083
51	1.6510	0.0082

52	1.6590	0.0080
53	1.6669	0.0079
54	1.6747	0.0078
55	1.6825	0.0077
56	1.6901	0.0076
57	1.6976	0.0075
58	1.7050	0.0074
59	1.7123	0.0073
60	1.7195	0.0072
61	1.7266	0.0071
62	1.7337	0.0070
63	1.7406	0.0070
64	1.7475	0.0069
65	1.7543	0.0068
66	1.7610	0.0067
67	1.7676	0.0066
68	1.7742	0.0066
69	1.7807	0.0065
70	1.7871	0.0064
71	1.7935	0.0064
72	1.7997	0.0063
73	1.8089	0.0092
74	1.8180	0.0091
75	1.8270	0.0090
76	1.8360	0.0089
77	1.8448	0.0089
78	1.8536	0.0088
79	1.8624	0.0087
80	1.8710	0.0087
81	1.8796	0.0086
82	1.8881	0.0085
83	1.8966	0.0085
84	1.9050	0.0084
85	1.9133	0.0083
86	1.9215	0.0083
87	1.9298	0.0082
88	1.9379	0.0081
89	1.9460	0.0081
90	1.9540	0.0080
91	1.9620	0.0080
92	1.9699	0.0079
93	1.9778	0.0079
94	1.9856	0.0078
95	1.9933	0.0078
96	2.0010	0.0077
97	2.0087	0.0077
98	2.0163	0.0076
99	2.0239	0.0076
100	2.0314	0.0075
101	2.0388	0.0075
102	2.0463	0.0074
103	2.0536	0.0074
104	2.0610	0.0073
105	2.0682	0.0073
106	2.0755	0.0072
107	2.0827	0.0072
108	2.0898	0.0072
109	2.0969	0.0071
110	2.1040	0.0071
111	2.1110	0.0070
112	2.1180	0.0070
113	2.1250	0.0069
114	2.1319	0.0069

115	2.1388	0.0069
116	2.1456	0.0068
117	2.1524	0.0068
118	2.1591	0.0068
119	2.1659	0.0067
120	2.1726	0.0067
121	2.1792	0.0067
122	2.1858	0.0066
123	2.1924	0.0066
124	2.1990	0.0066
125	2.2055	0.0065
126	2.2120	0.0065
127	2.2184	0.0065
128	2.2249	0.0064
129	2.2312	0.0064
130	2.2376	0.0064
131	2.2439	0.0063
132	2.2502	0.0063
133	2.2565	0.0063
134	2.2627	0.0062
135	2.2689	0.0062
136	2.2751	0.0062
137	2.2813	0.0062
138	2.2874	0.0061
139	2.2935	0.0061
140	2.2996	0.0061
141	2.3056	0.0060
142	2.3116	0.0060
143	2.3176	0.0060
144	2.3236	0.0060
145	2.3295	0.0059
146	2.3354	0.0059
147	2.3413	0.0059
148	2.3471	0.0059
149	2.3530	0.0058
150	2.3588	0.0058
151	2.3646	0.0058
152	2.3703	0.0058
153	2.3761	0.0057
154	2.3818	0.0057
155	2.3875	0.0057
156	2.3931	0.0057
157	2.3988	0.0056
158	2.4044	0.0056
159	2.4100	0.0056
160	2.4156	0.0056
161	2.4211	0.0056
162	2.4266	0.0055
163	2.4322	0.0055
164	2.4376	0.0055
165	2.4431	0.0055
166	2.4486	0.0054
167	2.4540	0.0054
168	2.4594	0.0054
169	2.4648	0.0054
170	2.4701	0.0054
171	2.4755	0.0053
172	2.4808	0.0053
173	2.4861	0.0053
174	2.4914	0.0053
175	2.4967	0.0053
176	2.5019	0.0052
177	2.5071	0.0052

178	2.5124	0.0052
179	2.5176	0.0052
180	2.5227	0.0052
181	2.5279	0.0052
182	2.5330	0.0051
183	2.5381	0.0051
184	2.5432	0.0051
185	2.5483	0.0051
186	2.5534	0.0051
187	2.5584	0.0051
188	2.5635	0.0050
189	2.5685	0.0050
190	2.5735	0.0050
191	2.5785	0.0050
192	2.5834	0.0050
193	2.5884	0.0050
194	2.5933	0.0049
195	2.5983	0.0049
196	2.6032	0.0049
197	2.6080	0.0049
198	2.6129	0.0049
199	2.6178	0.0049
200	2.6226	0.0048
201	2.6274	0.0048
202	2.6322	0.0048
203	2.6370	0.0048
204	2.6418	0.0048
205	2.6466	0.0048
206	2.6513	0.0048
207	2.6561	0.0047
208	2.6608	0.0047
209	2.6655	0.0047
210	2.6702	0.0047
211	2.6749	0.0047
212	2.6795	0.0047
213	2.6842	0.0047
214	2.6888	0.0046
215	2.6935	0.0046
216	2.6981	0.0046
217	2.7027	0.0046
218	2.7072	0.0046
219	2.7118	0.0046
220	2.7164	0.0046
221	2.7209	0.0045
222	2.7254	0.0045
223	2.7300	0.0045
224	2.7345	0.0045
225	2.7390	0.0045
226	2.7434	0.0045
227	2.7479	0.0045
228	2.7524	0.0045
229	2.7568	0.0044
230	2.7612	0.0044
231	2.7657	0.0044
232	2.7701	0.0044
233	2.7745	0.0044
234	2.7788	0.0044
235	2.7832	0.0044
236	2.7876	0.0044
237	2.7919	0.0043
238	2.7962	0.0043
239	2.8006	0.0043
240	2.8049	0.0043

241	2.8092	0.0043
242	2.8135	0.0043
243	2.8178	0.0043
244	2.8220	0.0043
245	2.8263	0.0043
246	2.8305	0.0042
247	2.8348	0.0042
248	2.8390	0.0042
249	2.8432	0.0042
250	2.8474	0.0042
251	2.8516	0.0042
252	2.8558	0.0042
253	2.8599	0.0042
254	2.8641	0.0042
255	2.8683	0.0042
256	2.8724	0.0041
257	2.8765	0.0041
258	2.8807	0.0041
259	2.8848	0.0041
260	2.8889	0.0041
261	2.8930	0.0041
262	2.8970	0.0041
263	2.9011	0.0041
264	2.9052	0.0041
265	2.9092	0.0041
266	2.9133	0.0040
267	2.9173	0.0040
268	2.9213	0.0040
269	2.9253	0.0040
270	2.9293	0.0040
271	2.9333	0.0040
272	2.9373	0.0040
273	2.9413	0.0040
274	2.9452	0.0040
275	2.9492	0.0040
276	2.9531	0.0039
277	2.9571	0.0039
278	2.9610	0.0039
279	2.9649	0.0039
280	2.9688	0.0039
281	2.9728	0.0039
282	2.9766	0.0039
283	2.9805	0.0039
284	2.9844	0.0039
285	2.9883	0.0039
286	2.9921	0.0039
287	2.9960	0.0039
288	2.9998	0.0038

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0038	0.0003	0.0036
2	0.0039	0.0003	0.0036
3	0.0039	0.0003	0.0036
4	0.0039	0.0003	0.0036
5	0.0039	0.0003	0.0036
6	0.0039	0.0003	0.0036
7	0.0039	0.0003	0.0036
8	0.0039	0.0003	0.0037
9	0.0039	0.0003	0.0037
10	0.0040	0.0003	0.0037

11	0.0040	0.0003	0.0037
12	0.0040	0.0003	0.0037
13	0.0040	0.0003	0.0037
14	0.0040	0.0003	0.0037
15	0.0040	0.0003	0.0038
16	0.0040	0.0003	0.0038
17	0.0041	0.0003	0.0038
18	0.0041	0.0003	0.0038
19	0.0041	0.0003	0.0038
20	0.0041	0.0003	0.0038
21	0.0041	0.0003	0.0038
22	0.0041	0.0003	0.0038
23	0.0042	0.0003	0.0039
24	0.0042	0.0003	0.0039
25	0.0042	0.0003	0.0039
26	0.0042	0.0003	0.0039
27	0.0042	0.0003	0.0039
28	0.0042	0.0003	0.0039
29	0.0042	0.0003	0.0039
30	0.0043	0.0003	0.0040
31	0.0043	0.0003	0.0040
32	0.0043	0.0003	0.0040
33	0.0043	0.0003	0.0040
34	0.0043	0.0003	0.0040
35	0.0043	0.0003	0.0040
36	0.0044	0.0003	0.0041
37	0.0044	0.0003	0.0041
38	0.0044	0.0003	0.0041
39	0.0044	0.0003	0.0041
40	0.0044	0.0003	0.0041
41	0.0045	0.0003	0.0041
42	0.0045	0.0003	0.0042
43	0.0045	0.0003	0.0042
44	0.0045	0.0003	0.0042
45	0.0045	0.0003	0.0042
46	0.0045	0.0003	0.0042
47	0.0046	0.0003	0.0043
48	0.0046	0.0003	0.0043
49	0.0046	0.0003	0.0043
50	0.0046	0.0003	0.0043
51	0.0047	0.0003	0.0043
52	0.0047	0.0003	0.0043
53	0.0047	0.0003	0.0044
54	0.0047	0.0003	0.0044
55	0.0047	0.0003	0.0044
56	0.0048	0.0003	0.0044
57	0.0048	0.0003	0.0044
58	0.0048	0.0003	0.0045
59	0.0048	0.0003	0.0045
60	0.0048	0.0003	0.0045
61	0.0049	0.0003	0.0045
62	0.0049	0.0003	0.0045
63	0.0049	0.0003	0.0046
64	0.0049	0.0003	0.0046
65	0.0050	0.0003	0.0046
66	0.0050	0.0003	0.0046
67	0.0050	0.0003	0.0047
68	0.0050	0.0004	0.0047
69	0.0051	0.0004	0.0047
70	0.0051	0.0004	0.0047
71	0.0051	0.0004	0.0048
72	0.0051	0.0004	0.0048
73	0.0052	0.0004	0.0048

74	0.0052	0.0004	0.0048
75	0.0052	0.0004	0.0049
76	0.0052	0.0004	0.0049
77	0.0053	0.0004	0.0049
78	0.0053	0.0004	0.0049
79	0.0053	0.0004	0.0050
80	0.0054	0.0004	0.0050
81	0.0054	0.0004	0.0050
82	0.0054	0.0004	0.0050
83	0.0055	0.0004	0.0051
84	0.0055	0.0004	0.0051
85	0.0055	0.0004	0.0051
86	0.0056	0.0004	0.0052
87	0.0056	0.0004	0.0052
88	0.0056	0.0004	0.0052
89	0.0057	0.0004	0.0053
90	0.0057	0.0004	0.0053
91	0.0057	0.0004	0.0053
92	0.0058	0.0004	0.0054
93	0.0058	0.0004	0.0054
94	0.0058	0.0004	0.0054
95	0.0059	0.0004	0.0055
96	0.0059	0.0004	0.0055
97	0.0060	0.0004	0.0055
98	0.0060	0.0004	0.0056
99	0.0060	0.0004	0.0056
100	0.0061	0.0004	0.0056
101	0.0061	0.0004	0.0057
102	0.0062	0.0004	0.0057
103	0.0062	0.0004	0.0058
104	0.0062	0.0004	0.0058
105	0.0063	0.0004	0.0059
106	0.0063	0.0004	0.0059
107	0.0064	0.0004	0.0059
108	0.0064	0.0004	0.0060
109	0.0065	0.0005	0.0060
110	0.0065	0.0005	0.0061
111	0.0066	0.0005	0.0061
112	0.0066	0.0005	0.0062
113	0.0067	0.0005	0.0062
114	0.0067	0.0005	0.0063
115	0.0068	0.0005	0.0063
116	0.0068	0.0005	0.0064
117	0.0069	0.0005	0.0064
118	0.0069	0.0005	0.0065
119	0.0070	0.0005	0.0065
120	0.0071	0.0005	0.0066
121	0.0072	0.0005	0.0067
122	0.0072	0.0005	0.0067
123	0.0073	0.0005	0.0068
124	0.0073	0.0005	0.0068
125	0.0074	0.0005	0.0069
126	0.0075	0.0005	0.0069
127	0.0076	0.0005	0.0070
128	0.0076	0.0005	0.0071
129	0.0077	0.0005	0.0072
130	0.0078	0.0005	0.0072
131	0.0079	0.0005	0.0073
132	0.0079	0.0006	0.0074
133	0.0080	0.0006	0.0075
134	0.0081	0.0006	0.0075
135	0.0082	0.0006	0.0076
136	0.0083	0.0006	0.0077

137	0.0084	0.0006	0.0078
138	0.0085	0.0006	0.0079
139	0.0086	0.0006	0.0080
140	0.0087	0.0006	0.0080
141	0.0088	0.0006	0.0082
142	0.0089	0.0006	0.0082
143	0.0090	0.0006	0.0084
144	0.0091	0.0006	0.0085
145	0.0063	0.0004	0.0058
146	0.0064	0.0004	0.0059
147	0.0065	0.0005	0.0060
148	0.0066	0.0005	0.0061
149	0.0067	0.0005	0.0062
150	0.0068	0.0005	0.0063
151	0.0070	0.0005	0.0065
152	0.0070	0.0005	0.0065
153	0.0072	0.0005	0.0067
154	0.0073	0.0005	0.0068
155	0.0075	0.0005	0.0070
156	0.0076	0.0005	0.0071
157	0.0078	0.0005	0.0073
158	0.0079	0.0006	0.0074
159	0.0082	0.0006	0.0076
160	0.0083	0.0006	0.0077
161	0.0085	0.0006	0.0079
162	0.0087	0.0006	0.0081
163	0.0090	0.0006	0.0083
164	0.0091	0.0006	0.0085
165	0.0095	0.0007	0.0088
166	0.0096	0.0007	0.0090
167	0.0100	0.0007	0.0093
168	0.0102	0.0007	0.0095
169	0.0107	0.0007	0.0099
170	0.0109	0.0008	0.0102
171	0.0114	0.0008	0.0106
172	0.0117	0.0008	0.0109
173	0.0123	0.0009	0.0114
174	0.0126	0.0009	0.0117
175	0.0133	0.0009	0.0124
176	0.0137	0.0010	0.0127
177	0.0146	0.0010	0.0135
178	0.0150	0.0010	0.0140
179	0.0161	0.0011	0.0150
180	0.0167	0.0012	0.0156
181	0.0182	0.0013	0.0169
182	0.0190	0.0013	0.0176
183	0.0209	0.0015	0.0194
184	0.0220	0.0015	0.0205
185	0.0296	0.0021	0.0275
186	0.0315	0.0022	0.0293
187	0.0365	0.0025	0.0340
188	0.0399	0.0028	0.0371
189	0.0496	0.0030	0.0466
190	0.0571	0.0030	0.0542
191	0.0867	0.0030	0.0837
192	0.1259	0.0030	0.1229
193	0.5445	0.0030	0.5416
194	0.0682	0.0030	0.0653
195	0.0441	0.0030	0.0411
196	0.0338	0.0024	0.0314
197	0.0234	0.0016	0.0217
198	0.0199	0.0014	0.0185
199	0.0174	0.0012	0.0162

200	0.0156	0.0011	0.0145
201	0.0141	0.0010	0.0131
202	0.0129	0.0009	0.0120
203	0.0120	0.0008	0.0111
204	0.0112	0.0008	0.0104
205	0.0104	0.0007	0.0097
206	0.0098	0.0007	0.0091
207	0.0093	0.0006	0.0086
208	0.0088	0.0006	0.0082
209	0.0084	0.0006	0.0078
210	0.0080	0.0006	0.0075
211	0.0077	0.0005	0.0072
212	0.0074	0.0005	0.0069
213	0.0071	0.0005	0.0066
214	0.0069	0.0005	0.0064
215	0.0066	0.0005	0.0062
216	0.0064	0.0004	0.0060
217	0.0092	0.0006	0.0085
218	0.0089	0.0006	0.0083
219	0.0087	0.0006	0.0081
220	0.0085	0.0006	0.0079
221	0.0083	0.0006	0.0077
222	0.0081	0.0006	0.0076
223	0.0080	0.0006	0.0074
224	0.0078	0.0005	0.0073
225	0.0077	0.0005	0.0071
226	0.0075	0.0005	0.0070
227	0.0074	0.0005	0.0069
228	0.0072	0.0005	0.0067
229	0.0071	0.0005	0.0066
230	0.0070	0.0005	0.0065
231	0.0069	0.0005	0.0064
232	0.0068	0.0005	0.0063
233	0.0067	0.0005	0.0062
234	0.0066	0.0005	0.0061
235	0.0065	0.0005	0.0060
236	0.0064	0.0004	0.0059
237	0.0063	0.0004	0.0058
238	0.0062	0.0004	0.0057
239	0.0061	0.0004	0.0057
240	0.0060	0.0004	0.0056
241	0.0059	0.0004	0.0055
242	0.0059	0.0004	0.0054
243	0.0058	0.0004	0.0054
244	0.0057	0.0004	0.0053
245	0.0056	0.0004	0.0052
246	0.0056	0.0004	0.0052
247	0.0055	0.0004	0.0051
248	0.0054	0.0004	0.0051
249	0.0054	0.0004	0.0050
250	0.0053	0.0004	0.0050
251	0.0053	0.0004	0.0049
252	0.0052	0.0004	0.0048
253	0.0052	0.0004	0.0048
254	0.0051	0.0004	0.0047
255	0.0051	0.0004	0.0047
256	0.0050	0.0003	0.0047
257	0.0050	0.0003	0.0046
258	0.0049	0.0003	0.0046
259	0.0049	0.0003	0.0045
260	0.0048	0.0003	0.0045
261	0.0048	0.0003	0.0044
262	0.0047	0.0003	0.0044

263	0.0047	0.0003	0.0044
264	0.0046	0.0003	0.0043
265	0.0046	0.0003	0.0043
266	0.0046	0.0003	0.0042
267	0.0045	0.0003	0.0042
268	0.0045	0.0003	0.0042
269	0.0044	0.0003	0.0041
270	0.0044	0.0003	0.0041
271	0.0044	0.0003	0.0041
272	0.0043	0.0003	0.0040
273	0.0043	0.0003	0.0040
274	0.0043	0.0003	0.0040
275	0.0042	0.0003	0.0039
276	0.0042	0.0003	0.0039
277	0.0042	0.0003	0.0039
278	0.0041	0.0003	0.0039
279	0.0041	0.0003	0.0038
280	0.0041	0.0003	0.0038
281	0.0041	0.0003	0.0038
282	0.0040	0.0003	0.0037
283	0.0040	0.0003	0.0037
284	0.0040	0.0003	0.0037
285	0.0039	0.0003	0.0037
286	0.0039	0.0003	0.0036
287	0.0039	0.0003	0.0036
288	0.0039	0.0003	0.0036

Total soil rain loss = 0.16(In)
Total effective rainfall = 2.84(In)
Peak flow rate in flood hydrograph = 72.82(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	20.0	40.0	60.0	80.0
0+ 5	0.0003	0.04	Q	|	|	|	|
0+10	0.0014	0.17	Q	|	|	|	|
0+15	0.0041	0.39	Q	|	|	|	|
0+20	0.0088	0.69	Q	|	|	|	|
0+25	0.0157	0.99	Q	|	|	|	|
0+30	0.0240	1.20	Q	|	|	|	|
0+35	0.0332	1.34	Q	|	|	|	|
0+40	0.0431	1.44	Q	|	|	|	|
0+45	0.0535	1.51	Q	|	|	|	|
0+50	0.0643	1.57	Q	|	|	|	|
0+55	0.0755	1.62	Q	|	|	|	|
1+ 0	0.0870	1.67	Q	|	|	|	|
1+ 5	0.0988	1.71	Q	|	|	|	|
1+10	0.1109	1.75	Q	|	|	|	|
1+15	0.1231	1.78	Q	|	|	|	|
1+20	0.1356	1.81	Q	|	|	|	|
1+25	0.1483	1.84	Q	|	|	|	|
1+30	0.1611	1.86	Q	|	|	|	|
1+35	0.1741	1.88	Q	|	|	|	|
1+40	0.1872	1.91	Q	|	|	|	|
1+45	0.2005	1.93	Q	|	|	|	|
1+50	0.2139	1.95	Q	|	|	|	|

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1+55      0.2274      1.96  Q          |          |          |          |
2+ 0      0.2410      1.98  Q          |          |          |          |
2+ 5      0.2548      2.00  Q          |          |          |          |
2+10      0.2686      2.01  |Q         |          |          |          |
2+15      0.2826      2.03  |Q         |          |          |          |
2+20      0.2966      2.04  |Q         |          |          |          |
2+25      0.3108      2.05  |Q         |          |          |          |
2+30      0.3250      2.07  |Q         |          |          |          |
2+35      0.3393      2.08  |Q         |          |          |          |
2+40      0.3537      2.09  |Q         |          |          |          |
2+45      0.3682      2.10  |Q         |          |          |          |
2+50      0.3828      2.12  |Q         |          |          |          |
2+55      0.3974      2.13  |Q         |          |          |          |
3+ 0      0.4122      2.14  |Q         |          |          |          |
3+ 5      0.4269      2.15  |Q         |          |          |          |
3+10      0.4418      2.16  |Q         |          |          |          |
3+15      0.4567      2.16  |Q         |          |          |          |
3+20      0.4717      2.17  |Q         |          |          |          |
3+25      0.4867      2.18  |Q         |          |          |          |
3+30      0.5018      2.19  |Q         |          |          |          |
3+35      0.5169      2.20  |Q         |          |          |          |
3+40      0.5321      2.21  |QV        |          |          |          |
3+45      0.5474      2.22  |QV        |          |          |          |
3+50      0.5627      2.23  |QV        |          |          |          |
3+55      0.5781      2.24  |QV        |          |          |          |
4+ 0      0.5936      2.24  |QV        |          |          |          |
4+ 5      0.6091      2.25  |QV        |          |          |          |
4+10      0.6247      2.26  |QV        |          |          |          |
4+15      0.6403      2.27  |QV        |          |          |          |
4+20      0.6560      2.28  |QV        |          |          |          |
4+25      0.6718      2.29  |QV        |          |          |          |
4+30      0.6877      2.30  |QV        |          |          |          |
4+35      0.7036      2.31  |QV        |          |          |          |
4+40      0.7196      2.32  |QV        |          |          |          |
4+45      0.7357      2.33  |QV        |          |          |          |
4+50      0.7518      2.34  |QV        |          |          |          |
4+55      0.7680      2.35  |QV        |          |          |          |
5+ 0      0.7843      2.36  |QV        |          |          |          |
5+ 5      0.8007      2.38  |Q V       |          |          |          |
5+10      0.8171      2.39  |Q V       |          |          |          |
5+15      0.8336      2.40  |Q V       |          |          |          |
5+20      0.8502      2.41  |Q V       |          |          |          |
5+25      0.8669      2.42  |Q V       |          |          |          |
5+30      0.8836      2.43  |Q V       |          |          |          |
5+35      0.9005      2.44  |Q V       |          |          |          |
5+40      0.9174      2.46  |Q V       |          |          |          |
5+45      0.9344      2.47  |Q V       |          |          |          |
5+50      0.9514      2.48  |Q V       |          |          |          |
5+55      0.9686      2.49  |Q V       |          |          |          |
6+ 0      0.9858      2.50  |Q V       |          |          |          |
6+ 5      1.0032      2.52  |Q V       |          |          |          |
6+10      1.0206      2.53  |Q V       |          |          |          |
6+15      1.0381      2.54  |Q V       |          |          |          |
6+20      1.0557      2.55  |Q V       |          |          |          |
6+25      1.0734      2.57  |Q  V      |          |          |          |
6+30      1.0911      2.58  |Q  V      |          |          |          |
6+35      1.1090      2.59  |Q  V      |          |          |          |
6+40      1.1270      2.61  |Q  V      |          |          |          |
6+45      1.1450      2.62  |Q  V      |          |          |          |
6+50      1.1632      2.64  |Q  V      |          |          |          |
6+55      1.1815      2.65  |Q  V      |          |          |          |
7+ 0      1.1998      2.67  |Q  V      |          |          |          |
7+ 5      1.2183      2.68  |Q  V      |          |          |          |
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 7+10        1.2368       2.70  |Q  V      |          |          |          |
 7+15        1.2555       2.71  |Q  V      |          |          |          |
 7+20        1.2743       2.73  |Q  V      |          |          |          |
 7+25        1.2932       2.74  |Q  V      |          |          |          |
 7+30        1.3122       2.76  |Q  V      |          |          |          |
 7+35        1.3313       2.77  |Q   V     |          |          |          |
 7+40        1.3505       2.79  |Q   V     |          |          |          |
 7+45        1.3698       2.81  |Q   V     |          |          |          |
 7+50        1.3892       2.82  |Q   V     |          |          |          |
 7+55        1.4088       2.84  |Q   V     |          |          |          |
 8+ 0        1.4285       2.86  |Q   V     |          |          |          |
 8+ 5        1.4483       2.88  |Q   V     |          |          |          |
 8+10        1.4682       2.89  |Q   V     |          |          |          |
 8+15        1.4883       2.91  |Q   V     |          |          |          |
 8+20        1.5085       2.93  |Q   V     |          |          |          |
 8+25        1.5288       2.95  |Q   V     |          |          |          |
 8+30        1.5492       2.97  |Q   V     |          |          |          |
 8+35        1.5698       2.99  |Q   V     |          |          |          |
 8+40        1.5905       3.01  |Q    V    |          |          |          |
 8+45        1.6114       3.03  |Q    V    |          |          |          |
 8+50        1.6323       3.05  |Q    V    |          |          |          |
 8+55        1.6535       3.07  |Q    V    |          |          |          |
 9+ 0        1.6748       3.09  |Q    V    |          |          |          |
 9+ 5        1.6962       3.11  |Q    V    |          |          |          |
 9+10        1.7178       3.13  |Q    V    |          |          |          |
 9+15        1.7395       3.16  |Q    V    |          |          |          |
 9+20        1.7614       3.18  |Q    V    |          |          |          |
 9+25        1.7835       3.20  |Q    V    |          |          |          |
 9+30        1.8057       3.23  |Q    V    |          |          |          |
 9+35        1.8281       3.25  |Q    V    |          |          |          |
 9+40        1.8507       3.28  |Q     V   |          |          |          |
 9+45        1.8734       3.30  |Q     V   |          |          |          |
 9+50        1.8963       3.33  |Q     V   |          |          |          |
 9+55        1.9194       3.35  |Q     V   |          |          |          |
10+ 0        1.9427       3.38  |Q     V   |          |          |          |
10+ 5        1.9662       3.41  |Q     V   |          |          |          |
10+10        1.9898       3.44  |Q     V   |          |          |          |
10+15        2.0137       3.46  |Q     V   |          |          |          |
10+20        2.0377       3.49  |Q     V   |          |          |          |
10+25        2.0620       3.52  |Q     V   |          |          |          |
10+30        2.0865       3.55  |Q     V   |          |          |          |
10+35        2.1112       3.58  |Q     V   |          |          |          |
10+40        2.1361       3.62  |Q      V  |          |          |          |
10+45        2.1612       3.65  |Q      V  |          |          |          |
10+50        2.1866       3.68  |Q      V  |          |          |          |
10+55        2.2122       3.72  |Q      V  |          |          |          |
11+ 0        2.2380       3.75  |Q      V  |          |          |          |
11+ 5        2.2641       3.79  |Q      V  |          |          |          |
11+10        2.2904       3.83  |Q      V  |          |          |          |
11+15        2.3170       3.86  |Q      V  |          |          |          |
11+20        2.3439       3.90  |Q      V  |          |          |          |
11+25        2.3711       3.94  |Q      V  |          |          |          |
11+30        2.3985       3.98  |Q       V|          |          |          |
11+35        2.4262       4.02  | Q      V|          |          |          |
11+40        2.4542       4.07  | Q      V|          |          |          |
11+45        2.4825       4.11  | Q      V|          |          |          |
11+50        2.5112       4.16  | Q      V|          |          |          |
11+55        2.5401       4.21  | Q      V|          |          |          |
12+ 0        2.5694       4.25  | Q      V|          |          |          |
12+ 5        2.5989       4.27  | Q      V|          |          |          |
12+10        2.6280       4.23  | Q      V|          |          |          |
12+15        2.6563       4.11  | Q       V          |          |          |
12+20        2.6833       3.93  |Q        V          |          |          |
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12+25      2.7092      3.75  |Q        V         |         |         |
12+30      2.7342      3.64  |Q        V         |         |         |
12+35      2.7590      3.59  |Q        V         |         |         |
12+40      2.7836      3.58  |Q        V         |         |         |
12+45      2.8082      3.58  |Q        V         |         |         |
12+50      2.8330      3.59  |Q        V         |         |         |
12+55      2.8579      3.62  |Q        V         |         |         |
13+ 0      2.8830      3.64  |Q        V         |         |         |
13+ 5      2.9083      3.68  |Q        |V        |         |         |
13+10      2.9340      3.72  |Q        |V        |         |         |
13+15      2.9600      3.77  |Q        |V        |         |         |
13+20      2.9863      3.83  |Q        |V        |         |         |
13+25      3.0131      3.89  |Q        |V        |         |         |
13+30      3.0403      3.95  |Q        |V        |         |         |
13+35      3.0679      4.02  | Q       |V        |         |         |
13+40      3.0962      4.10  | Q       |V        |         |         |
13+45      3.1249      4.18  | Q       |V        |         |         |
13+50      3.1543      4.26  | Q       |V        |         |         |
13+55      3.1843      4.36  | Q       | V       |         |         |
14+ 0      3.2150      4.46  | Q       | V       |         |         |
14+ 5      3.2464      4.56  | Q       | V       |         |         |
14+10      3.2787      4.68  | Q       | V       |         |         |
14+15      3.3118      4.81  | Q       | V       |         |         |
14+20      3.3458      4.95  | Q       | V       |         |         |
14+25      3.3809      5.09  | Q       | V       |         |         |
14+30      3.4171      5.25  | Q       | V       |         |         |
14+35      3.4545      5.42  | Q       |  V      |         |         |
14+40      3.4931      5.61  | Q       |  V      |         |         |
14+45      3.5331      5.81  | Q       |  V      |         |         |
14+50      3.5746      6.03  |  Q      |  V      |         |         |
14+55      3.6177      6.27  |  Q      |  V      |         |         |
15+ 0      3.6627      6.53  |  Q      |  V      |         |         |
15+ 5      3.7097      6.83  |  Q      |   V     |         |         |
15+10      3.7590      7.16  |  Q      |   V     |         |         |
15+15      3.8109      7.53  |  Q      |   V     |         |         |
15+20      3.8658      7.96  |  Q      |   V     |         |         |
15+25      3.9243      8.50  |   Q     |   V     |         |         |
15+30      3.9879      9.23  |   Q     |    V    |         |         |
15+35      4.0581     10.20  |    Q    |    V    |         |         |
15+40      4.1368     11.42  |    Q    |    V    |         |         |
15+45      4.2257     12.90  |     Q   |    V    |         |         |
15+50      4.3265     14.64  |      Q  |     V   |         |         |
15+55      4.4435     16.99  |       Q |     V   |         |         |
16+ 0      4.5856     20.63  |         Q      V  |         |         |
16+ 5      4.7963     30.60  |         |    Q  V |         |         |
16+10      5.1172     46.59  |         |        V|  Q      |         |
16+15      5.5473     62.45  |         |         |V        |Q        |
16+20      6.0488     72.82  |         |         | V       |     Q   |
16+25      6.5328     70.29  |         |         |   V     |    Q    |
16+30      6.9077     54.43  |         |         |     VQ  |         |
16+35      7.1884     40.75  |         |         Q      V  |         |
16+40      7.4063     31.64  |         |    Q    |       V |         |
16+45      7.5856     26.04  |         |  Q      |       V |         |
16+50      7.7415     22.62  |         |Q        |        V|         |
16+55      7.8787     19.92  |        Q|         |        V|         |
17+ 0      8.0017     17.87  |       Q |         |         V         |
17+ 5      8.1124     16.07  |       Q |         |         V         |
17+10      8.2118     14.43  |      Q  |         |         |V        |
17+15      8.3028     13.21  |     Q   |         |         |V        |
17+20      8.3873     12.28  |     Q   |         |         |V        |
17+25      8.4631     11.00  |    Q    |         |         | V       |
17+30      8.5340     10.29  |    Q    |         |         | V       |
17+35      8.5981      9.31  |   Q     |         |         | V       |
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17+40      8.6586     8.79  |   Q     |         |         | V       |
17+45      8.7160     8.34  |   Q     |         |         | V       |
17+50      8.7707     7.94  |  Q      |         |         |  V      |
17+55      8.8212     7.33  |  Q      |         |         |  V      |
18+ 0      8.8683     6.84  |  Q      |         |         |  V      |
18+ 5      8.9130     6.49  |  Q      |         |         |  V      |
18+10      8.9556     6.19  |  Q      |         |         |  V      |
18+15      8.9972     6.04  |  Q      |         |         |   V     |
18+20      9.0377     5.88  | Q       |         |         |   V     |
18+25      9.0779     5.84  | Q       |         |         |   V     |
18+30      9.1167     5.63  | Q       |         |         |   V     |
18+35      9.1547     5.52  | Q       |         |         |   V     |
18+40      9.1920     5.42  | Q       |         |         |   V     |
18+45      9.2285     5.30  | Q       |         |         |   V     |
18+50      9.2641     5.16  | Q       |         |         |    V    |
18+55      9.2984     4.99  | Q       |         |         |    V    |
19+ 0      9.3297     4.55  | Q       |         |         |    V    |
19+ 5      9.3580     4.10  | Q       |         |         |    V    |
19+10      9.3854     3.98  |Q        |         |         |    V    |
19+15      9.4121     3.88  |Q        |         |         |    V    |
19+20      9.4383     3.81  |Q        |         |         |    V    |
19+25      9.4640     3.73  |Q        |         |         |    V    |
19+30      9.4893     3.67  |Q        |         |         |    V    |
19+35      9.5141     3.60  |Q        |         |         |     V   |
19+40      9.5385     3.54  |Q        |         |         |     V   |
19+45      9.5625     3.49  |Q        |         |         |     V   |
19+50      9.5862     3.43  |Q        |         |         |     V   |
19+55      9.6095     3.38  |Q        |         |         |     V   |
20+ 0      9.6324     3.33  |Q        |         |         |     V   |
20+ 5      9.6551     3.28  |Q        |         |         |     V   |
20+10      9.6774     3.24  |Q        |         |         |     V   |
20+15      9.6994     3.19  |Q        |         |         |     V   |
20+20      9.7211     3.15  |Q        |         |         |     V   |
20+25      9.7425     3.11  |Q        |         |         |     V   |
20+30      9.7636     3.07  |Q        |         |         |     V   |
20+35      9.7845     3.03  |Q        |         |         |      V  |
20+40      9.8051     2.99  |Q        |         |         |      V  |
20+45      9.8254     2.95  |Q        |         |         |      V  |
20+50      9.8455     2.92  |Q        |         |         |      V  |
20+55      9.8654     2.89  |Q        |         |         |      V  |
21+ 0      9.8850     2.85  |Q        |         |         |      V  |
21+ 5      9.9044     2.82  |Q        |         |         |      V  |
21+10      9.9236     2.78  |Q        |         |         |      V  |
21+15      9.9425     2.75  |Q        |         |         |      V  |
21+20      9.9612     2.72  |Q        |         |         |      V  |
21+25      9.9797     2.69  |Q        |         |         |      V  |
21+30      9.9980     2.66  |Q        |         |         |      V  |
21+35     10.0161     2.63  |Q        |         |         |      V  |
21+40     10.0340     2.60  |Q        |         |         |      V  |
21+45     10.0517     2.57  |Q        |         |         |       V |
21+50     10.0693     2.55  |Q        |         |         |       V |
21+55     10.0866     2.52  |Q        |         |         |       V |
22+ 0     10.1038     2.49  |Q        |         |         |       V |
22+ 5     10.1208     2.47  |Q        |         |         |       V |
22+10     10.1377     2.45  |Q        |         |         |       V |
22+15     10.1544     2.42  |Q        |         |         |       V |
22+20     10.1709     2.40  |Q        |         |         |       V |
22+25     10.1873     2.38  |Q        |         |         |       V |
22+30     10.2035     2.36  |Q        |         |         |       V |
22+35     10.2196     2.33  |Q        |         |         |       V |
22+40     10.2355     2.31  |Q        |         |         |       V |
22+45     10.2513     2.29  |Q        |         |         |       V |
22+50     10.2670     2.27  |Q        |         |         |       V |
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 22+55      10.2825      2.25  |Q         |         |         |        V |
 23+ 0      10.2979      2.24  |Q         |         |         |        V |
 23+ 5      10.3132      2.22  |Q         |         |         |         V|
 23+10      10.3283      2.20  |Q         |         |         |         V|
 23+15      10.3433      2.18  |Q         |         |         |         V|
 23+20      10.3582      2.16  |Q         |         |         |         V|
 23+25      10.3730      2.15  |Q         |         |         |         V|
 23+30      10.3877      2.13  |Q         |         |         |         V|
 23+35      10.4023      2.11  |Q         |         |         |         V|
 23+40      10.4167      2.10  |Q         |         |         |         V|
 23+45      10.4310      2.08  |Q         |         |         |         V|
 23+50      10.4453      2.07  |Q         |         |         |         V|
 23+55      10.4594      2.05  |Q         |         |         |         V|
 24+ 0      10.4734      2.04  |Q         |         |         |         V|
 24+ 5      10.4871      1.98  Q          |         |         |         V|
 24+10      10.4998      1.84  Q          |         |         |         V|
 24+15      10.5109      1.61  Q          |         |         |         V|
 24+20      10.5198      1.30  Q          |         |         |         V|
 24+25      10.5266      0.99  Q          |         |         |         V|
 24+30      10.5320      0.77  Q          |         |         |         V|
 24+35      10.5363      0.63  Q          |         |         |         V|
 24+40      10.5400      0.54  Q          |         |         |         V|
 24+45      10.5433      0.47  Q          |         |         |         V|
 24+50      10.5461      0.41  Q          |         |         |         V|
 24+55      10.5485      0.36  Q          |         |         |         V|
 25+ 0      10.5507      0.31  Q          |         |         |         V|
 25+ 5      10.5526      0.28  Q          |         |         |         V|
 25+10      10.5543      0.24  Q          |         |         |         V|
 25+15      10.5558      0.22  Q          |         |         |         V|
 25+20      10.5571      0.19  Q          |         |         |         V|
 25+25      10.5582      0.17  Q          |         |         |         V|
 25+30      10.5593      0.15  Q          |         |         |         V|
 25+35      10.5602      0.13  Q          |         |         |         V|
 25+40      10.5610      0.12  Q          |         |         |         V|
 25+45      10.5617      0.10  Q          |         |         |         V|
 25+50      10.5623      0.09  Q          |         |         |         V|
 25+55      10.5629      0.08  Q          |         |         |         V|
 26+ 0      10.5633      0.07  Q          |         |         |         V|
 26+ 5      10.5637      0.06  Q          |         |         |         V|
 26+10      10.5641      0.05  Q          |         |         |         V|
 26+15      10.5644      0.04  Q          |         |         |         V|
 26+20      10.5646      0.04  Q          |         |         |         V|
 26+25      10.5648      0.03  Q          |         |         |         V|
 26+30      10.5650      0.02  Q          |         |         |         V|
 26+35      10.5651      0.02  Q          |         |         |         V|
 26+40      10.5653      0.02  Q          |         |         |         V|
 26+45      10.5653      0.01  Q          |         |         |         V|
 26+50      10.5654      0.01  Q          |         |         |         V|
 26+55      10.5654      0.00  Q          |         |         |          V
-----------------------------------------------------------------------
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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 09/06/17

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

Program License Serial Number 6145

SCLA 19
UNIT HYDROGRAPH - 10 YEAR PROPOSED CONDITION
7180UH10

Storm Event Year = 10

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
44.70	1	0.75
Rainfall data for year 2		
44.70	6	0.70
Rainfall data for year 2		
44.70	24	1.00
Rainfall data for year 100		
44.70	1	1.15
Rainfall data for year 100		
44.70	6	1.80
Rainfall data for year 100		
44.70	24	3.00

++

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

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	69.0	44.70	1.000	0.548	0.100	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 (AMC2)	S	Pervious Yield Fr
4.47	0.100	69.0	69.0	4.49	0.087
40.23	0.900	98.0	98.0	0.20	0.877

Area-averaged catchment yield fraction, Y = 0.798
Area-averaged low loss fraction, Yb = 0.202
Direct entry of lag time by user
++
Watershed area = 44.70(Ac.)
Catchment Lag time = 0.244 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 34.1530
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.055(In/Hr)
Average low loss rate fraction (Yb) = 0.202 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.356(In)
Computed peak 30-minute rainfall = 0.609(In)
Specified peak 1-hour rainfall = 0.750(In)
Computed peak 3-hour rainfall = 0.976(In)
Specified peak 6-hour rainfall = 1.153(In)
Specified peak 24-hour rainfall = 1.823(In)

Rainfall depth area reduction factors:
Using a total area of 44.70(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.355(In)
30-minute factor = 0.998 Adjusted rainfall = 0.608(In)
1-hour factor = 0.998 Adjusted rainfall = 0.748(In)
3-hour factor = 1.000 Adjusted rainfall = 0.976(In)
6-hour factor = 1.000 Adjusted rainfall = 1.152(In)
24-hour factor = 1.000 Adjusted rainfall = 1.823(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 = 540.59 (CFS))	
1	2.357	12.742
2	14.391	65.054
3	37.247	123.555
4	65.933	155.077
5	83.817	96.678
6	92.658	47.793
7	96.912	22.997
8	98.411	8.103
9	99.025	3.323
10	99.639	3.318
11	100.000	1.950

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.3551	0.3551

2	0.4372	0.0821
3	0.4938	0.0566
4	0.5383	0.0445
5	0.5756	0.0373
6	0.6079	0.0324
7	0.6367	0.0288
8	0.6627	0.0260
9	0.6865	0.0238
10	0.7086	0.0220
11	0.7291	0.0206
12	0.7484	0.0193
13	0.7630	0.0146
14	0.7768	0.0138
15	0.7899	0.0130
16	0.8023	0.0124
17	0.8141	0.0118
18	0.8254	0.0113
19	0.8363	0.0108
20	0.8467	0.0104
21	0.8567	0.0100
22	0.8664	0.0097
23	0.8757	0.0093
24	0.8848	0.0090
25	0.8936	0.0088
26	0.9021	0.0085
27	0.9103	0.0083
28	0.9183	0.0080
29	0.9262	0.0078
30	0.9338	0.0076
31	0.9412	0.0074
32	0.9484	0.0072
33	0.9555	0.0071
34	0.9624	0.0069
35	0.9692	0.0068
36	0.9758	0.0066
37	0.9822	0.0064
38	0.9885	0.0063
39	0.9947	0.0062
40	1.0008	0.0061
41	1.0067	0.0059
42	1.0126	0.0058
43	1.0183	0.0057
44	1.0239	0.0056
45	1.0295	0.0055
46	1.0349	0.0054
47	1.0403	0.0054
48	1.0455	0.0053
49	1.0507	0.0052
50	1.0558	0.0051
51	1.0609	0.0050
52	1.0658	0.0050
53	1.0707	0.0049
54	1.0755	0.0048
55	1.0803	0.0047
56	1.0849	0.0047
57	1.0896	0.0046
58	1.0941	0.0046
59	1.0986	0.0045
60	1.1031	0.0044
61	1.1074	0.0044
62	1.1118	0.0043
63	1.1160	0.0043
64	1.1203	0.0042

65	1.1244	0.0042
66	1.1286	0.0041
67	1.1327	0.0041
68	1.1367	0.0040
69	1.1407	0.0040
70	1.1446	0.0039
71	1.1485	0.0039
72	1.1524	0.0039
73	1.1577	0.0053
74	1.1629	0.0052
75	1.1681	0.0052
76	1.1732	0.0051
77	1.1783	0.0051
78	1.1833	0.0050
79	1.1883	0.0050
80	1.1933	0.0050
81	1.1982	0.0049
82	1.2030	0.0049
83	1.2079	0.0048
84	1.2127	0.0048
85	1.2174	0.0048
86	1.2221	0.0047
87	1.2268	0.0047
88	1.2315	0.0046
89	1.2361	0.0046
90	1.2407	0.0046
91	1.2452	0.0045
92	1.2497	0.0045
93	1.2542	0.0045
94	1.2586	0.0044
95	1.2630	0.0044
96	1.2674	0.0044
97	1.2718	0.0044
98	1.2761	0.0043
99	1.2804	0.0043
100	1.2846	0.0043
101	1.2889	0.0042
102	1.2931	0.0042
103	1.2973	0.0042
104	1.3014	0.0042
105	1.3055	0.0041
106	1.3096	0.0041
107	1.3137	0.0041
108	1.3178	0.0040
109	1.3218	0.0040
110	1.3258	0.0040
111	1.3298	0.0040
112	1.3337	0.0040
113	1.3376	0.0039
114	1.3415	0.0039
115	1.3454	0.0039
116	1.3493	0.0039
117	1.3531	0.0038
118	1.3569	0.0038
119	1.3607	0.0038
120	1.3645	0.0038
121	1.3682	0.0038
122	1.3720	0.0037
123	1.3757	0.0037
124	1.3794	0.0037
125	1.3830	0.0037
126	1.3867	0.0036
127	1.3903	0.0036

128	1.3939	0.0036
129	1.3975	0.0036
130	1.4011	0.0036
131	1.4047	0.0036
132	1.4082	0.0035
133	1.4117	0.0035
134	1.4152	0.0035
135	1.4187	0.0035
136	1.4222	0.0035
137	1.4256	0.0035
138	1.4290	0.0034
139	1.4325	0.0034
140	1.4359	0.0034
141	1.4392	0.0034
142	1.4426	0.0034
143	1.4460	0.0034
144	1.4493	0.0033
145	1.4526	0.0033
146	1.4559	0.0033
147	1.4592	0.0033
148	1.4625	0.0033
149	1.4658	0.0033
150	1.4690	0.0032
151	1.4722	0.0032
152	1.4755	0.0032
153	1.4787	0.0032
154	1.4818	0.0032
155	1.4850	0.0032
156	1.4882	0.0032
157	1.4913	0.0031
158	1.4945	0.0031
159	1.4976	0.0031
160	1.5007	0.0031
161	1.5038	0.0031
162	1.5069	0.0031
163	1.5099	0.0031
164	1.5130	0.0031
165	1.5160	0.0030
166	1.5191	0.0030
167	1.5221	0.0030
168	1.5251	0.0030
169	1.5281	0.0030
170	1.5311	0.0030
171	1.5341	0.0030
172	1.5370	0.0030
173	1.5400	0.0029
174	1.5429	0.0029
175	1.5458	0.0029
176	1.5488	0.0029
177	1.5517	0.0029
178	1.5546	0.0029
179	1.5574	0.0029
180	1.5603	0.0029
181	1.5632	0.0029
182	1.5660	0.0029
183	1.5689	0.0028
184	1.5717	0.0028
185	1.5745	0.0028
186	1.5773	0.0028
187	1.5801	0.0028
188	1.5829	0.0028
189	1.5857	0.0028
190	1.5885	0.0028

191	1.5912	0.0028
192	1.5940	0.0028
193	1.5967	0.0027
194	1.5994	0.0027
195	1.6022	0.0027
196	1.6049	0.0027
197	1.6076	0.0027
198	1.6103	0.0027
199	1.6130	0.0027
200	1.6156	0.0027
201	1.6183	0.0027
202	1.6210	0.0027
203	1.6236	0.0026
204	1.6263	0.0026
205	1.6289	0.0026
206	1.6315	0.0026
207	1.6341	0.0026
208	1.6367	0.0026
209	1.6393	0.0026
210	1.6419	0.0026
211	1.6445	0.0026
212	1.6471	0.0026
213	1.6496	0.0026
214	1.6522	0.0026
215	1.6547	0.0025
216	1.6573	0.0025
217	1.6598	0.0025
218	1.6623	0.0025
219	1.6649	0.0025
220	1.6674	0.0025
221	1.6699	0.0025
222	1.6724	0.0025
223	1.6749	0.0025
224	1.6773	0.0025
225	1.6798	0.0025
226	1.6823	0.0025
227	1.6847	0.0025
228	1.6872	0.0025
229	1.6896	0.0024
230	1.6921	0.0024
231	1.6945	0.0024
232	1.6969	0.0024
233	1.6993	0.0024
234	1.7017	0.0024
235	1.7041	0.0024
236	1.7065	0.0024
237	1.7089	0.0024
238	1.7113	0.0024
239	1.7137	0.0024
240	1.7161	0.0024
241	1.7184	0.0024
242	1.7208	0.0024
243	1.7231	0.0023
244	1.7255	0.0023
245	1.7278	0.0023
246	1.7301	0.0023
247	1.7324	0.0023
248	1.7348	0.0023
249	1.7371	0.0023
250	1.7394	0.0023
251	1.7417	0.0023
252	1.7440	0.0023
253	1.7463	0.0023

254	1.7485	0.0023
255	1.7508	0.0023
256	1.7531	0.0023
257	1.7553	0.0023
258	1.7576	0.0023
259	1.7598	0.0023
260	1.7621	0.0022
261	1.7643	0.0022
262	1.7666	0.0022
263	1.7688	0.0022
264	1.7710	0.0022
265	1.7732	0.0022
266	1.7754	0.0022
267	1.7776	0.0022
268	1.7798	0.0022
269	1.7820	0.0022
270	1.7842	0.0022
271	1.7864	0.0022
272	1.7886	0.0022
273	1.7908	0.0022
274	1.7929	0.0022
275	1.7951	0.0022
276	1.7972	0.0022
277	1.7994	0.0022
278	1.8015	0.0021
279	1.8037	0.0021
280	1.8058	0.0021
281	1.8079	0.0021
282	1.8101	0.0021
283	1.8122	0.0021
284	1.8143	0.0021
285	1.8164	0.0021
286	1.8185	0.0021
287	1.8206	0.0021
288	1.8227	0.0021

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0021	0.0004	0.0017
2	0.0021	0.0004	0.0017
3	0.0021	0.0004	0.0017
4	0.0021	0.0004	0.0017
5	0.0021	0.0004	0.0017
6	0.0021	0.0004	0.0017
7	0.0021	0.0004	0.0017
8	0.0021	0.0004	0.0017
9	0.0022	0.0004	0.0017
10	0.0022	0.0004	0.0017
11	0.0022	0.0004	0.0017
12	0.0022	0.0004	0.0017
13	0.0022	0.0004	0.0017
14	0.0022	0.0004	0.0018
15	0.0022	0.0004	0.0018
16	0.0022	0.0004	0.0018
17	0.0022	0.0004	0.0018
18	0.0022	0.0004	0.0018
19	0.0022	0.0005	0.0018
20	0.0022	0.0005	0.0018
21	0.0023	0.0005	0.0018
22	0.0023	0.0005	0.0018
23	0.0023	0.0005	0.0018

24	0.0023	0.0005	0.0018
25	0.0023	0.0005	0.0018
26	0.0023	0.0005	0.0018
27	0.0023	0.0005	0.0018
28	0.0023	0.0005	0.0018
29	0.0023	0.0005	0.0019
30	0.0023	0.0005	0.0019
31	0.0023	0.0005	0.0019
32	0.0024	0.0005	0.0019
33	0.0024	0.0005	0.0019
34	0.0024	0.0005	0.0019
35	0.0024	0.0005	0.0019
36	0.0024	0.0005	0.0019
37	0.0024	0.0005	0.0019
38	0.0024	0.0005	0.0019
39	0.0024	0.0005	0.0019
40	0.0024	0.0005	0.0019
41	0.0025	0.0005	0.0020
42	0.0025	0.0005	0.0020
43	0.0025	0.0005	0.0020
44	0.0025	0.0005	0.0020
45	0.0025	0.0005	0.0020
46	0.0025	0.0005	0.0020
47	0.0025	0.0005	0.0020
48	0.0025	0.0005	0.0020
49	0.0025	0.0005	0.0020
50	0.0025	0.0005	0.0020
51	0.0026	0.0005	0.0020
52	0.0026	0.0005	0.0021
53	0.0026	0.0005	0.0021
54	0.0026	0.0005	0.0021
55	0.0026	0.0005	0.0021
56	0.0026	0.0005	0.0021
57	0.0026	0.0005	0.0021
58	0.0026	0.0005	0.0021
59	0.0027	0.0005	0.0021
60	0.0027	0.0005	0.0021
61	0.0027	0.0005	0.0022
62	0.0027	0.0005	0.0022
63	0.0027	0.0005	0.0022
64	0.0027	0.0006	0.0022
65	0.0028	0.0006	0.0022
66	0.0028	0.0006	0.0022
67	0.0028	0.0006	0.0022
68	0.0028	0.0006	0.0022
69	0.0028	0.0006	0.0022
70	0.0028	0.0006	0.0023
71	0.0028	0.0006	0.0023
72	0.0029	0.0006	0.0023
73	0.0029	0.0006	0.0023
74	0.0029	0.0006	0.0023
75	0.0029	0.0006	0.0023
76	0.0029	0.0006	0.0023
77	0.0029	0.0006	0.0023
78	0.0029	0.0006	0.0024
79	0.0030	0.0006	0.0024
80	0.0030	0.0006	0.0024
81	0.0030	0.0006	0.0024
82	0.0030	0.0006	0.0024
83	0.0030	0.0006	0.0024
84	0.0031	0.0006	0.0024
85	0.0031	0.0006	0.0025
86	0.0031	0.0006	0.0025

87	0.0031	0.0006	0.0025
88	0.0031	0.0006	0.0025
89	0.0032	0.0006	0.0025
90	0.0032	0.0006	0.0025
91	0.0032	0.0006	0.0026
92	0.0032	0.0006	0.0026
93	0.0032	0.0007	0.0026
94	0.0033	0.0007	0.0026
95	0.0033	0.0007	0.0026
96	0.0033	0.0007	0.0026
97	0.0033	0.0007	0.0027
98	0.0034	0.0007	0.0027
99	0.0034	0.0007	0.0027
100	0.0034	0.0007	0.0027
101	0.0034	0.0007	0.0027
102	0.0035	0.0007	0.0028
103	0.0035	0.0007	0.0028
104	0.0035	0.0007	0.0028
105	0.0035	0.0007	0.0028
106	0.0036	0.0007	0.0028
107	0.0036	0.0007	0.0029
108	0.0036	0.0007	0.0029
109	0.0036	0.0007	0.0029
110	0.0037	0.0007	0.0029
111	0.0037	0.0007	0.0030
112	0.0037	0.0008	0.0030
113	0.0038	0.0008	0.0030
114	0.0038	0.0008	0.0030
115	0.0038	0.0008	0.0031
116	0.0039	0.0008	0.0031
117	0.0039	0.0008	0.0031
118	0.0039	0.0008	0.0031
119	0.0040	0.0008	0.0032
120	0.0040	0.0008	0.0032
121	0.0040	0.0008	0.0032
122	0.0041	0.0008	0.0033
123	0.0041	0.0008	0.0033
124	0.0042	0.0008	0.0033
125	0.0042	0.0008	0.0034
126	0.0042	0.0009	0.0034
127	0.0043	0.0009	0.0034
128	0.0043	0.0009	0.0034
129	0.0044	0.0009	0.0035
130	0.0044	0.0009	0.0035
131	0.0045	0.0009	0.0036
132	0.0045	0.0009	0.0036
133	0.0046	0.0009	0.0037
134	0.0046	0.0009	0.0037
135	0.0047	0.0009	0.0037
136	0.0047	0.0010	0.0038
137	0.0048	0.0010	0.0038
138	0.0048	0.0010	0.0039
139	0.0049	0.0010	0.0039
140	0.0050	0.0010	0.0040
141	0.0050	0.0010	0.0040
142	0.0051	0.0010	0.0041
143	0.0052	0.0010	0.0041
144	0.0052	0.0011	0.0042
145	0.0039	0.0008	0.0031
146	0.0039	0.0008	0.0031
147	0.0040	0.0008	0.0032
148	0.0040	0.0008	0.0032
149	0.0041	0.0008	0.0033

150	0.0042	0.0008	0.0033
151	0.0043	0.0009	0.0034
152	0.0043	0.0009	0.0035
153	0.0044	0.0009	0.0035
154	0.0045	0.0009	0.0036
155	0.0046	0.0009	0.0037
156	0.0047	0.0009	0.0037
157	0.0048	0.0010	0.0038
158	0.0049	0.0010	0.0039
159	0.0050	0.0010	0.0040
160	0.0051	0.0010	0.0041
161	0.0053	0.0011	0.0042
162	0.0054	0.0011	0.0043
163	0.0055	0.0011	0.0044
164	0.0056	0.0011	0.0045
165	0.0058	0.0012	0.0047
166	0.0059	0.0012	0.0047
167	0.0062	0.0012	0.0049
168	0.0063	0.0013	0.0050
169	0.0066	0.0013	0.0053
170	0.0068	0.0014	0.0054
171	0.0071	0.0014	0.0056
172	0.0072	0.0015	0.0058
173	0.0076	0.0015	0.0061
174	0.0078	0.0016	0.0062
175	0.0083	0.0017	0.0066
176	0.0085	0.0017	0.0068
177	0.0090	0.0018	0.0072
178	0.0093	0.0019	0.0075
179	0.0100	0.0020	0.0080
180	0.0104	0.0021	0.0083
181	0.0113	0.0023	0.0090
182	0.0118	0.0024	0.0094
183	0.0130	0.0026	0.0104
184	0.0138	0.0028	0.0110
185	0.0193	0.0039	0.0154
186	0.0206	0.0041	0.0164
187	0.0238	0.0046	0.0193
188	0.0260	0.0046	0.0215
189	0.0324	0.0046	0.0278
190	0.0373	0.0046	0.0327
191	0.0566	0.0046	0.0520
192	0.0821	0.0046	0.0775
193	0.3551	0.0046	0.3506
194	0.0445	0.0046	0.0399
195	0.0288	0.0046	0.0242
196	0.0220	0.0045	0.0176
197	0.0146	0.0029	0.0117
198	0.0124	0.0025	0.0099
199	0.0108	0.0022	0.0087
200	0.0097	0.0020	0.0077
201	0.0088	0.0018	0.0070
202	0.0080	0.0016	0.0064
203	0.0074	0.0015	0.0059
204	0.0069	0.0014	0.0055
205	0.0064	0.0013	0.0051
206	0.0061	0.0012	0.0048
207	0.0057	0.0012	0.0046
208	0.0054	0.0011	0.0043
209	0.0052	0.0010	0.0041
210	0.0050	0.0010	0.0040
211	0.0047	0.0010	0.0038
212	0.0046	0.0009	0.0036

213	0.0044	0.0009	0.0035
214	0.0042	0.0009	0.0034
215	0.0041	0.0008	0.0033
216	0.0039	0.0008	0.0031
217	0.0053	0.0011	0.0042
218	0.0051	0.0010	0.0041
219	0.0050	0.0010	0.0040
220	0.0049	0.0010	0.0039
221	0.0048	0.0010	0.0038
222	0.0046	0.0009	0.0037
223	0.0045	0.0009	0.0036
224	0.0044	0.0009	0.0035
225	0.0044	0.0009	0.0035
226	0.0043	0.0009	0.0034
227	0.0042	0.0008	0.0033
228	0.0041	0.0008	0.0033
229	0.0040	0.0008	0.0032
230	0.0040	0.0008	0.0032
231	0.0039	0.0008	0.0031
232	0.0038	0.0008	0.0030
233	0.0038	0.0008	0.0030
234	0.0037	0.0007	0.0029
235	0.0036	0.0007	0.0029
236	0.0036	0.0007	0.0029
237	0.0035	0.0007	0.0028
238	0.0035	0.0007	0.0028
239	0.0034	0.0007	0.0027
240	0.0034	0.0007	0.0027
241	0.0033	0.0007	0.0027
242	0.0033	0.0007	0.0026
243	0.0032	0.0007	0.0026
244	0.0032	0.0006	0.0025
245	0.0031	0.0006	0.0025
246	0.0031	0.0006	0.0025
247	0.0031	0.0006	0.0025
248	0.0030	0.0006	0.0024
249	0.0030	0.0006	0.0024
250	0.0030	0.0006	0.0024
251	0.0029	0.0006	0.0023
252	0.0029	0.0006	0.0023
253	0.0029	0.0006	0.0023
254	0.0028	0.0006	0.0023
255	0.0028	0.0006	0.0022
256	0.0028	0.0006	0.0022
257	0.0027	0.0006	0.0022
258	0.0027	0.0005	0.0022
259	0.0027	0.0005	0.0021
260	0.0027	0.0005	0.0021
261	0.0026	0.0005	0.0021
262	0.0026	0.0005	0.0021
263	0.0026	0.0005	0.0021
264	0.0026	0.0005	0.0020
265	0.0025	0.0005	0.0020
266	0.0025	0.0005	0.0020
267	0.0025	0.0005	0.0020
268	0.0025	0.0005	0.0020
269	0.0024	0.0005	0.0020
270	0.0024	0.0005	0.0019
271	0.0024	0.0005	0.0019
272	0.0024	0.0005	0.0019
273	0.0024	0.0005	0.0019
274	0.0023	0.0005	0.0019
275	0.0023	0.0005	0.0019

276	0.0023	0.0005	0.0018
277	0.0023	0.0005	0.0018
278	0.0023	0.0005	0.0018
279	0.0023	0.0005	0.0018
280	0.0022	0.0005	0.0018
281	0.0022	0.0004	0.0018
282	0.0022	0.0004	0.0018
283	0.0022	0.0004	0.0017
284	0.0022	0.0004	0.0017
285	0.0022	0.0004	0.0017
286	0.0021	0.0004	0.0017
287	0.0021	0.0004	0.0017
288	0.0021	0.0004	0.0017

Total soil rain loss = 0.27(In)
Total effective rainfall = 1.55(In)
Peak flow rate in flood hydrograph = 72.22(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	20.0	40.0	60.0	80.0
0+ 5	0.0001	0.02	Q	|	|	|	|
0+10	0.0010	0.13	Q	|	|	|	|
0+15	0.0034	0.34	Q	|	|	|	|
0+20	0.0075	0.60	Q	|	|	|	|
0+25	0.0127	0.76	Q	|	|	|	|
0+30	0.0185	0.84	Q	|	|	|	|
0+35	0.0246	0.89	Q	|	|	|	|
0+40	0.0308	0.90	Q	|	|	|	|
0+45	0.0371	0.91	Q	|	|	|	|
0+50	0.0434	0.92	Q	|	|	|	|
0+55	0.0498	0.93	Q	|	|	|	|
1+ 0	0.0562	0.93	Q	|	|	|	|
1+ 5	0.0626	0.93	Q	|	|	|	|
1+10	0.0691	0.94	Q	|	|	|	|
1+15	0.0756	0.94	Q	|	|	|	|
1+20	0.0821	0.94	Q	|	|	|	|
1+25	0.0886	0.95	Q	|	|	|	|
1+30	0.0951	0.95	Q	|	|	|	|
1+35	0.1017	0.95	Q	|	|	|	|
1+40	0.1083	0.96	Q	|	|	|	|
1+45	0.1149	0.96	Q	|	|	|	|
1+50	0.1216	0.96	Q	|	|	|	|
1+55	0.1282	0.97	Q	|	|	|	|
2+ 0	0.1349	0.97	Q	|	|	|	|
2+ 5	0.1417	0.98	Q	|	|	|	|
2+10	0.1484	0.98	QV	|	|	|	|
2+15	0.1552	0.98	QV	|	|	|	|
2+20	0.1620	0.99	QV	|	|	|	|
2+25	0.1688	0.99	QV	|	|	|	|
2+30	0.1757	1.00	QV	|	|	|	|
2+35	0.1826	1.00	QV	|	|	|	|
2+40	0.1895	1.00	QV	|	|	|	|
2+45	0.1964	1.01	QV	|	|	|	|
2+50	0.2034	1.01	QV	|	|	|	|
2+55	0.2104	1.02	QV	|	|	|	|

3+ 0	0.2174	1.02	QV	|	|	|	|
3+ 5	0.2245	1.02	QV	|	|	|	|
3+10	0.2316	1.03	QV	|	|	|	|
3+15	0.2387	1.03	QV	|	|	|	|
3+20	0.2458	1.04	QV	|	|	|	|
3+25	0.2530	1.04	QV	|	|	|	|
3+30	0.2602	1.05	QV	|	|	|	|
3+35	0.2675	1.05	QV	|	|	|	|
3+40	0.2747	1.06	QV	|	|	|	|
3+45	0.2820	1.06	QV	|	|	|	|
3+50	0.2894	1.07	Q V	|	|	|	|
3+55	0.2968	1.07	Q V	|	|	|	|
4+ 0	0.3042	1.08	Q V	|	|	|	|
4+ 5	0.3116	1.08	Q V	|	|	|	|
4+10	0.3191	1.09	Q V	|	|	|	|
4+15	0.3266	1.09	Q V	|	|	|	|
4+20	0.3341	1.10	Q V	|	|	|	|
4+25	0.3417	1.10	Q V	|	|	|	|
4+30	0.3493	1.11	Q V	|	|	|	|
4+35	0.3570	1.11	Q V	|	|	|	|
4+40	0.3647	1.12	Q V	|	|	|	|
4+45	0.3724	1.12	Q V	|	|	|	|
4+50	0.3801	1.13	Q V	|	|	|	|
4+55	0.3879	1.13	Q V	|	|	|	|
5+ 0	0.3958	1.14	Q V	|	|	|	|
5+ 5	0.4037	1.14	Q V	|	|	|	|
5+10	0.4116	1.15	Q V	|	|	|	|
5+15	0.4195	1.16	Q V	|	|	|	|
5+20	0.4275	1.16	Q V	|	|	|	|
5+25	0.4356	1.17	Q V	|	|	|	|
5+30	0.4436	1.17	Q V	|	|	|	|
5+35	0.4518	1.18	Q V	|	|	|	|
5+40	0.4599	1.19	Q V	|	|	|	|
5+45	0.4681	1.19	Q V	|	|	|	|
5+50	0.4764	1.20	Q V	|	|	|	|
5+55	0.4847	1.20	Q V	|	|	|	|
6+ 0	0.4930	1.21	Q V	|	|	|	|
6+ 5	0.5014	1.22	Q V	|	|	|	|
6+10	0.5098	1.22	Q V	|	|	|	|
6+15	0.5183	1.23	Q V	|	|	|	|
6+20	0.5268	1.24	Q V	|	|	|	|
6+25	0.5354	1.24	Q V	|	|	|	|
6+30	0.5440	1.25	Q V	|	|	|	|
6+35	0.5527	1.26	Q V	|	|	|	|
6+40	0.5614	1.27	Q V	|	|	|	|
6+45	0.5702	1.27	Q V	|	|	|	|
6+50	0.5790	1.28	Q V	|	|	|	|
6+55	0.5878	1.29	Q V	|	|	|	|
7+ 0	0.5968	1.30	Q V	|	|	|	|
7+ 5	0.6058	1.30	Q V	|	|	|	|
7+10	0.6148	1.31	Q V	|	|	|	|
7+15	0.6239	1.32	Q V	|	|	|	|
7+20	0.6330	1.33	Q V	|	|	|	|
7+25	0.6422	1.34	Q V	|	|	|	|
7+30	0.6515	1.34	Q V	|	|	|	|
7+35	0.6608	1.35	Q V	|	|	|	|
7+40	0.6702	1.36	Q V	|	|	|	|
7+45	0.6796	1.37	Q V	|	|	|	|
7+50	0.6891	1.38	Q V	|	|	|	|
7+55	0.6987	1.39	Q V	|	|	|	|
8+ 0	0.7083	1.40	Q V	|	|	|	|
8+ 5	0.7180	1.41	Q V	|	|	|	|
8+10	0.7278	1.42	Q V	|	|	|	|

8+15	0.7376	1.43	Q	V	|	|	|	|
8+20	0.7475	1.44	Q	V	|	|	|	|
8+25	0.7575	1.45	Q	V	|	|	|	|
8+30	0.7675	1.46	Q	V	|	|	|	|
8+35	0.7776	1.47	Q	V	|	|	|	|
8+40	0.7878	1.48	Q	V	|	|	|	|
8+45	0.7981	1.49	Q	V	|	|	|	|
8+50	0.8084	1.50	Q	V	|	|	|	|
8+55	0.8188	1.51	Q	V	|	|	|	|
9+ 0	0.8293	1.52	Q	V	|	|	|	|
9+ 5	0.8399	1.53	Q	V	|	|	|	|
9+10	0.8505	1.55	Q	V	|	|	|	|
9+15	0.8613	1.56	Q	V	|	|	|	|
9+20	0.8721	1.57	Q	V	|	|	|	|
9+25	0.8830	1.58	Q	V	|	|	|	|
9+30	0.8940	1.60	Q	V	|	|	|	|
9+35	0.9051	1.61	Q	V	|	|	|	|
9+40	0.9163	1.62	Q	V	|	|	|	|
9+45	0.9276	1.64	Q	V	|	|	|	|
9+50	0.9389	1.65	Q	V	|	|	|	|
9+55	0.9504	1.67	Q	V	|	|	|	|
10+ 0	0.9620	1.68	Q	V	|	|	|	|
10+ 5	0.9737	1.70	Q	V	|	|	|	|
10+10	0.9854	1.71	Q	V	|	|	|	|
10+15	0.9973	1.73	Q	V	|	|	|	|
10+20	1.0093	1.74	Q	V	|	|	|	|
10+25	1.0214	1.76	Q	V	|	|	|	|
10+30	1.0337	1.78	Q	V	|	|	|	|
10+35	1.0460	1.79	Q	V	|	|	|	|
10+40	1.0585	1.81	Q	V	|	|	|	|
10+45	1.0711	1.83	Q	V	|	|	|	|
10+50	1.0838	1.85	Q	V	|	|	|	|
10+55	1.0967	1.87	Q	V	|	|	|	|
11+ 0	1.1097	1.89	Q	V	|	|	|	|
11+ 5	1.1228	1.91	Q	V	|	|	|	|
11+10	1.1361	1.93	Q	V	|	|	|	|
11+15	1.1495	1.95	Q	V	|	|	|	|
11+20	1.1630	1.97	Q	V	|	|	|	|
11+25	1.1767	1.99	Q	V	|	|	|	|
11+30	1.1906	2.01	|Q	V	|	|	|	|
11+35	1.2047	2.04	|Q	V	|	|	|	|
11+40	1.2189	2.06	|Q	V	|	|	|	|
11+45	1.2332	2.09	|Q	V	|	|	|	|
11+50	1.2478	2.11	|Q	V	|	|	|	|
11+55	1.2625	2.14	|Q	V	|	|	|	|
12+ 0	1.2775	2.17	|Q	V	|	|	|	|
12+ 5	1.2925	2.18	|Q	V	|	|	|	|
12+10	1.3072	2.14	|Q	V	|	|	|	|
12+15	1.3211	2.02	|Q	V	|	|	|	|
12+20	1.3340	1.87	Q	V	|	|	|	|
12+25	1.3463	1.79	Q	V	|	|	|	|
12+30	1.3584	1.76	Q	V	|	|	|	|
12+35	1.3706	1.76	Q	V	|	|	|	|
12+40	1.3829	1.78	Q	V	|	|	|	|
12+45	1.3953	1.81	Q	V	|	|	|	|
12+50	1.4080	1.84	Q	V	|	|	|	|
12+55	1.4209	1.87	Q	V	|	|	|	|
13+ 0	1.4341	1.91	Q	V	|	|	|	|
13+ 5	1.4475	1.95	Q	V	|	|	|	|
13+10	1.4611	1.98	Q	V	|	|	|	|
13+15	1.4751	2.02	|Q	V	|	|	|	|
13+20	1.4893	2.07	|Q	V	|	|	|	|
13+25	1.5039	2.11	|Q	V	|	|	|	|

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13+30      1.5187     2.16  |Q        V         |         |         |
13+35      1.5340     2.21  |Q        V         |         |         |
13+40      1.5495     2.26  |Q        V         |         |         |
13+45      1.5655     2.32  |Q        V         |         |         |
13+50      1.5819     2.38  |Q        V         |         |         |
13+55      1.5987     2.44  |Q        |V        |         |         |
14+ 0      1.6160     2.51  |Q        |V        |         |         |
14+ 5      1.6337     2.58  |Q        |V        |         |         |
14+10      1.6520     2.66  |Q        |V        |         |         |
14+15      1.6709     2.74  |Q        |V        |         |         |
14+20      1.6904     2.83  |Q        |V        |         |         |
14+25      1.7106     2.93  |Q        |V        |         |         |
14+30      1.7315     3.03  |Q        |V        |         |         |
14+35      1.7531     3.14  |Q        | V       |         |         |
14+40      1.7756     3.27  |Q        | V       |         |         |
14+45      1.7990     3.40  |Q        | V       |         |         |
14+50      1.8234     3.54  |Q        | V       |         |         |
14+55      1.8489     3.70  |Q        | V       |         |         |
15+ 0      1.8756     3.88  |Q        | V       |         |         |
15+ 5      1.9037     4.08  | Q       |  V      |         |         |
15+10      1.9333     4.31  | Q       |  V      |         |         |
15+15      1.9647     4.56  | Q       |  V      |         |         |
15+20      1.9982     4.86  | Q       |  V      |         |         |
15+25      2.0342     5.24  | Q       |   V     |         |         |
15+30      2.0745     5.85  | Q       |   V     |         |         |
15+35      2.1208     6.72  |  Q      |   V     |         |         |
15+40      2.1749     7.86  |  Q      |    V    |         |         |
15+45      2.2374     9.08  |   Q     |    V    |         |         |
15+50      2.3104    10.60  |    Q    |    V    |         |         |
15+55      2.3981    12.72  |     Q   |     V   |         |         |
16+ 0      2.5104    16.31  |       Q |      V  |         |         |
16+ 5      2.6853    25.40  |         | Q     V |         |         |
16+10      3.0036    46.22  |         |         V  Q      |         |
16+15      3.4568    65.79  |         |         |  V      | Q       |
16+20      3.9542    72.22  |         |         |      V  |     Q   |
16+25      4.2967    49.74  |         |         |   Q    V|         |
16+30      4.5025    29.88  |         |   Q     |         |V        |
16+35      4.6278    18.20  |        Q|         |         | V       |
16+40      4.7022    10.80  |    Q    |         |         | V       |
16+45      4.7543     7.57  |  Q      |         |         | V       |
16+50      4.7984     6.40  |  Q      |         |         |  V      |
16+55      4.8340     5.17  | Q       |         |         |  V      |
17+ 0      4.8618     4.03  | Q       |         |         |  V      |
17+ 5      4.8867     3.62  |Q        |         |         |  V      |
17+10      4.9094     3.30  |Q        |         |         |  V      |
17+15      4.9304     3.05  |Q        |         |         |   V     |
17+20      4.9500     2.84  |Q        |         |         |   V     |
17+25      4.9684     2.67  |Q        |         |         |   V     |
17+30      4.9857     2.51  |Q        |         |         |   V     |
17+35      5.0021     2.38  |Q        |         |         |   V     |
17+40      5.0177     2.27  |Q        |         |         |   V     |
17+45      5.0326     2.16  |Q        |         |         |   V     |
17+50      5.0468     2.07  |Q        |         |         |   V     |
17+55      5.0605     1.98  Q         |         |         |    V    |
18+ 0      5.0736     1.91  Q         |         |         |    V    |
18+ 5      5.0864     1.85  Q         |         |         |    V    |
18+10      5.0992     1.86  Q         |         |         |    V    |
18+15      5.1126     1.94  Q         |         |         |    V    |
18+20      5.1268     2.07  |Q        |         |         |    V    |
18+25      5.1414     2.12  |Q        |         |         |    V    |
18+30      5.1560     2.12  |Q        |         |         |    V    |
18+35      5.1704     2.09  |Q        |         |         |    V    |
18+40      5.1845     2.05  |Q        |         |         |    V    |
```

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18+45      5.1984      2.01  |Q        |         |         |    V    |
18+50      5.2119      1.96  Q         |         |         |     V   |
18+55      5.2251      1.92  Q         |         |         |     V   |
19+ 0      5.2381      1.88  Q         |         |         |     V   |
19+ 5      5.2508      1.85  Q         |         |         |     V   |
19+10      5.2633      1.81  Q         |         |         |     V   |
19+15      5.2755      1.77  Q         |         |         |     V   |
19+20      5.2875      1.74  Q         |         |         |     V   |
19+25      5.2993      1.71  Q         |         |         |     V   |
19+30      5.3108      1.68  Q         |         |         |     V   |
19+35      5.3222      1.65  Q         |         |         |     V   |
19+40      5.3334      1.62  Q         |         |         |     V   |
19+45      5.3443      1.60  Q         |         |         |     V   |
19+50      5.3552      1.57  Q         |         |         |      V  |
19+55      5.3658      1.55  Q         |         |         |      V  |
20+ 0      5.3763      1.52  Q         |         |         |      V  |
20+ 5      5.3866      1.50  Q         |         |         |      V  |
20+10      5.3968      1.48  Q         |         |         |      V  |
20+15      5.4068      1.46  Q         |         |         |      V  |
20+20      5.4167      1.44  Q         |         |         |      V  |
20+25      5.4264      1.42  Q         |         |         |      V  |
20+30      5.4361      1.40  Q         |         |         |      V  |
20+35      5.4456      1.38  Q         |         |         |      V  |
20+40      5.4549      1.36  Q         |         |         |      V  |
20+45      5.4642      1.34  Q         |         |         |      V  |
20+50      5.4733      1.33  Q         |         |         |      V  |
20+55      5.4823      1.31  Q         |         |         |      V  |
21+ 0      5.4913      1.29  Q         |         |         |       V |
21+ 5      5.5001      1.28  Q         |         |         |       V |
21+10      5.5088      1.26  Q         |         |         |       V |
21+15      5.5174      1.25  Q         |         |         |       V |
21+20      5.5259      1.24  Q         |         |         |       V |
21+25      5.5343      1.22  Q         |         |         |       V |
21+30      5.5427      1.21  Q         |         |         |       V |
21+35      5.5509      1.20  Q         |         |         |       V |
21+40      5.5591      1.18  Q         |         |         |       V |
21+45      5.5671      1.17  Q         |         |         |       V |
21+50      5.5751      1.16  Q         |         |         |       V |
21+55      5.5830      1.15  Q         |         |         |       V |
22+ 0      5.5909      1.14  Q         |         |         |       V |
22+ 5      5.5986      1.13  Q         |         |         |       V |
22+10      5.6063      1.12  Q         |         |         |       V |
22+15      5.6139      1.10  Q         |         |         |       V |
22+20      5.6214      1.09  Q         |         |         |       V |
22+25      5.6289      1.08  Q         |         |         |       V |
22+30      5.6363      1.07  Q         |         |         |        V|
22+35      5.6436      1.06  Q         |         |         |        V|
22+40      5.6509      1.06  Q         |         |         |        V|
22+45      5.6581      1.05  Q         |         |         |        V|
22+50      5.6653      1.04  Q         |         |         |        V|
22+55      5.6724      1.03  Q         |         |         |        V|
23+ 0      5.6794      1.02  Q         |         |         |        V|
23+ 5      5.6863      1.01  Q         |         |         |        V|
23+10      5.6933      1.00  Q         |         |         |        V|
23+15      5.7001      1.00  Q         |         |         |        V|
23+20      5.7069      0.99  Q         |         |         |        V|
23+25      5.7136      0.98  Q         |         |         |        V|
23+30      5.7203      0.97  Q         |         |         |        V|
23+35      5.7270      0.96  Q         |         |         |        V|
23+40      5.7336      0.96  Q         |         |         |        V|
23+45      5.7401      0.95  Q         |         |         |        V|
23+50      5.7466      0.94  Q         |         |         |        V|
23+55      5.7530      0.94  Q         |         |         |        V|
```

24+ 0	5.7594	0.93	Q	|	|	|	V|
24+ 5	5.7656	0.90	Q	|	|	|	V|
24+10	5.7711	0.79	Q	|	|	|	V|
24+15	5.7750	0.57	Q	|	|	|	V|
24+20	5.7772	0.31	Q	|	|	|	V|
24+25	5.7782	0.15	Q	|	|	|	V|
24+30	5.7786	0.07	Q	|	|	|	V|
24+35	5.7788	0.03	Q	|	|	|	V|
24+40	5.7789	0.01	Q	|	|	|	V|
24+45	5.7790	0.01	Q	|	|	|	V|
24+50	5.7790	0.00	Q	|	|	|	V|

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 04/28/17

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

Program License Serial Number 6145

SCLA 19
UNIT HYDROGRAPH - 100 YEAR PROPOSED CONDITION
7180UNIHYDPROP

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		
44.70	1	1.15
Rainfall data for year 100		
44.70	6	1.80
Rainfall data for year 100		
44.70	24	3.00

++

******** 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)
69.0	86.2	44.70	1.000	0.262	0.100	0.026

Area-averaged adjusted loss rate Fm (In/Hr) = 0.026

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

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
4.47	0.100	69.0	86.2	1.60	0.559

40.23	0.900	98.0	98.0	0.20	0.923

Area-averaged catchment yield fraction, Y = 0.886
Area-averaged low loss fraction, Yb = 0.114
Direct entry of lag time by user
++
Watershed area = 44.70(Ac.)
Catchment Lag time = 0.227 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 36.7107
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.026(In/Hr)
Average low loss rate fraction (Yb) = 0.114 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.546(In)
Computed peak 30-minute rainfall = 0.934(In)
Specified peak 1-hour rainfall = 1.150(In)
Computed peak 3-hour rainfall = 1.514(In)
Specified peak 6-hour rainfall = 1.800(In)
Specified peak 24-hour rainfall = 3.000(In)

Rainfall depth area reduction factors:
Using a total area of 44.70(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.545(In)
30-minute factor = 0.998 Adjusted rainfall = 0.932(In)
1-hour factor = 0.998 Adjusted rainfall = 1.148(In)
3-hour factor = 1.000 Adjusted rainfall = 1.513(In)
6-hour factor = 1.000 Adjusted rainfall = 1.800(In)
24-hour factor = 1.000 Adjusted rainfall = 3.000(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 = 540.59 (CFS))	
1	2.642	14.283
2	16.580	75.348
3	42.485	140.038
4	71.795	158.448
5	87.633	85.619
6	94.824	38.875
7	97.876	16.495
8	98.756	4.760
9	99.417	3.572
10	100.000	3.153

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.5445	0.5445
2	0.6704	0.1259
3	0.7571	0.0867
4	0.8254	0.0682
5	0.8825	0.0571
6	0.9321	0.0496
7	0.9763	0.0441
8	1.0162	0.0399
9	1.0527	0.0365
10	1.0865	0.0338

11	1.1180	0.0315
12	1.1476	0.0296
13	1.1709	0.0234
14	1.1930	0.0220
15	1.2139	0.0209
16	1.2338	0.0199
17	1.2527	0.0190
18	1.2709	0.0182
19	1.2883	0.0174
20	1.3051	0.0167
21	1.3212	0.0161
22	1.3367	0.0156
23	1.3518	0.0150
24	1.3663	0.0146
25	1.3805	0.0141
26	1.3942	0.0137
27	1.4075	0.0133
28	1.4204	0.0129
29	1.4330	0.0126
30	1.4453	0.0123
31	1.4573	0.0120
32	1.4690	0.0117
33	1.4804	0.0114
34	1.4915	0.0112
35	1.5025	0.0109
36	1.5132	0.0107
37	1.5236	0.0104
38	1.5338	0.0102
39	1.5438	0.0100
40	1.5536	0.0098
41	1.5632	0.0096
42	1.5727	0.0095
43	1.5820	0.0093
44	1.5911	0.0091
45	1.6001	0.0090
46	1.6089	0.0088
47	1.6176	0.0087
48	1.6261	0.0085
49	1.6345	0.0084
50	1.6428	0.0083
51	1.6510	0.0082
52	1.6590	0.0080
53	1.6669	0.0079
54	1.6747	0.0078
55	1.6825	0.0077
56	1.6901	0.0076
57	1.6976	0.0075
58	1.7050	0.0074
59	1.7123	0.0073
60	1.7195	0.0072
61	1.7266	0.0071
62	1.7337	0.0070
63	1.7406	0.0070
64	1.7475	0.0069
65	1.7543	0.0068
66	1.7610	0.0067
67	1.7676	0.0066
68	1.7742	0.0066
69	1.7807	0.0065
70	1.7871	0.0064
71	1.7935	0.0064
72	1.7997	0.0063
73	1.8089	0.0092

74	1.8180	0.0091
75	1.8270	0.0090
76	1.8360	0.0089
77	1.8448	0.0089
78	1.8536	0.0088
79	1.8624	0.0087
80	1.8710	0.0087
81	1.8796	0.0086
82	1.8881	0.0085
83	1.8966	0.0085
84	1.9050	0.0084
85	1.9133	0.0083
86	1.9215	0.0083
87	1.9298	0.0082
88	1.9379	0.0081
89	1.9460	0.0081
90	1.9540	0.0080
91	1.9620	0.0080
92	1.9699	0.0079
93	1.9778	0.0079
94	1.9856	0.0078
95	1.9933	0.0078
96	2.0010	0.0077
97	2.0087	0.0077
98	2.0163	0.0076
99	2.0239	0.0076
100	2.0314	0.0075
101	2.0388	0.0075
102	2.0463	0.0074
103	2.0536	0.0074
104	2.0610	0.0073
105	2.0682	0.0073
106	2.0755	0.0072
107	2.0827	0.0072
108	2.0898	0.0072
109	2.0969	0.0071
110	2.1040	0.0071
111	2.1110	0.0070
112	2.1180	0.0070
113	2.1250	0.0069
114	2.1319	0.0069
115	2.1388	0.0069
116	2.1456	0.0068
117	2.1524	0.0068
118	2.1591	0.0068
119	2.1659	0.0067
120	2.1726	0.0067
121	2.1792	0.0067
122	2.1858	0.0066
123	2.1924	0.0066
124	2.1990	0.0066
125	2.2055	0.0065
126	2.2120	0.0065
127	2.2184	0.0065
128	2.2249	0.0064
129	2.2312	0.0064
130	2.2376	0.0064
131	2.2439	0.0063
132	2.2502	0.0063
133	2.2565	0.0063
134	2.2627	0.0062
135	2.2689	0.0062
136	2.2751	0.0062

137	2.2813	0.0062
138	2.2874	0.0061
139	2.2935	0.0061
140	2.2996	0.0061
141	2.3056	0.0060
142	2.3116	0.0060
143	2.3176	0.0060
144	2.3236	0.0060
145	2.3295	0.0059
146	2.3354	0.0059
147	2.3413	0.0059
148	2.3471	0.0059
149	2.3530	0.0058
150	2.3588	0.0058
151	2.3646	0.0058
152	2.3703	0.0058
153	2.3761	0.0057
154	2.3818	0.0057
155	2.3875	0.0057
156	2.3931	0.0057
157	2.3988	0.0056
158	2.4044	0.0056
159	2.4100	0.0056
160	2.4156	0.0056
161	2.4211	0.0056
162	2.4266	0.0055
163	2.4322	0.0055
164	2.4376	0.0055
165	2.4431	0.0055
166	2.4486	0.0054
167	2.4540	0.0054
168	2.4594	0.0054
169	2.4648	0.0054
170	2.4701	0.0054
171	2.4755	0.0053
172	2.4808	0.0053
173	2.4861	0.0053
174	2.4914	0.0053
175	2.4967	0.0053
176	2.5019	0.0052
177	2.5071	0.0052
178	2.5124	0.0052
179	2.5176	0.0052
180	2.5227	0.0052
181	2.5279	0.0052
182	2.5330	0.0051
183	2.5381	0.0051
184	2.5432	0.0051
185	2.5483	0.0051
186	2.5534	0.0051
187	2.5584	0.0051
188	2.5635	0.0050
189	2.5685	0.0050
190	2.5735	0.0050
191	2.5785	0.0050
192	2.5834	0.0050
193	2.5884	0.0050
194	2.5933	0.0049
195	2.5983	0.0049
196	2.6032	0.0049
197	2.6080	0.0049
198	2.6129	0.0049
199	2.6178	0.0049

200	2.6226	0.0048
201	2.6274	0.0048
202	2.6322	0.0048
203	2.6370	0.0048
204	2.6418	0.0048
205	2.6466	0.0048
206	2.6513	0.0048
207	2.6561	0.0047
208	2.6608	0.0047
209	2.6655	0.0047
210	2.6702	0.0047
211	2.6749	0.0047
212	2.6795	0.0047
213	2.6842	0.0047
214	2.6888	0.0046
215	2.6935	0.0046
216	2.6981	0.0046
217	2.7027	0.0046
218	2.7072	0.0046
219	2.7118	0.0046
220	2.7164	0.0046
221	2.7209	0.0045
222	2.7254	0.0045
223	2.7300	0.0045
224	2.7345	0.0045
225	2.7390	0.0045
226	2.7434	0.0045
227	2.7479	0.0045
228	2.7524	0.0045
229	2.7568	0.0044
230	2.7612	0.0044
231	2.7657	0.0044
232	2.7701	0.0044
233	2.7745	0.0044
234	2.7788	0.0044
235	2.7832	0.0044
236	2.7876	0.0044
237	2.7919	0.0043
238	2.7962	0.0043
239	2.8006	0.0043
240	2.8049	0.0043
241	2.8092	0.0043
242	2.8135	0.0043
243	2.8178	0.0043
244	2.8220	0.0043
245	2.8263	0.0043
246	2.8305	0.0042
247	2.8348	0.0042
248	2.8390	0.0042
249	2.8432	0.0042
250	2.8474	0.0042
251	2.8516	0.0042
252	2.8558	0.0042
253	2.8599	0.0042
254	2.8641	0.0042
255	2.8683	0.0042
256	2.8724	0.0041
257	2.8765	0.0041
258	2.8807	0.0041
259	2.8848	0.0041
260	2.8889	0.0041
261	2.8930	0.0041
262	2.8970	0.0041

263	2.9011	0.0041
264	2.9052	0.0041
265	2.9092	0.0041
266	2.9133	0.0040
267	2.9173	0.0040
268	2.9213	0.0040
269	2.9253	0.0040
270	2.9293	0.0040
271	2.9333	0.0040
272	2.9373	0.0040
273	2.9413	0.0040
274	2.9452	0.0040
275	2.9492	0.0040
276	2.9531	0.0039
277	2.9571	0.0039
278	2.9610	0.0039
279	2.9649	0.0039
280	2.9688	0.0039
281	2.9728	0.0039
282	2.9766	0.0039
283	2.9805	0.0039
284	2.9844	0.0039
285	2.9883	0.0039
286	2.9921	0.0039
287	2.9960	0.0039
288	2.9998	0.0038

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0038	0.0004	0.0034
2	0.0039	0.0004	0.0034
3	0.0039	0.0004	0.0034
4	0.0039	0.0004	0.0034
5	0.0039	0.0004	0.0035
6	0.0039	0.0004	0.0035
7	0.0039	0.0004	0.0035
8	0.0039	0.0004	0.0035
9	0.0039	0.0004	0.0035
10	0.0040	0.0004	0.0035
11	0.0040	0.0005	0.0035
12	0.0040	0.0005	0.0035
13	0.0040	0.0005	0.0035
14	0.0040	0.0005	0.0036
15	0.0040	0.0005	0.0036
16	0.0040	0.0005	0.0036
17	0.0041	0.0005	0.0036
18	0.0041	0.0005	0.0036
19	0.0041	0.0005	0.0036
20	0.0041	0.0005	0.0036
21	0.0041	0.0005	0.0037
22	0.0041	0.0005	0.0037
23	0.0042	0.0005	0.0037
24	0.0042	0.0005	0.0037
25	0.0042	0.0005	0.0037
26	0.0042	0.0005	0.0037
27	0.0042	0.0005	0.0037
28	0.0042	0.0005	0.0037
29	0.0042	0.0005	0.0038
30	0.0043	0.0005	0.0038
31	0.0043	0.0005	0.0038
32	0.0043	0.0005	0.0038

33	0.0043	0.0005	0.0038
34	0.0043	0.0005	0.0038
35	0.0043	0.0005	0.0039
36	0.0044	0.0005	0.0039
37	0.0044	0.0005	0.0039
38	0.0044	0.0005	0.0039
39	0.0044	0.0005	0.0039
40	0.0044	0.0005	0.0039
41	0.0045	0.0005	0.0039
42	0.0045	0.0005	0.0040
43	0.0045	0.0005	0.0040
44	0.0045	0.0005	0.0040
45	0.0045	0.0005	0.0040
46	0.0045	0.0005	0.0040
47	0.0046	0.0005	0.0041
48	0.0046	0.0005	0.0041
49	0.0046	0.0005	0.0041
50	0.0046	0.0005	0.0041
51	0.0047	0.0005	0.0041
52	0.0047	0.0005	0.0041
53	0.0047	0.0005	0.0042
54	0.0047	0.0005	0.0042
55	0.0047	0.0005	0.0042
56	0.0048	0.0005	0.0042
57	0.0048	0.0005	0.0042
58	0.0048	0.0005	0.0043
59	0.0048	0.0005	0.0043
60	0.0048	0.0005	0.0043
61	0.0049	0.0006	0.0043
62	0.0049	0.0006	0.0043
63	0.0049	0.0006	0.0044
64	0.0049	0.0006	0.0044
65	0.0050	0.0006	0.0044
66	0.0050	0.0006	0.0044
67	0.0050	0.0006	0.0044
68	0.0050	0.0006	0.0045
69	0.0051	0.0006	0.0045
70	0.0051	0.0006	0.0045
71	0.0051	0.0006	0.0045
72	0.0051	0.0006	0.0046
73	0.0052	0.0006	0.0046
74	0.0052	0.0006	0.0046
75	0.0052	0.0006	0.0046
76	0.0052	0.0006	0.0047
77	0.0053	0.0006	0.0047
78	0.0053	0.0006	0.0047
79	0.0053	0.0006	0.0047
80	0.0054	0.0006	0.0048
81	0.0054	0.0006	0.0048
82	0.0054	0.0006	0.0048
83	0.0055	0.0006	0.0048
84	0.0055	0.0006	0.0049
85	0.0055	0.0006	0.0049
86	0.0056	0.0006	0.0049
87	0.0056	0.0006	0.0050
88	0.0056	0.0006	0.0050
89	0.0057	0.0006	0.0050
90	0.0057	0.0006	0.0050
91	0.0057	0.0007	0.0051
92	0.0058	0.0007	0.0051
93	0.0058	0.0007	0.0051
94	0.0058	0.0007	0.0052
95	0.0059	0.0007	0.0052

96	0.0059	0.0007	0.0052
97	0.0060	0.0007	0.0053
98	0.0060	0.0007	0.0053
99	0.0060	0.0007	0.0054
100	0.0061	0.0007	0.0054
101	0.0061	0.0007	0.0054
102	0.0062	0.0007	0.0055
103	0.0062	0.0007	0.0055
104	0.0062	0.0007	0.0055
105	0.0063	0.0007	0.0056
106	0.0063	0.0007	0.0056
107	0.0064	0.0007	0.0057
108	0.0064	0.0007	0.0057
109	0.0065	0.0007	0.0057
110	0.0065	0.0007	0.0058
111	0.0066	0.0007	0.0058
112	0.0066	0.0008	0.0059
113	0.0067	0.0008	0.0059
114	0.0067	0.0008	0.0060
115	0.0068	0.0008	0.0060
116	0.0068	0.0008	0.0061
117	0.0069	0.0008	0.0061
118	0.0069	0.0008	0.0062
119	0.0070	0.0008	0.0062
120	0.0071	0.0008	0.0063
121	0.0072	0.0008	0.0063
122	0.0072	0.0008	0.0064
123	0.0073	0.0008	0.0065
124	0.0073	0.0008	0.0065
125	0.0074	0.0008	0.0066
126	0.0075	0.0008	0.0066
127	0.0076	0.0009	0.0067
128	0.0076	0.0009	0.0067
129	0.0077	0.0009	0.0068
130	0.0078	0.0009	0.0069
131	0.0079	0.0009	0.0070
132	0.0079	0.0009	0.0070
133	0.0080	0.0009	0.0071
134	0.0081	0.0009	0.0072
135	0.0082	0.0009	0.0073
136	0.0083	0.0009	0.0073
137	0.0084	0.0010	0.0074
138	0.0085	0.0010	0.0075
139	0.0086	0.0010	0.0076
140	0.0087	0.0010	0.0077
141	0.0088	0.0010	0.0078
142	0.0089	0.0010	0.0079
143	0.0090	0.0010	0.0080
144	0.0091	0.0010	0.0081
145	0.0063	0.0007	0.0056
146	0.0064	0.0007	0.0056
147	0.0065	0.0007	0.0058
148	0.0066	0.0007	0.0058
149	0.0067	0.0008	0.0060
150	0.0068	0.0008	0.0060
151	0.0070	0.0008	0.0062
152	0.0070	0.0008	0.0062
153	0.0072	0.0008	0.0064
154	0.0073	0.0008	0.0065
155	0.0075	0.0009	0.0066
156	0.0076	0.0009	0.0067
157	0.0078	0.0009	0.0069
158	0.0079	0.0009	0.0070

159	0.0082	0.0009	0.0072
160	0.0083	0.0009	0.0073
161	0.0085	0.0010	0.0076
162	0.0087	0.0010	0.0077
163	0.0090	0.0010	0.0080
164	0.0091	0.0010	0.0081
165	0.0095	0.0011	0.0084
166	0.0096	0.0011	0.0085
167	0.0100	0.0011	0.0089
168	0.0102	0.0012	0.0090
169	0.0107	0.0012	0.0095
170	0.0109	0.0012	0.0097
171	0.0114	0.0013	0.0101
172	0.0117	0.0013	0.0104
173	0.0123	0.0014	0.0109
174	0.0126	0.0014	0.0112
175	0.0133	0.0015	0.0118
176	0.0137	0.0016	0.0121
177	0.0146	0.0017	0.0129
178	0.0150	0.0017	0.0133
179	0.0161	0.0018	0.0143
180	0.0167	0.0019	0.0148
181	0.0182	0.0021	0.0161
182	0.0190	0.0022	0.0168
183	0.0209	0.0022	0.0187
184	0.0220	0.0022	0.0199
185	0.0296	0.0022	0.0274
186	0.0315	0.0022	0.0293
187	0.0365	0.0022	0.0344
188	0.0399	0.0022	0.0377
189	0.0496	0.0022	0.0474
190	0.0571	0.0022	0.0550
191	0.0867	0.0022	0.0845
192	0.1259	0.0022	0.1237
193	0.5445	0.0022	0.5424
194	0.0682	0.0022	0.0661
195	0.0441	0.0022	0.0419
196	0.0338	0.0022	0.0316
197	0.0234	0.0022	0.0212
198	0.0199	0.0022	0.0177
199	0.0174	0.0020	0.0154
200	0.0156	0.0018	0.0138
201	0.0141	0.0016	0.0125
202	0.0129	0.0015	0.0115
203	0.0120	0.0014	0.0106
204	0.0112	0.0013	0.0099
205	0.0104	0.0012	0.0092
206	0.0098	0.0011	0.0087
207	0.0093	0.0011	0.0082
208	0.0088	0.0010	0.0078
209	0.0084	0.0010	0.0075
210	0.0080	0.0009	0.0071
211	0.0077	0.0009	0.0068
212	0.0074	0.0008	0.0066
213	0.0071	0.0008	0.0063
214	0.0069	0.0008	0.0061
215	0.0066	0.0008	0.0059
216	0.0064	0.0007	0.0057
217	0.0092	0.0010	0.0081
218	0.0089	0.0010	0.0079
219	0.0087	0.0010	0.0077
220	0.0085	0.0010	0.0076
221	0.0083	0.0009	0.0074

222	0.0081	0.0009	0.0072
223	0.0080	0.0009	0.0071
224	0.0078	0.0009	0.0069
225	0.0077	0.0009	0.0068
226	0.0075	0.0009	0.0067
227	0.0074	0.0008	0.0065
228	0.0072	0.0008	0.0064
229	0.0071	0.0008	0.0063
230	0.0070	0.0008	0.0062
231	0.0069	0.0008	0.0061
232	0.0068	0.0008	0.0060
233	0.0067	0.0008	0.0059
234	0.0066	0.0007	0.0058
235	0.0065	0.0007	0.0057
236	0.0064	0.0007	0.0056
237	0.0063	0.0007	0.0056
238	0.0062	0.0007	0.0055
239	0.0061	0.0007	0.0054
240	0.0060	0.0007	0.0053
241	0.0059	0.0007	0.0053
242	0.0059	0.0007	0.0052
243	0.0058	0.0007	0.0051
244	0.0057	0.0006	0.0051
245	0.0056	0.0006	0.0050
246	0.0056	0.0006	0.0049
247	0.0055	0.0006	0.0049
248	0.0054	0.0006	0.0048
249	0.0054	0.0006	0.0048
250	0.0053	0.0006	0.0047
251	0.0053	0.0006	0.0047
252	0.0052	0.0006	0.0046
253	0.0052	0.0006	0.0046
254	0.0051	0.0006	0.0045
255	0.0051	0.0006	0.0045
256	0.0050	0.0006	0.0044
257	0.0050	0.0006	0.0044
258	0.0049	0.0006	0.0043
259	0.0049	0.0006	0.0043
260	0.0048	0.0005	0.0043
261	0.0048	0.0005	0.0042
262	0.0047	0.0005	0.0042
263	0.0047	0.0005	0.0041
264	0.0046	0.0005	0.0041
265	0.0046	0.0005	0.0041
266	0.0046	0.0005	0.0040
267	0.0045	0.0005	0.0040
268	0.0045	0.0005	0.0040
269	0.0044	0.0005	0.0039
270	0.0044	0.0005	0.0039
271	0.0044	0.0005	0.0039
272	0.0043	0.0005	0.0038
273	0.0043	0.0005	0.0038
274	0.0043	0.0005	0.0038
275	0.0042	0.0005	0.0038
276	0.0042	0.0005	0.0037
277	0.0042	0.0005	0.0037
278	0.0041	0.0005	0.0037
279	0.0041	0.0005	0.0036
280	0.0041	0.0005	0.0036
281	0.0041	0.0005	0.0036
282	0.0040	0.0005	0.0036
283	0.0040	0.0005	0.0035
284	0.0040	0.0005	0.0035

285	0.0039	0.0004	0.0035
286	0.0039	0.0004	0.0035
287	0.0039	0.0004	0.0034
288	0.0039	0.0004	0.0034

Total soil rain loss = 0.24(In)
Total effective rainfall = 2.76(In)
Peak flow rate in flood hydrograph = 114.05(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	50.0	100.0	150.0	200.0
0+ 5	0.0003	0.05	Q	|	|	|	|
0+10	0.0024	0.31	Q	|	|	|	|
0+15	0.0078	0.78	Q	|	|	|	|
0+20	0.0170	1.33	Q	|	|	|	|
0+25	0.0281	1.62	Q	|	|	|	|
0+30	0.0402	1.76	Q	|	|	|	|
0+35	0.0528	1.82	Q	|	|	|	|
0+40	0.0655	1.84	Q	|	|	|	|
0+45	0.0783	1.86	Q	|	|	|	|
0+50	0.0912	1.88	Q	|	|	|	|
0+55	0.1042	1.88	Q	|	|	|	|
1+ 0	0.1172	1.89	Q	|	|	|	|
1+ 5	0.1303	1.90	Q	|	|	|	|
1+10	0.1434	1.90	Q	|	|	|	|
1+15	0.1566	1.91	Q	|	|	|	|
1+20	0.1698	1.92	Q	|	|	|	|
1+25	0.1831	1.92	Q	|	|	|	|
1+30	0.1964	1.93	Q	|	|	|	|
1+35	0.2097	1.94	Q	|	|	|	|
1+40	0.2231	1.95	Q	|	|	|	|
1+45	0.2366	1.95	Q	|	|	|	|
1+50	0.2501	1.96	Q	|	|	|	|
1+55	0.2636	1.97	QV	|	|	|	|
2+ 0	0.2772	1.97	QV	|	|	|	|
2+ 5	0.2908	1.98	QV	|	|	|	|
2+10	0.3045	1.99	QV	|	|	|	|
2+15	0.3183	2.00	QV	|	|	|	|
2+20	0.3321	2.00	QV	|	|	|	|
2+25	0.3459	2.01	QV	|	|	|	|
2+30	0.3598	2.02	QV	|	|	|	|
2+35	0.3738	2.03	QV	|	|	|	|
2+40	0.3878	2.03	QV	|	|	|	|
2+45	0.4019	2.04	QV	|	|	|	|
2+50	0.4160	2.05	QV	|	|	|	|
2+55	0.4302	2.06	QV	|	|	|	|
3+ 0	0.4444	2.07	QV	|	|	|	|
3+ 5	0.4587	2.07	QV	|	|	|	|
3+10	0.4730	2.08	QV	|	|	|	|
3+15	0.4874	2.09	QV	|	|	|	|
3+20	0.5019	2.10	QV	|	|	|	|
3+25	0.5164	2.11	Q V	|	|	|	|
3+30	0.5310	2.12	Q V	|	|	|	|
3+35	0.5456	2.13	Q V	|	|	|	|
3+40	0.5603	2.13	Q V	|	|	|	|

3+45	0.5751	2.14	Q V				
3+50	0.5899	2.15	Q V				
3+55	0.6048	2.16	Q V				
4+ 0	0.6197	2.17	Q V				
4+ 5	0.6348	2.18	Q V				
4+10	0.6498	2.19	Q V				
4+15	0.6650	2.20	Q V				
4+20	0.6802	2.21	Q V				
4+25	0.6955	2.22	Q V				
4+30	0.7108	2.23	Q V				
4+35	0.7262	2.24	Q V				
4+40	0.7417	2.25	Q V				
4+45	0.7573	2.26	Q V				
4+50	0.7729	2.27	Q V				
4+55	0.7886	2.28	Q V				
5+ 0	0.8044	2.29	Q V				
5+ 5	0.8202	2.30	Q V				
5+10	0.8362	2.31	Q V				
5+15	0.8521	2.32	Q V				
5+20	0.8682	2.33	Q V				
5+25	0.8844	2.35	Q V				
5+30	0.9006	2.36	Q V				
5+35	0.9169	2.37	Q V				
5+40	0.9333	2.38	Q V				
5+45	0.9498	2.39	Q V				
5+50	0.9663	2.40	Q V				
5+55	0.9830	2.42	Q V				
6+ 0	0.9997	2.43	Q V				
6+ 5	1.0165	2.44	Q V				
6+10	1.0334	2.45	Q V				
6+15	1.0504	2.47	Q V				
6+20	1.0674	2.48	Q V				
6+25	1.0846	2.49	Q V				
6+30	1.1019	2.51	Q V				
6+35	1.1192	2.52	Q V				
6+40	1.1367	2.53	Q V				
6+45	1.1542	2.55	Q V				
6+50	1.1718	2.56	Q V				
6+55	1.1896	2.58	Q V				
7+ 0	1.2074	2.59	Q V				
7+ 5	1.2253	2.60	Q V				
7+10	1.2434	2.62	Q V				
7+15	1.2615	2.63	Q V				
7+20	1.2798	2.65	Q V				
7+25	1.2981	2.67	Q V				
7+30	1.3166	2.68	Q V				
7+35	1.3352	2.70	Q V				
7+40	1.3539	2.71	Q V				
7+45	1.3727	2.73	Q V				
7+50	1.3916	2.75	Q V				
7+55	1.4106	2.76	Q V				
8+ 0	1.4298	2.78	Q V				
8+ 5	1.4491	2.80	Q V				
8+10	1.4685	2.82	Q V				
8+15	1.4880	2.84	Q V				
8+20	1.5077	2.86	Q V				
8+25	1.5275	2.87	Q V				
8+30	1.5474	2.89	Q V				
8+35	1.5675	2.91	Q V				
8+40	1.5877	2.93	Q V				
8+45	1.6080	2.95	Q V				
8+50	1.6285	2.97	Q V				
8+55	1.6492	3.00	Q V				

9+ 0	1.6699	3.02	Q	V	|	|	|	|
9+ 5	1.6909	3.04	Q	V	|	|	|	|
9+10	1.7120	3.06	Q	V	|	|	|	|
9+15	1.7332	3.08	Q	V	|	|	|	|
9+20	1.7546	3.11	Q	V	|	|	|	|
9+25	1.7762	3.13	Q	V	|	|	|	|
9+30	1.7979	3.16	Q	V	|	|	|	|
9+35	1.8198	3.18	Q	V	|	|	|	|
9+40	1.8419	3.21	Q	V	|	|	|	|
9+45	1.8641	3.23	Q	V	|	|	|	|
9+50	1.8865	3.26	Q	V	|	|	|	|
9+55	1.9092	3.28	Q	V	|	|	|	|
10+ 0	1.9320	3.31	Q	V	|	|	|	|
10+ 5	1.9550	3.34	Q	V	|	|	|	|
10+10	1.9782	3.37	Q	V	|	|	|	|
10+15	2.0015	3.40	Q	V	|	|	|	|
10+20	2.0251	3.43	Q	V	|	|	|	|
10+25	2.0490	3.46	Q	V	|	|	|	|
10+30	2.0730	3.49	Q	V	|	|	|	|
10+35	2.0972	3.52	Q	V	|	|	|	|
10+40	2.1217	3.55	Q	V	|	|	|	|
10+45	2.1464	3.59	Q	V	|	|	|	|
10+50	2.1713	3.62	Q	V	|	|	|	|
10+55	2.1965	3.66	Q	V	|	|	|	|
11+ 0	2.2220	3.69	Q	V	|	|	|	|
11+ 5	2.2476	3.73	Q	V	|	|	|	|
11+10	2.2736	3.77	Q	V	|	|	|	|
11+15	2.2998	3.81	Q	V	|	|	|	|
11+20	2.3263	3.85	Q	V	|	|	|	|
11+25	2.3531	3.89	Q	V	|	|	|	|
11+30	2.3802	3.93	Q	V	|	|	|	|
11+35	2.4075	3.97	Q	V	|	|	|	|
11+40	2.4352	4.02	Q	V	|	|	|	|
11+45	2.4632	4.07	Q	V	|	|	|	|
11+50	2.4915	4.11	Q	V	|	|	|	|
11+55	2.5202	4.16	Q	V	|	|	|	|
12+ 0	2.5492	4.21	Q	V	|	|	|	|
12+ 5	2.5783	4.23	Q	V		|	|	|
12+10	2.6065	4.08	Q	V		|	|	|
12+15	2.6324	3.77	Q	V		|	|	|
12+20	2.6559	3.41	Q	V		|	|	|
12+25	2.6782	3.23	Q	V		|	|	|
12+30	2.7001	3.18	Q	V		|	|	|
12+35	2.7221	3.19	Q	V		|	|	|
12+40	2.7444	3.24	Q	V		|	|	|
12+45	2.7670	3.28	Q	V		|	|	|
12+50	2.7899	3.33	Q	V		|	|	|
12+55	2.8133	3.39	Q	V		|	|	|
13+ 0	2.8371	3.46	Q		V	|	|	|
13+ 5	2.8614	3.52	Q		V	|	|	|
13+10	2.8862	3.60	Q		V	|	|	|
13+15	2.9114	3.67	Q		V	|	|	|
13+20	2.9372	3.75	Q		V	|	|	|
13+25	2.9636	3.83	Q		V	|	|	|
13+30	2.9905	3.91	Q		V	|	|	|
13+35	3.0181	4.00	Q		V	|	|	|
13+40	3.0463	4.10	Q		V	|	|	|
13+45	3.0752	4.19	Q		V	|	|	|
13+50	3.1048	4.30	Q		| V	|	|	|
13+55	3.1352	4.41	Q		| V	|	|	|
14+ 0	3.1664	4.53	Q		| V	|	|	|
14+ 5	3.1985	4.66	Q		| V	|	|	|
14+10	3.2316	4.80	Q		| V	|	|	|

14+15	3.2657	4.95	Q
14+20	3.3010	5.12	|Q
14+25	3.3374	5.29	|Q
14+30	3.3752	5.48	|Q
14+35	3.4143	5.68	|Q
14+40	3.4549	5.90	|Q
14+45	3.4971	6.13	|Q
14+50	3.5412	6.40	|Q
14+55	3.5872	6.68	|Q
15+ 0	3.6354	7.00	|Q
15+ 5	3.6861	7.36	|Q
15+10	3.7396	7.77	|Q
15+15	3.7963	8.23	|Q
15+20	3.8568	8.79	|Q
15+25	3.9223	9.51	|Q
15+30	3.9960	10.70	| Q
15+35	4.0812	12.37	| Q
15+40	4.1807	14.46	| Q
15+45	4.2950	16.59	| Q
15+50	4.4272	19.19	| Q
15+55	4.5836	22.72	| Q
16+ 0	4.7810	28.66	| Q
16+ 5	5.0841	44.01	| Q
16+10	5.6354	80.05	|
16+15	6.4046	111.68	|
16+20	7.1901	114.05	|
16+25	7.6874	72.22	|
16+30	7.9798	42.45	| Q
16+35	8.1568	25.70	| Q
16+40	8.2664	15.91	| Q
16+45	8.3529	12.56	| Q
16+50	8.4251	10.49	| Q
16+55	8.4790	7.82	|Q
17+ 0	8.5269	6.95	|Q
17+ 5	8.5703	6.30	|Q
17+10	8.6101	5.79	|Q
17+15	8.6471	5.37	|Q
17+20	8.6817	5.02	|Q
17+25	8.7142	4.72	Q
17+30	8.7449	4.46	Q
17+35	8.7741	4.23	Q
17+40	8.8019	4.03	Q
17+45	8.8284	3.85	Q
17+50	8.8538	3.69	Q
17+55	8.8783	3.55	Q
18+ 0	8.9018	3.41	Q
18+ 5	8.9247	3.33	Q
18+10	8.9482	3.41	Q
18+15	8.9735	3.67	Q
18+20	9.0009	3.98	Q
18+25	9.0291	4.10	Q
18+30	9.0574	4.10	Q
18+35	9.0852	4.05	Q
18+40	9.1126	3.97	Q
18+45	9.1393	3.89	Q
18+50	9.1656	3.82	Q
18+55	9.1914	3.74	Q
19+ 0	9.2166	3.66	Q
19+ 5	9.2414	3.59	Q
19+10	9.2657	3.53	Q
19+15	9.2895	3.46	Q
19+20	9.3130	3.40	Q
19+25	9.3360	3.35	Q

19+30	9.3587	3.29	Q				V
19+35	9.3809	3.24	Q				V
19+40	9.4029	3.19	Q				V
19+45	9.4245	3.14	Q				V
19+50	9.4458	3.09	Q				V
19+55	9.4667	3.04	Q				V
20+ 0	9.4874	3.00	Q				V
20+ 5	9.5078	2.96	Q				V
20+10	9.5278	2.92	Q				V
20+15	9.5477	2.88	Q				V
20+20	9.5672	2.84	Q				V
20+25	9.5865	2.80	Q				V
20+30	9.6056	2.77	Q				V
20+35	9.6244	2.73	Q				V
20+40	9.6430	2.70	Q				V
20+45	9.6614	2.67	Q				V
20+50	9.6796	2.64	Q				V
20+55	9.6975	2.61	Q				V
21+ 0	9.7153	2.58	Q				V
21+ 5	9.7328	2.55	Q				V
21+10	9.7502	2.52	Q				V
21+15	9.7674	2.49	Q				V
21+20	9.7844	2.47	Q				V
21+25	9.8012	2.44	Q				V
21+30	9.8179	2.42	Q				V
21+35	9.8344	2.39	Q				V
21+40	9.8507	2.37	Q				V
21+45	9.8668	2.35	Q				V
21+50	9.8829	2.32	Q				V
21+55	9.8987	2.30	Q				V
22+ 0	9.9144	2.28	Q				V
22+ 5	9.9300	2.26	Q				V
22+10	9.9454	2.24	Q				V
22+15	9.9607	2.22	Q				V
22+20	9.9759	2.20	Q				V
22+25	9.9909	2.18	Q				V
22+30	10.0058	2.16	Q				V
22+35	10.0206	2.15	Q				V
22+40	10.0352	2.13	Q				V
22+45	10.0498	2.11	Q				V
22+50	10.0642	2.09	Q				V
22+55	10.0785	2.08	Q				V
23+ 0	10.0927	2.06	Q				V
23+ 5	10.1067	2.04	Q				V
23+10	10.1207	2.03	Q				V
23+15	10.1346	2.01	Q				V
23+20	10.1483	2.00	Q				V
23+25	10.1620	1.98	Q				V
23+30	10.1755	1.97	Q				V
23+35	10.1890	1.95	Q				V
23+40	10.2023	1.94	Q				V
23+45	10.2156	1.93	Q				V
23+50	10.2288	1.91	Q				V
23+55	10.2418	1.90	Q				V
24+10	10.2781	1.56	Q				V
24+15	10.2855	1.07	Q				V
24+20	10.2891	0.52	Q				V
24+25	10.2907	0.23	Q				V
24+30	10.2913	0.10	Q				V
24+35	10.2916	0.04	Q				V
24+40	10.2918	0.02	Q				V
24+45	10.2919	0.01	Q				V

Appendix D
Routing Analysis

DETENTION BASIN

elevation	depth	outflow	storage	area	open basin storage volume	cumulative volume	ac-ft volume	4'x3' Outlet Structure	
								0	
2858.0	0.0	0.00	0.000	45,903		0	0.000	0	
2859.0	1.0	0.00	1.129	52,416	49,160	49,160	1.129	0.00	
2860.0	2.0	0.00	2.408	59,038	55,727	104,887	2.408	0.00	
2861.0	3.0	46.62	3.840	65,738	62,388	167,275	3.840	46.6	Q = CLH3/2 Weir
2862.0	4.0	81.7	5.428	72,593	69,166	236,440	5.428	81.7	Q = CA(2gh)' Orifice
2863.0	5.0	100.1	7.174	79,563	76,078	312,518	7.174	100.1	Q = CA(2gh)' Orifice

Outlet Elevation = 2860.0

Max allowable discharge100yr = 0.9 * 72.8 = 65.5 cfs

WQMP Storage Requirement = 95,420 cf

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
Study date: 09/06/17

SCLA LOT 19
10yr ROUTING STUDY - PROPOSED CONDITION
7180ROUTING10

Program License Serial Number 6145

********** HYDROGRAPH INFORMATION **********

From study/file name: 7180UH10.rte
**********HYDROGRAPH DATA**********
Number of intervals = 298
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 72.223 (CFS)
Total volume = 5.779 (Ac.Ft)
Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++
Process from Point/Station 6.000 to Point/Station 7.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 298
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
1.000	1.129	0.001	1.129	1.129
2.000	2.408	0.002	2.408	2.408
3.000	3.840	46.600	3.680	4.000
4.000	5.428	81.700	5.147	5.709
5.000	7.174	100.100	6.829	7.519

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	18.1	36.11	54.17	72.22	Depth (Ft.)
0.083	0.02	0.00	0.000	O	|	|	|	|	0.00
0.167	0.13	0.00	0.001	O	|	|	|	|	0.00
0.250	0.34	0.00	0.002	O	|	|	|	|	0.00
0.333	0.60	0.00	0.005	O	|	|	|	|	0.00
0.417	0.76	0.00	0.010	O	|	|	|	|	0.01
0.500	0.84	0.00	0.016	O	|	|	|	|	0.01
0.583	0.89	0.00	0.022	O	|	|	|	|	0.02
0.667	0.90	0.00	0.028	O	|	|	|	|	0.02
0.750	0.91	0.00	0.034	O	|	|	|	|	0.03
0.833	0.92	0.00	0.040	O	|	|	|	|	0.04
0.917	0.93	0.00	0.047	O	|	|	|	|	0.04
1.000	0.93	0.00	0.053	O	|	|	|	|	0.05
1.083	0.93	0.00	0.059	O	|	|	|	|	0.05
1.167	0.94	0.00	0.066	O	|	|	|	|	0.06
1.250	0.94	0.00	0.072	O	|	|	|	|	0.06
1.333	0.94	0.00	0.079	O	|	|	|	|	0.07
1.417	0.95	0.00	0.085	O	|	|	|	|	0.08
1.500	0.95	0.00	0.092	O	|	|	|	|	0.08
1.583	0.95	0.00	0.098	O	|	|	|	|	0.09
1.667	0.96	0.00	0.105	O	|	|	|	|	0.09
1.750	0.96	0.00	0.112	O	|	|	|	|	0.10
1.833	0.96	0.00	0.118	O	|	|	|	|	0.10
1.917	0.97	0.00	0.125	O	|	|	|	|	0.11
2.000	0.97	0.00	0.132	O	|	|	|	|	0.12
2.083	0.98	0.00	0.138	O	|	|	|	|	0.12
2.167	0.98	0.00	0.145	O	|	|	|	|	0.13
2.250	0.98	0.00	0.152	O	|	|	|	|	0.13
2.333	0.99	0.00	0.159	O	|	|	|	|	0.14
2.417	0.99	0.00	0.165	O	|	|	|	|	0.15
2.500	1.00	0.00	0.172	O	|	|	|	|	0.15
2.583	1.00	0.00	0.179	O	|	|	|	|	0.16
2.667	1.00	0.00	0.186	O	|	|	|	|	0.16
2.750	1.01	0.00	0.193	O	|	|	|	|	0.17
2.833	1.01	0.00	0.200	O	|	|	|	|	0.18
2.917	1.02	0.00	0.207	O	|	|	|	|	0.18
3.000	1.02	0.00	0.214	O	|	|	|	|	0.19
3.083	1.02	0.00	0.221	O	|	|	|	|	0.20
3.167	1.03	0.00	0.228	O	|	|	|	|	0.20
3.250	1.03	0.00	0.235	O	|	|	|	|	0.21
3.333	1.04	0.00	0.242	O	|	|	|	|	0.21
3.417	1.04	0.00	0.249	O	|	|	|	|	0.22
3.500	1.05	0.00	0.257	O	|	|	|	|	0.23
3.583	1.05	0.00	0.264	O	|	|	|	|	0.23
3.667	1.06	0.00	0.271	O	|	|	|	|	0.24
3.750	1.06	0.00	0.278	O	|	|	|	|	0.25
3.833	1.07	0.00	0.286	O	|	|	|	|	0.25
3.917	1.07	0.00	0.293	O	|	|	|	|	0.26
4.000	1.08	0.00	0.300	O	|	|	|	|	0.27
4.083	1.08	0.00	0.308	O	|	|	|	|	0.27
4.167	1.09	0.00	0.315	O	|	|	|	|	0.28
4.250	1.09	0.00	0.323	O	|	|	|	|	0.29
4.333	1.10	0.00	0.330	O	|	|	|	|	0.29
4.417	1.10	0.00	0.338	O	|	|	|	|	0.30
4.500	1.11	0.00	0.345	O	|	|	|	|	0.31
4.583	1.11	0.00	0.353	O	|	|	|	|	0.31
4.667	1.12	0.00	0.361	O	|	|	|	|	0.32

4.750	1.12	0.00	0.368	O	|	|	|	|	0.33
4.833	1.13	0.00	0.376	O	|	|	|	|	0.33
4.917	1.13	0.00	0.384	O	|	|	|	|	0.34
5.000	1.14	0.00	0.392	O	|	|	|	|	0.35
5.083	1.14	0.00	0.400	O	|	|	|	|	0.35
5.167	1.15	0.00	0.408	O	|	|	|	|	0.36
5.250	1.16	0.00	0.415	O	|	|	|	|	0.37
5.333	1.16	0.00	0.423	O	|	|	|	|	0.38
5.417	1.17	0.00	0.431	O	|	|	|	|	0.38
5.500	1.17	0.00	0.440	O	|	|	|	|	0.39
5.583	1.18	0.00	0.448	O	|	|	|	|	0.40
5.667	1.19	0.00	0.456	O	|	|	|	|	0.40
5.750	1.19	0.00	0.464	O	|	|	|	|	0.41
5.833	1.20	0.00	0.472	O	|	|	|	|	0.42
5.917	1.20	0.00	0.480	O	|	|	|	|	0.43
6.000	1.21	0.00	0.489	O	|	|	|	|	0.43
6.083	1.22	0.00	0.497	O	|	|	|	|	0.44
6.167	1.22	0.00	0.505	O	|	|	|	|	0.45
6.250	1.23	0.00	0.514	O	|	|	|	|	0.46
6.333	1.24	0.00	0.522	O	|	|	|	|	0.46
6.417	1.24	0.00	0.531	O	|	|	|	|	0.47
6.500	1.25	0.00	0.540	O	|	|	|	|	0.48
6.583	1.26	0.00	0.548	O	|	|	|	|	0.49
6.667	1.27	0.00	0.557	O	|	|	|	|	0.49
6.750	1.27	0.00	0.566	O	|	|	|	|	0.50
6.833	1.28	0.00	0.574	O	|	|	|	|	0.51
6.917	1.29	0.00	0.583	O	|	|	|	|	0.52
7.000	1.30	0.00	0.592	O	|	|	|	|	0.52
7.083	1.30	0.00	0.601	O	|	|	|	|	0.53
7.167	1.31	0.00	0.610	O	|	|	|	|	0.54
7.250	1.32	0.00	0.619	O	|	|	|	|	0.55
7.333	1.33	0.00	0.628	O	|	|	|	|	0.56
7.417	1.34	0.00	0.637	O	|	|	|	|	0.56
7.500	1.34	0.00	0.647	O	|	|	|	|	0.57
7.583	1.35	0.00	0.656	O	|	|	|	|	0.58
7.667	1.36	0.00	0.665	O	|	|	|	|	0.59
7.750	1.37	0.00	0.675	O	|	|	|	|	0.60
7.833	1.38	0.00	0.684	O	|	|	|	|	0.61
7.917	1.39	0.00	0.694	O	|	|	|	|	0.61
8.000	1.40	0.00	0.703	O	|	|	|	|	0.62
8.083	1.41	0.00	0.713	O	|	|	|	|	0.63
8.167	1.42	0.00	0.723	O	|	|	|	|	0.64
8.250	1.43	0.00	0.733	O	|	|	|	|	0.65
8.333	1.44	0.00	0.742	O	|	|	|	|	0.66
8.417	1.45	0.00	0.752	O	|	|	|	|	0.67
8.500	1.46	0.00	0.762	O	|	|	|	|	0.68
8.583	1.47	0.00	0.772	O	|	|	|	|	0.68
8.667	1.48	0.00	0.782	O	|	|	|	|	0.69
8.750	1.49	0.00	0.793	O	|	|	|	|	0.70
8.833	1.50	0.00	0.803	O	|	|	|	|	0.71
8.917	1.51	0.00	0.813	O	|	|	|	|	0.72
9.000	1.52	0.00	0.824	O	|	|	|	|	0.73
9.083	1.53	0.00	0.834	O	|	|	|	|	0.74
9.167	1.55	0.00	0.845	O	|	|	|	|	0.75
9.250	1.56	0.00	0.856	O	|	|	|	|	0.76
9.333	1.57	0.00	0.866	O	|	|	|	|	0.77
9.417	1.58	0.00	0.877	O	|	|	|	|	0.78
9.500	1.60	0.00	0.888	O	|	|	|	|	0.79
9.583	1.61	0.00	0.899	O	|	|	|	|	0.80
9.667	1.62	0.00	0.910	O	|	|	|	|	0.81
9.750	1.64	0.00	0.922	O	|	|	|	|	0.82
9.833	1.65	0.00	0.933	O	|	|	|	|	0.83
9.917	1.67	0.00	0.944	O	|	|	|	|	0.84

10.000	1.68	0.00	0.956	O	|	|	|	|	0.85
10.083	1.70	0.00	0.968	O	|	|	|	|	0.86
10.167	1.71	0.00	0.979	O	|	|	|	|	0.87
10.250	1.73	0.00	0.991	O	|	|	|	|	0.88
10.333	1.74	0.00	1.003	O	|	|	|	|	0.89
10.417	1.76	0.00	1.015	O	|	|	|	|	0.90
10.500	1.78	0.00	1.027	O	|	|	|	|	0.91
10.583	1.79	0.00	1.040	O	|	|	|	|	0.92
10.667	1.81	0.00	1.052	O	|	|	|	|	0.93
10.750	1.83	0.00	1.064	O	|	|	|	|	0.94
10.833	1.85	0.00	1.077	O	|	|	|	|	0.95
10.917	1.87	0.00	1.090	O	|	|	|	|	0.97
11.000	1.89	0.00	1.103	O	|	|	|	|	0.98
11.083	1.91	0.00	1.116	O	|	|	|	|	0.99
11.167	1.93	0.00	1.129	O	|	|	|	|	1.00
11.250	1.95	0.00	1.142	O	|	|	|	|	1.01
11.333	1.97	0.00	1.156	O	|	|	|	|	1.02
11.417	1.99	0.00	1.169	O	|	|	|	|	1.03
11.500	2.01	0.00	1.183	O	|	|	|	|	1.04
11.583	2.04	0.00	1.197	O	|	|	|	|	1.05
11.667	2.06	0.00	1.211	O	|	|	|	|	1.06
11.750	2.09	0.00	1.226	O	|	|	|	|	1.08
11.833	2.11	0.00	1.240	O	|	|	|	|	1.09
11.917	2.14	0.00	1.255	O	|	|	|	|	1.10
12.000	2.17	0.00	1.270	O	|	|	|	|	1.11
12.083	2.18	0.00	1.285	O	|	|	|	|	1.12
12.167	2.14	0.00	1.299	O	|	|	|	|	1.13
12.250	2.02	0.00	1.314	O	|	|	|	|	1.14
12.333	1.87	0.00	1.327	O	|	|	|	|	1.15
12.417	1.79	0.00	1.340	O	|	|	|	|	1.16
12.500	1.76	0.00	1.352	O	|	|	|	|	1.17
12.583	1.76	0.00	1.364	O	|	|	|	|	1.18
12.667	1.78	0.00	1.376	O	|	|	|	|	1.19
12.750	1.81	0.00	1.389	O	|	|	|	|	1.20
12.833	1.84	0.00	1.401	O	|	|	|	|	1.21
12.917	1.87	0.00	1.414	O	|	|	|	|	1.22
13.000	1.91	0.00	1.427	O	|	|	|	|	1.23
13.083	1.95	0.00	1.440	O	|	|	|	|	1.24
13.167	1.98	0.00	1.454	O	|	|	|	|	1.25
13.250	2.02	0.00	1.468	O	|	|	|	|	1.26
13.333	2.07	0.00	1.482	O	|	|	|	|	1.28
13.417	2.11	0.00	1.496	O	|	|	|	|	1.29
13.500	2.16	0.00	1.511	O	|	|	|	|	1.30
13.583	2.21	0.00	1.526	O	|	|	|	|	1.31
13.667	2.26	0.00	1.541	OI	|	|	|	|	1.32
13.750	2.32	0.00	1.557	OI	|	|	|	|	1.33
13.833	2.38	0.00	1.573	OI	|	|	|	|	1.35
13.917	2.44	0.00	1.590	OI	|	|	|	|	1.36
14.000	2.51	0.00	1.607	OI	|	|	|	|	1.37
14.083	2.58	0.00	1.624	OI	|	|	|	|	1.39
14.167	2.66	0.00	1.642	OI	|	|	|	|	1.40
14.250	2.74	0.00	1.661	OI	|	|	|	|	1.42
14.333	2.83	0.00	1.680	OI	|	|	|	|	1.43
14.417	2.93	0.00	1.700	OI	|	|	|	|	1.45
14.500	3.03	0.00	1.720	OI	|	|	|	|	1.46
14.583	3.14	0.00	1.742	OI	|	|	|	|	1.48
14.667	3.27	0.00	1.764	OI	|	|	|	|	1.50
14.750	3.40	0.00	1.787	OI	|	|	|	|	1.51
14.833	3.54	0.00	1.810	OI	|	|	|	|	1.53
14.917	3.70	0.00	1.835	OI	|	|	|	|	1.55
15.000	3.88	0.00	1.861	OI	|	|	|	|	1.57
15.083	4.08	0.00	1.889	OI	|	|	|	|	1.59
15.167	4.31	0.00	1.918	OI	|	|	|	|	1.62

15.250	4.56	0.00	1.948	O I	1.64
15.333	4.86	0.00	1.981	O I	1.67
15.417	5.24	0.00	2.015	O I	1.69
15.500	5.85	0.00	2.054	O I	1.72
15.583	6.72	0.00	2.097	O I	1.76
15.667	7.86	0.00	2.147	O I	1.80
15.750	9.08	0.00	2.205	O I	1.84
15.833	10.60	0.00	2.273	O I	1.89
15.917	12.72	0.00	2.353	O I	1.96
16.000	16.31	1.33	2.449	O I	2.03
16.083	25.40	5.26	2.570	O I	2.11
16.167	46.22	11.42	2.759	O I	2.25
16.250	65.79	20.40	3.035	O I	2.44
16.333	72.22	30.20	3.336	O I	2.65
16.417	49.74	36.40	3.527	O I	2.78
16.500	29.88	37.09	3.548	O I	2.80
16.583	18.20	34.46	3.467	I O	2.74
16.667	10.80	30.44	3.343	I O	2.65
16.750	7.57	26.15	3.212	I O	2.56
16.833	6.40	22.29	3.093	I O	2.48
16.917	5.17	18.96	2.991	I O	2.41
17.000	4.03	16.07	2.902	I O	2.34
17.083	3.62	13.60	2.826	I O	2.29
17.167	3.30	11.56	2.763	I O	2.25
17.250	3.05	9.87	2.711	I O	2.21
17.333	2.84	8.47	2.668	I O	2.18
17.417	2.67	7.32	2.633	I O	2.16
17.500	2.51	6.37	2.604	IO	2.14
17.583	2.38	5.58	2.579	IO	2.12
17.667	2.27	4.92	2.559	IO	2.11
17.750	2.16	4.38	2.542	IO	2.09
17.833	2.07	3.92	2.528	IO	2.08
17.917	1.98	3.54	2.517	IO	2.08
18.000	1.91	3.22	2.507	IO	2.07
18.083	1.85	2.95	2.499	IO	2.06
18.167	1.86	2.73	2.492	IO	2.06
18.250	1.94	2.56	2.487	IO	2.05
18.333	2.07	2.45	2.483	IO	2.05
18.417	2.12	2.38	2.481	IO	2.05
18.500	2.12	2.33	2.479	IO	2.05
18.583	2.09	2.28	2.478	IO	2.05
18.667	2.05	2.24	2.477	O	2.05
18.750	2.01	2.20	2.475	O	2.05
18.833	1.96	2.15	2.474	O	2.05
18.917	1.92	2.11	2.473	O	2.05
19.000	1.88	2.07	2.472	O	2.04
19.083	1.85	2.03	2.470	O	2.04
19.167	1.81	1.99	2.469	O	2.04
19.250	1.77	1.95	2.468	O	2.04
19.333	1.74	1.91	2.467	O	2.04
19.417	1.71	1.87	2.465	O	2.04
19.500	1.68	1.84	2.464	O	2.04
19.583	1.65	1.80	2.463	O	2.04
19.667	1.62	1.77	2.462	O	2.04
19.750	1.60	1.74	2.461	O	2.04
19.833	1.57	1.71	2.460	O	2.04
19.917	1.55	1.68	2.459	O	2.04
20.000	1.52	1.65	2.459	O	2.04
20.083	1.50	1.62	2.458	O	2.03
20.167	1.48	1.59	2.457	O	2.03
20.250	1.46	1.57	2.456	O	2.03
20.333	1.44	1.54	2.455	O	2.03
20.417	1.42	1.52	2.455	O	2.03

20.500	1.40	1.50	2.454	O					2.03
20.583	1.38	1.47	2.453	O					2.03
20.667	1.36	1.45	2.453	O					2.03
20.750	1.34	1.43	2.452	O					2.03
20.833	1.33	1.41	2.451	O					2.03
20.917	1.31	1.39	2.451	O					2.03
21.000	1.29	1.38	2.450	O					2.03
21.083	1.28	1.36	2.450	O					2.03
21.167	1.26	1.34	2.449	O					2.03
21.250	1.25	1.32	2.449	O					2.03
21.333	1.24	1.31	2.448	O					2.03
21.417	1.22	1.29	2.448	O					2.03
21.500	1.21	1.28	2.447	O					2.03
21.583	1.20	1.26	2.447	O					2.03
21.667	1.18	1.25	2.446	O					2.03
21.750	1.17	1.23	2.446	O					2.03
21.833	1.16	1.22	2.445	O					2.03
21.917	1.15	1.21	2.445	O					2.03
22.000	1.14	1.19	2.445	O					2.03
22.083	1.13	1.18	2.444	O					2.03
22.167	1.12	1.17	2.444	O					2.03
22.250	1.10	1.16	2.443	O					2.02
22.333	1.09	1.15	2.443	O					2.02
22.417	1.08	1.13	2.443	O					2.02
22.500	1.07	1.12	2.442	O					2.02
22.583	1.06	1.11	2.442	O					2.02
22.667	1.06	1.10	2.442	O					2.02
22.750	1.05	1.09	2.441	O					2.02
22.833	1.04	1.08	2.441	O					2.02
22.917	1.03	1.07	2.441	O					2.02
23.000	1.02	1.06	2.441	O					2.02
23.083	1.01	1.05	2.440	O					2.02
23.167	1.00	1.04	2.440	O					2.02
23.250	1.00	1.03	2.440	O					2.02
23.333	0.99	1.03	2.439	O					2.02
23.417	0.98	1.02	2.439	O					2.02
23.500	0.97	1.01	2.439	O					2.02
23.583	0.96	1.00	2.439	O					2.02
23.667	0.96	0.99	2.438	O					2.02
23.750	0.95	0.98	2.438	O					2.02
23.833	0.94	0.98	2.438	O					2.02
23.917	0.94	0.97	2.438	O					2.02
24.000	0.93	0.96	2.437	O					2.02
24.083	0.90	0.95	2.437	O					2.02
24.167	0.79	0.93	2.437	O					2.02
24.250	0.57	0.88	2.435	O					2.02
24.333	0.31	0.79	2.432	O					2.02
24.417	0.15	0.68	2.429	O					2.01
24.500	0.07	0.56	2.425	O					2.01
24.583	0.03	0.46	2.422	O					2.01
24.667	0.01	0.37	2.419	O					2.01
24.750	0.01	0.30	2.417	O					2.01
24.833	0.00	0.24	2.415	O					2.01
24.917	0.00	0.19	2.414	O					2.00
25.000	0.00	0.15	2.413	O					2.00
25.083	0.00	0.12	2.412	O					2.00
25.167	0.00	0.10	2.411	O					2.00
25.250	0.00	0.08	2.410	O					2.00
25.333	0.00	0.06	2.410	O					2.00
25.417	0.00	0.05	2.409	O					2.00
25.500	0.00	0.04	2.409	O					2.00
25.583	0.00	0.03	2.409	O					2.00
25.667	0.00	0.03	2.409	O					2.00

25.750	0.00	0.02	2.409	O	|	|	|	|	2.00
25.833	0.00	0.02	2.408	O	|	|	|	|	2.00
25.917	0.00	0.01	2.408	O	|	|	|	|	2.00
26.000	0.00	0.01	2.408	O	|	|	|	|	2.00
26.083	0.00	0.01	2.408	O	|	|	|	|	2.00
26.167	0.00	0.01	2.408	O	|	|	|	|	2.00
26.250	0.00	0.01	2.408	O	|	|	|	|	2.00
26.333	0.00	0.00	2.408	O	|	|	|	|	2.00
26.417	0.00	0.00	2.408	O	|	|	|	|	2.00
26.500	0.00	0.00	2.408	O	|	|	|	|	2.00
26.583	0.00	0.00	2.408	O	|	|	|	|	2.00
26.667	0.00	0.00	2.408	O	|	|	|	|	2.00
26.750	0.00	0.00	2.408	O	|	|	|	|	2.00
26.833	0.00	0.00	2.408	O	|	|	|	|	2.00
26.917	0.00	0.00	2.408	O	|	|	|	|	2.00
27.000	0.00	0.00	2.408	O	|	|	|	|	2.00
27.083	0.00	0.00	2.408	O	|	|	|	|	2.00
27.167	0.00	0.00	2.408	O	|	|	|	|	2.00
27.250	0.00	0.00	2.408	O	|	|	|	|	2.00
27.333	0.00	0.00	2.408	O	|	|	|	|	2.00
27.417	0.00	0.00	2.408	O	|	|	|	|	2.00
27.500	0.00	0.00	2.408	O	|	|	|	|	2.00
27.583	0.00	0.00	2.408	O	|	|	|	|	2.00
27.667	0.00	0.00	2.408	O	|	|	|	|	2.00
27.750	0.00	0.00	2.408	O	|	|	|	|	2.00
27.833	0.00	0.00	2.408	O	|	|	|	|	2.00
166.333	0.00	0.00	2.385	O	|	|	|	|	1.98
166.417	0.00	0.00	2.385	O	|	|	|	|	1.98
166.500	0.00	0.00	2.385	O	|	|	|	|	1.98
166.583	0.00	0.00	2.385	O	|	|	|	|	1.98
166.667	0.00	0.00	2.385	O	|	|	|	|	1.98

Remaining water in basin = 2.38 (Ac.Ft)

```
****************************HYDROGRAPH DATA****************************
              Number of intervals =  2001
              Time interval =    5.0 (Min.)
              Maximum/Peak flow rate =       37.089 (CFS)
              Total volume =       3.394 (Ac.Ft)
       Status of hydrographs being held in storage
                 Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
       Peak (CFS)      0.000     0.000     0.000     0.000     0.000
       Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
***********************************************************************
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------------------------------------------------------------------

                 FLOOD HYDROGRAPH ROUTING PROGRAM
          Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2005
                     Study date: 09/08/17

------------------------------------------------------------------

SCLA LOT 19
100 yr ROUTING STUDY - PROPOSED CONDITION
7180ROUTING

------------------------------------------------------------------

Program License Serial Number 6145

------------------------------------------------------------------
********************** HYDROGRAPH INFORMATION **********************

             From study/file name: 7180UH100.rte
****************************HYDROGRAPH DATA****************************
             Number of intervals =   297
             Time interval =    5.0 (Min.)
             Maximum/Peak flow rate =      114.052 (CFS)
             Total volume =      10.292 (Ac.Ft)
      Status of hydrographs being held in storage
                 Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
      Peak (CFS)      0.000     0.000     0.000     0.000     0.000
      Vol (Ac.Ft)     0.000     0.000     0.000     0.000     0.000
**********************************************************************

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station        7.000
**** RETARDING BASIN ROUTING ****
______________________________________________________________________

User entry of depth-outflow-storage data
------------------------------------------------------------------
Total number of inflow hydrograph intervals = 297
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)
------------------------------------------------------------------
------------------------------------------------------------------
Initial basin depth =   0.00 (Ft.)
Initial basin storage =      0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)
------------------------------------------------------------------
------------------------------------------------------------------
Depth vs. Storage and Depth vs. Discharge data:
 Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
     (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)     (Ac.Ft)
------------------------------------------------------------------
   0.000      0.000      0.000      0.000       0.000
   1.000      1.129      0.001      1.129       1.129
   2.000      2.408      0.002      2.408       2.408
   3.000      3.840     46.600      3.680       4.000
   4.000      5.428     81.700      5.147       5.709
   5.000      7.174    100.100      6.829       7.519
------------------------------------------------------------------
```

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	28.5	57.03	85.54	114.05	Depth (Ft.)
0.083	0.05	0.00	0.000	O	|	|	|	|	0.00
0.167	0.31	0.00	0.001	O	|	|	|	|	0.00
0.250	0.78	0.00	0.005	O	|	|	|	|	0.00
0.333	1.33	0.00	0.012	O	|	|	|	|	0.01
0.417	1.62	0.00	0.023	O	|	|	|	|	0.02
0.500	1.76	0.00	0.034	O	|	|	|	|	0.03
0.583	1.82	0.00	0.047	O	|	|	|	|	0.04
0.667	1.84	0.00	0.059	O	|	|	|	|	0.05
0.750	1.86	0.00	0.072	O	|	|	|	|	0.06
0.833	1.88	0.00	0.085	O	|	|	|	|	0.08
0.917	1.88	0.00	0.098	O	|	|	|	|	0.09
1.000	1.89	0.00	0.111	O	|	|	|	|	0.10
1.083	1.90	0.00	0.124	O	|	|	|	|	0.11
1.167	1.90	0.00	0.137	O	|	|	|	|	0.12
1.250	1.91	0.00	0.150	O	|	|	|	|	0.13
1.333	1.92	0.00	0.163	O	|	|	|	|	0.14
1.417	1.92	0.00	0.176	O	|	|	|	|	0.16
1.500	1.93	0.00	0.190	O	|	|	|	|	0.17
1.583	1.94	0.00	0.203	O	|	|	|	|	0.18
1.667	1.95	0.00	0.216	O	|	|	|	|	0.19
1.750	1.95	0.00	0.230	O	|	|	|	|	0.20
1.833	1.96	0.00	0.243	O	|	|	|	|	0.22
1.917	1.97	0.00	0.257	O	|	|	|	|	0.23
2.000	1.97	0.00	0.270	O	|	|	|	|	0.24
2.083	1.98	0.00	0.284	O	|	|	|	|	0.25
2.167	1.99	0.00	0.298	O	|	|	|	|	0.26
2.250	2.00	0.00	0.311	O	|	|	|	|	0.28
2.333	2.00	0.00	0.325	O	|	|	|	|	0.29
2.417	2.01	0.00	0.339	O	|	|	|	|	0.30
2.500	2.02	0.00	0.353	O	|	|	|	|	0.31
2.583	2.03	0.00	0.367	O	|	|	|	|	0.32
2.667	2.03	0.00	0.381	O	|	|	|	|	0.34
2.750	2.04	0.00	0.395	O	|	|	|	|	0.35
2.833	2.05	0.00	0.409	O	|	|	|	|	0.36
2.917	2.06	0.00	0.423	O	|	|	|	|	0.37
3.000	2.07	0.00	0.437	O	|	|	|	|	0.39
3.083	2.07	0.00	0.451	O	|	|	|	|	0.40
3.167	2.08	0.00	0.466	O	|	|	|	|	0.41
3.250	2.09	0.00	0.480	O	|	|	|	|	0.43
3.333	2.10	0.00	0.495	O	|	|	|	|	0.44
3.417	2.11	0.00	0.509	O	|	|	|	|	0.45
3.500	2.12	0.00	0.524	O	|	|	|	|	0.46
3.583	2.13	0.00	0.538	O	|	|	|	|	0.48
3.667	2.13	0.00	0.553	O	|	|	|	|	0.49
3.750	2.14	0.00	0.568	O	|	|	|	|	0.50
3.833	2.15	0.00	0.582	O	|	|	|	|	0.52
3.917	2.16	0.00	0.597	O	|	|	|	|	0.53
4.000	2.17	0.00	0.612	O	|	|	|	|	0.54
4.083	2.18	0.00	0.627	O	|	|	|	|	0.56
4.167	2.19	0.00	0.642	O	|	|	|	|	0.57
4.250	2.20	0.00	0.657	O	|	|	|	|	0.58
4.333	2.21	0.00	0.672	O	|	|	|	|	0.60
4.417	2.22	0.00	0.688	O	|	|	|	|	0.61
4.500	2.23	0.00	0.703	O	|	|	|	|	0.62
4.583	2.24	0.00	0.718	O	|	|	|	|	0.64
4.667	2.25	0.00	0.734	O	|	|	|	|	0.65

4.750	2.26	0.00	0.749	O	|	|	|	|	0.66
4.833	2.27	0.00	0.765	O	|	|	|	|	0.68
4.917	2.28	0.00	0.781	O	|	|	|	|	0.69
5.000	2.29	0.00	0.796	O	|	|	|	|	0.71
5.083	2.30	0.00	0.812	O	|	|	|	|	0.72
5.167	2.31	0.00	0.828	O	|	|	|	|	0.73
5.250	2.32	0.00	0.844	O	|	|	|	|	0.75
5.333	2.33	0.00	0.860	O	|	|	|	|	0.76
5.417	2.35	0.00	0.876	O	|	|	|	|	0.78
5.500	2.36	0.00	0.892	O	|	|	|	|	0.79
5.583	2.37	0.00	0.909	O	|	|	|	|	0.80
5.667	2.38	0.00	0.925	O	|	|	|	|	0.82
5.750	2.39	0.00	0.941	O	|	|	|	|	0.83
5.833	2.40	0.00	0.958	O	|	|	|	|	0.85
5.917	2.42	0.00	0.974	O	|	|	|	|	0.86
6.000	2.43	0.00	0.991	O	|	|	|	|	0.88
6.083	2.44	0.00	1.008	O	|	|	|	|	0.89
6.167	2.45	0.00	1.025	O	|	|	|	|	0.91
6.250	2.47	0.00	1.042	O	|	|	|	|	0.92
6.333	2.48	0.00	1.059	O	|	|	|	|	0.94
6.417	2.49	0.00	1.076	O	|	|	|	|	0.95
6.500	2.51	0.00	1.093	O	|	|	|	|	0.97
6.583	2.52	0.00	1.110	O	|	|	|	|	0.98
6.667	2.53	0.00	1.128	O	|	|	|	|	1.00
6.750	2.55	0.00	1.145	O	|	|	|	|	1.01
6.833	2.56	0.00	1.163	O	|	|	|	|	1.03
6.917	2.58	0.00	1.180	O	|	|	|	|	1.04
7.000	2.59	0.00	1.198	O	|	|	|	|	1.05
7.083	2.60	0.00	1.216	O	|	|	|	|	1.07
7.167	2.62	0.00	1.234	O	|	|	|	|	1.08
7.250	2.63	0.00	1.252	O	|	|	|	|	1.10
7.333	2.65	0.00	1.270	O	|	|	|	|	1.11
7.417	2.67	0.00	1.289	O	|	|	|	|	1.12
7.500	2.68	0.00	1.307	O	|	|	|	|	1.14
7.583	2.70	0.00	1.326	O	|	|	|	|	1.15
7.667	2.71	0.00	1.344	O	|	|	|	|	1.17
7.750	2.73	0.00	1.363	O	|	|	|	|	1.18
7.833	2.75	0.00	1.382	O	|	|	|	|	1.20
7.917	2.76	0.00	1.401	O	|	|	|	|	1.21
8.000	2.78	0.00	1.420	O	|	|	|	|	1.23
8.083	2.80	0.00	1.439	O	|	|	|	|	1.24
8.167	2.82	0.00	1.458	O	|	|	|	|	1.26
8.250	2.84	0.00	1.478	O	|	|	|	|	1.27
8.333	2.86	0.00	1.497	O	|	|	|	|	1.29
8.417	2.87	0.00	1.517	O	|	|	|	|	1.30
8.500	2.89	0.00	1.537	O	|	|	|	|	1.32
8.583	2.91	0.00	1.557	O	|	|	|	|	1.33
8.667	2.93	0.00	1.577	O	|	|	|	|	1.35
8.750	2.95	0.00	1.597	O	|	|	|	|	1.37
8.833	2.97	0.00	1.618	O	|	|	|	|	1.38
8.917	3.00	0.00	1.638	O	|	|	|	|	1.40
9.000	3.02	0.00	1.659	O	|	|	|	|	1.41
9.083	3.04	0.00	1.680	O	|	|	|	|	1.43
9.167	3.06	0.00	1.701	O	|	|	|	|	1.45
9.250	3.08	0.00	1.722	O	|	|	|	|	1.46
9.333	3.11	0.00	1.743	O	|	|	|	|	1.48
9.417	3.13	0.00	1.765	O	|	|	|	|	1.50
9.500	3.16	0.00	1.786	O	|	|	|	|	1.51
9.583	3.18	0.00	1.808	O	|	|	|	|	1.53
9.667	3.21	0.00	1.830	O	|	|	|	|	1.55
9.750	3.23	0.00	1.852	O	|	|	|	|	1.57
9.833	3.26	0.00	1.875	O	|	|	|	|	1.58
9.917	3.28	0.00	1.897	O	|	|	|	|	1.60

10.000	3.31	0.00	1.920	O	|	|	|	|	1.62
10.083	3.34	0.00	1.943	O	|	|	|	|	1.64
10.167	3.37	0.00	1.966	O	|	|	|	|	1.65
10.250	3.40	0.00	1.989	O	|	|	|	|	1.67
10.333	3.43	0.00	2.013	O	|	|	|	|	1.69
10.417	3.46	0.00	2.036	O	|	|	|	|	1.71
10.500	3.49	0.00	2.060	O	|	|	|	|	1.73
10.583	3.52	0.00	2.084	O	|	|	|	|	1.75
10.667	3.55	0.00	2.109	O	|	|	|	|	1.77
10.750	3.59	0.00	2.133	OI	|	|	|	|	1.79
10.833	3.62	0.00	2.158	OI	|	|	|	|	1.80
10.917	3.66	0.00	2.183	OI	|	|	|	|	1.82
11.000	3.69	0.00	2.208	OI	|	|	|	|	1.84
11.083	3.73	0.00	2.234	OI	|	|	|	|	1.86
11.167	3.77	0.00	2.260	OI	|	|	|	|	1.88
11.250	3.81	0.00	2.286	OI	|	|	|	|	1.90
11.333	3.85	0.00	2.312	OI	|	|	|	|	1.93
11.417	3.89	0.00	2.339	OI	|	|	|	|	1.95
11.500	3.93	0.00	2.366	OI	|	|	|	|	1.97
11.583	3.97	0.00	2.393	OI	|	|	|	|	1.99
11.667	4.02	0.37	2.419	OI	|	|	|	|	2.01
11.750	4.07	1.11	2.442	OI	|	|	|	|	2.02
11.833	4.11	1.71	2.460	OI	|	|	|	|	2.04
11.917	4.16	2.20	2.476	OI	|	|	|	|	2.05
12.000	4.21	2.60	2.488	OI	|	|	|	|	2.06
12.083	4.23	2.93	2.498	OI	|	|	|	|	2.06
12.167	4.08	3.17	2.505	OI	|	|	|	|	2.07
12.250	3.77	3.33	2.510	OI	|	|	|	|	2.07
12.333	3.41	3.38	2.512	O	|	|	|	|	2.07
12.417	3.23	3.37	2.511	O	|	|	|	|	2.07
12.500	3.18	3.34	2.510	O	|	|	|	|	2.07
12.583	3.19	3.31	2.510	O	|	|	|	|	2.07
12.667	3.24	3.29	2.509	O	|	|	|	|	2.07
12.750	3.28	3.28	2.509	O	|	|	|	|	2.07
12.833	3.33	3.29	2.509	O	|	|	|	|	2.07
12.917	3.39	3.30	2.509	O	|	|	|	|	2.07
13.000	3.46	3.33	2.510	O	|	|	|	|	2.07
13.083	3.52	3.36	2.511	O	|	|	|	|	2.07
13.167	3.60	3.40	2.512	OI	|	|	|	|	2.07
13.250	3.67	3.45	2.514	OI	|	|	|	|	2.07
13.333	3.75	3.50	2.515	OI	|	|	|	|	2.08
13.417	3.83	3.56	2.517	OI	|	|	|	|	2.08
13.500	3.91	3.62	2.519	|O	|	|	|	|	2.08
13.583	4.00	3.69	2.521	|O	|	|	|	|	2.08
13.667	4.10	3.76	2.523	|O	|	|	|	|	2.08
13.750	4.19	3.84	2.526	|O	|	|	|	|	2.08
13.833	4.30	3.92	2.528	|O	|	|	|	|	2.08
13.917	4.41	4.01	2.531	|O	|	|	|	|	2.09
14.000	4.53	4.10	2.534	|O	|	|	|	|	2.09
14.083	4.66	4.20	2.537	|O	|	|	|	|	2.09
14.167	4.80	4.31	2.540	|O	|	|	|	|	2.09
14.250	4.95	4.42	2.544	|O	|	|	|	|	2.09
14.333	5.12	4.55	2.548	|O	|	|	|	|	2.10
14.417	5.29	4.68	2.552	|O	|	|	|	|	2.10
14.500	5.48	4.82	2.556	|O	|	|	|	|	2.10
14.583	5.68	4.98	2.561	|O	|	|	|	|	2.11
14.667	5.90	5.14	2.566	|O	|	|	|	|	2.11
14.750	6.13	5.32	2.571	|O	|	|	|	|	2.11
14.833	6.40	5.51	2.577	|O	|	|	|	|	2.12
14.917	6.68	5.71	2.584	|O	|	|	|	|	2.12
15.000	7.00	5.94	2.591	|O	|	|	|	|	2.13
15.083	7.36	6.19	2.598	|OI	|	|	|	|	2.13
15.167	7.77	6.47	2.607	|OI	|	|	|	|	2.14

15.250	8.23	6.78	2.616	|OI | | | |	2.15
15.333	8.79	7.13	2.627	|OI | | | |	2.15
15.417	9.51	7.53	2.639	| O | | | |	2.16
15.500	10.70	8.05	2.655	| OI | | | |	2.17
15.583	12.37	8.75	2.677	| OI | | | |	2.19
15.667	14.46	9.69	2.706	| O I | | | |	2.21
15.750	16.59	10.87	2.742	| OI | | | |	2.23
15.833	19.19	12.28	2.785	| O I | | | |	2.26
15.917	22.72	14.03	2.839	| O I | | | |	2.30
16.000	28.66	16.38	2.911	| O I | | |	2.35
16.083	44.01	20.40	3.035	| O | I | |	2.44
16.167	80.05	28.79	3.293	| O | | I |	2.62
16.250	111.68	42.31	3.708	| | O | | I|	2.91
16.333	114.05	53.57	4.155	| | | O| | I	3.20
16.417	72.22	59.17	4.408	| | | O I | |	3.36
16.500	42.45	58.91	4.397	| | I O | |	3.35
16.583	25.70	55.39	4.238	| I| O| | |	3.25
16.667	15.91	50.50	4.016	| I | O | | |	3.11
16.750	12.56	44.85	3.786	| I | O | | |	2.96
16.833	10.49	38.13	3.580	| I | O | | |	2.82
16.917	7.82	32.29	3.400	| I |O | | |	2.69
17.000	6.95	27.27	3.246	|I O| | | |	2.59
17.083	6.30	23.11	3.118	|I O | | | |	2.50
17.167	5.79	19.67	3.013	|I O | | | |	2.42
17.250	5.37	16.83	2.925	|I O | | | |	2.36
17.333	5.02	14.49	2.853	|I O | | | |	2.31
17.417	4.72	12.55	2.794	|I O | | | |	2.27
17.500	4.46	10.95	2.744	|I O | | | |	2.23
17.583	4.23	9.62	2.703	|IO | | | |	2.21
17.667	4.03	8.51	2.669	|IO | | | |	2.18
17.750	3.85	7.59	2.641	|IO | | | |	2.16
17.833	3.69	6.82	2.618	|O | | | |	2.15
17.917	3.55	6.18	2.598	IO | | | |	2.13
18.000	3.41	5.63	2.581	IO | | | |	2.12
18.083	3.33	5.18	2.567	IO | | | |	2.11
18.167	3.41	4.81	2.556	IO | | | |	2.10
18.250	3.67	4.56	2.548	|O | | | |	2.10
18.333	3.98	4.41	2.543	|O | | | |	2.09
18.417	4.10	4.33	2.541	|O | | | |	2.09
18.500	4.10	4.29	2.540	|O | | | |	2.09
18.583	4.05	4.24	2.538	|O | | | |	2.09
18.667	3.97	4.20	2.537	|O | | | |	2.09
18.750	3.89	4.14	2.535	|O | | | |	2.09
18.833	3.82	4.08	2.533	|O | | | |	2.09
18.917	3.74	4.02	2.532	|O | | | |	2.09
19.000	3.66	3.96	2.530	|O | | | |	2.08
19.083	3.59	3.89	2.528	|O | | | |	2.08
19.167	3.53	3.83	2.525	IO | | | |	2.08
19.250	3.46	3.76	2.523	IO | | | |	2.08
19.333	3.40	3.69	2.521	IO | | | |	2.08
19.417	3.35	3.63	2.519	IO | | | |	2.08
19.500	3.29	3.57	2.518	IO | | | |	2.08
19.583	3.24	3.51	2.516	O | | | |	2.08
19.667	3.19	3.45	2.514	O | | | |	2.07
19.750	3.14	3.39	2.512	O | | | |	2.07
19.833	3.09	3.33	2.510	O | | | |	2.07
19.917	3.04	3.28	2.509	O | | | |	2.07
20.000	3.00	3.23	2.507	O | | | |	2.07
20.083	2.96	3.18	2.506	O | | | |	2.07
20.167	2.92	3.13	2.504	O | | | |	2.07
20.250	2.88	3.08	2.503	O | | | |	2.07
20.333	2.84	3.04	2.501	O | | | |	2.07
20.417	2.80	2.99	2.500	O | | | |	2.06

20.500	2.77	2.95	2.499	O					2.06
20.583	2.73	2.91	2.497	O					2.06
20.667	2.70	2.87	2.496	O					2.06
20.750	2.67	2.83	2.495	O					2.06
20.833	2.64	2.80	2.494	O					2.06
20.917	2.61	2.76	2.493	O					2.06
21.000	2.58	2.73	2.492	O					2.06
21.083	2.55	2.70	2.491	O					2.06
21.167	2.52	2.66	2.490	O					2.06
21.250	2.49	2.63	2.489	O					2.06
21.333	2.47	2.60	2.488	O					2.06
21.417	2.44	2.57	2.487	O					2.06
21.500	2.42	2.54	2.486	O					2.05
21.583	2.39	2.52	2.485	O					2.05
21.667	2.37	2.49	2.484	O					2.05
21.750	2.35	2.46	2.484	O					2.05
21.833	2.32	2.44	2.483	O					2.05
21.917	2.30	2.41	2.482	O					2.05
22.000	2.28	2.39	2.481	O					2.05
22.083	2.26	2.36	2.481	O					2.05
22.167	2.24	2.34	2.480	O					2.05
22.250	2.22	2.32	2.479	O					2.05
22.333	2.20	2.30	2.479	O					2.05
22.417	2.18	2.28	2.478	O					2.05
22.500	2.16	2.26	2.477	O					2.05
22.583	2.15	2.23	2.477	O					2.05
22.667	2.13	2.21	2.476	O					2.05
22.750	2.11	2.20	2.475	O					2.05
22.833	2.09	2.18	2.475	O					2.05
22.917	2.08	2.16	2.474	O					2.05
23.000	2.06	2.14	2.474	O					2.05
23.083	2.04	2.12	2.473	O					2.05
23.167	2.03	2.10	2.473	O					2.05
23.250	2.01	2.09	2.472	O					2.04
23.333	2.00	2.07	2.472	O					2.04
23.417	1.98	2.05	2.471	O					2.04
23.500	1.97	2.04	2.471	O					2.04
23.583	1.95	2.02	2.470	O					2.04
23.667	1.94	2.01	2.470	O					2.04
23.750	1.93	1.99	2.469	O					2.04
23.833	1.91	1.98	2.469	O					2.04
23.917	1.90	1.96	2.468	O					2.04
24.000	1.89	1.95	2.468	O					2.04
24.083	1.82	1.93	2.467	O					2.04
24.167	1.56	1.88	2.466	O					2.04
24.250	1.07	1.77	2.462	O					2.04
24.333	0.52	1.57	2.456	O					2.03
24.417	0.23	1.33	2.449	O					2.03
24.500	0.10	1.10	2.442	O					2.02
24.583	0.04	0.89	2.435	O					2.02
24.667	0.02	0.72	2.430	O					2.02
24.750	0.01	0.57	2.426	O					2.01
24.833	0.00	0.46	2.422	O					2.01
24.917	0.00	0.37	2.419	O					2.01
25.000	0.00	0.29	2.417	O					2.01
25.083	0.00	0.23	2.415	O					2.00
25.167	0.00	0.19	2.414	O					2.00
25.250	0.00	0.15	2.413	O					2.00
25.333	0.00	0.12	2.412	O					2.00
25.417	0.00	0.10	2.411	O					2.00
25.500	0.00	0.08	2.410	O					2.00
25.583	0.00	0.06	2.410	O					2.00
25.667	0.00	0.05	2.409	O					2.00

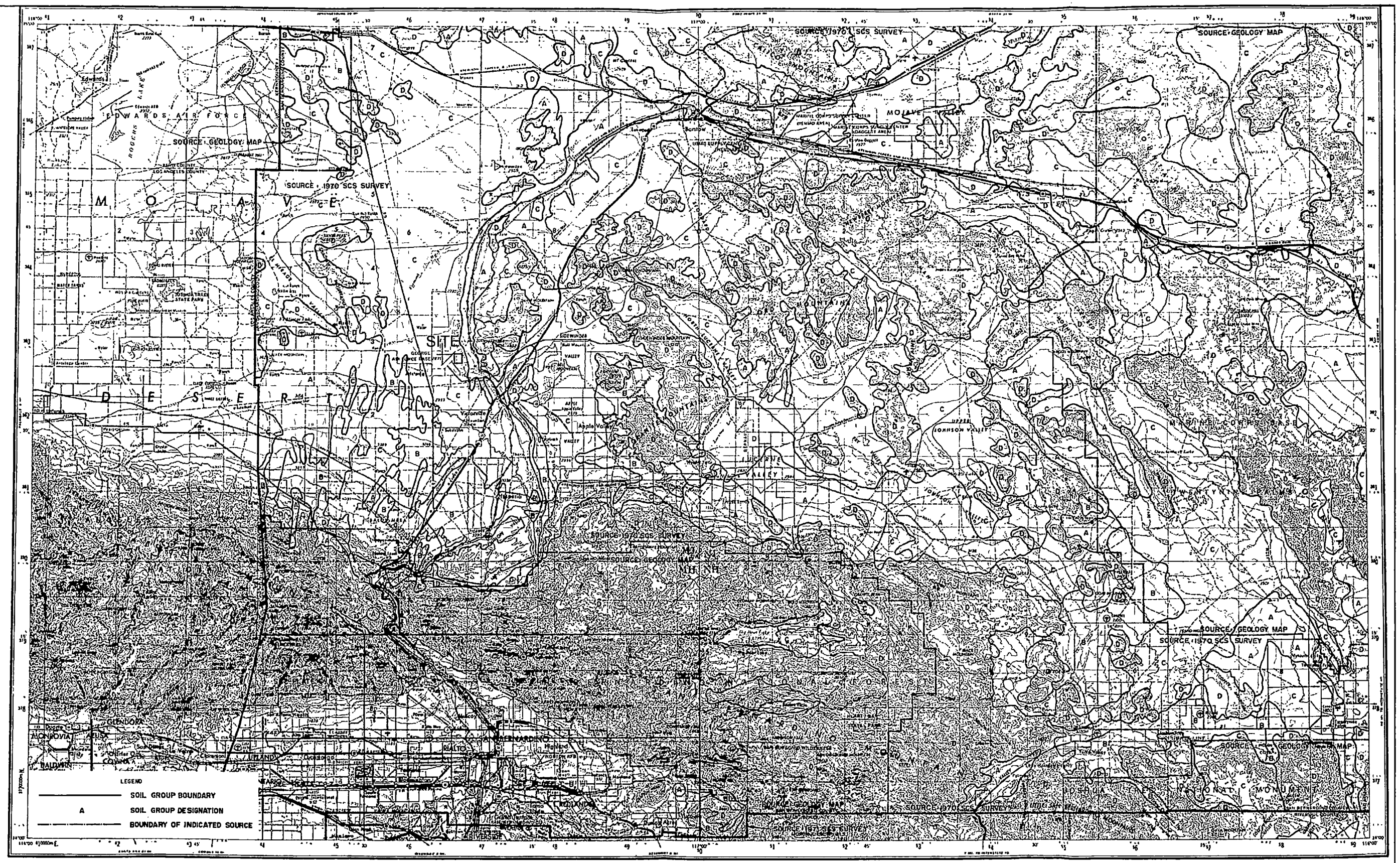
25.750	0.00	0.04	2.409	O	|	|	|	|	2.00
25.833	0.00	0.03	2.409	O	|	|	|	|	2.00
25.917	0.00	0.02	2.409	O	|	|	|	|	2.00
26.000	0.00	0.02	2.409	O	|	|	|	|	2.00
26.083	0.00	0.02	2.408	O	|	|	|	|	2.00
26.167	0.00	0.01	2.408	O	|	|	|	|	2.00
26.250	0.00	0.01	2.408	O	|	|	|	|	2.00
26.333	0.00	0.01	2.408	O	|	|	|	|	2.00
26.417	0.00	0.01	2.408	O	|	|	|	|	2.00
26.500	0.00	0.01	2.408	O	|	|	|	|	2.00
26.583	0.00	0.00	2.408	O	|	|	|	|	2.00
26.667	0.00	0.00	2.408	O	|	|	|	|	2.00
26.750	0.00	0.00	2.408	O	|	|	|	|	2.00
26.833	0.00	0.00	2.408	O	|	|	|	|	2.00
26.917	0.00	0.00	2.408	O	|	|	|	|	2.00
27.000	0.00	0.00	2.408	O	|	|	|	|	2.00
166.167	0.00	0.00	2.385	O	|	|	|	|	1.98
166.250	0.00	0.00	2.385	O	|	|	|	|	1.98
166.333	0.00	0.00	2.385	O	|	|	|	|	1.98
166.417	0.00	0.00	2.385	O	|	|	|	|	1.98
166.500	0.00	0.00	2.385	O	|	|	|	|	1.98
166.583	0.00	0.00	2.385	O	|	|	|	|	1.98
166.667	0.00	0.00	2.385	O	|	|	|	|	1.98

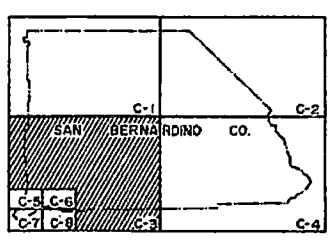
Remaining water in basin = 2.38 (Ac.Ft)

```
****************************HYDROGRAPH DATA****************************
             Number of intervals =  2001
             Time interval =    5.0 (Min.)
             Maximum/Peak flow rate =       59.165 (CFS)
             Total volume =       7.907 (Ac.Ft)
      Status of hydrographs being held in storage
                 Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
      Peak (CFS)      0.000     0.000     0.000     0.000     0.000
      Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
***********************************************************************

-----------------------------------------------------------------------
```

Appendix E
Soil Group Map and Isohyetal Map





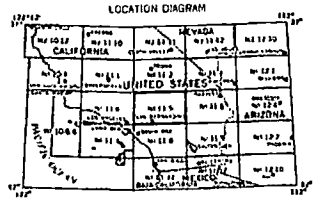
INDEX MAP

Scale 1:250,000

CONTOUR INTERVAL 200 FEET
WITH SUPPLEMENTARY CONTOURS AT 100 FOOT INTERVALS
TRANSVERSE MERCATOR PROJECTION

BASE MAP REPRODUCED FROM U.S.G.S. "SAN BERNARDINO" TOPOGRAPHIC MAP

SCALE REDUCED BY 1/2

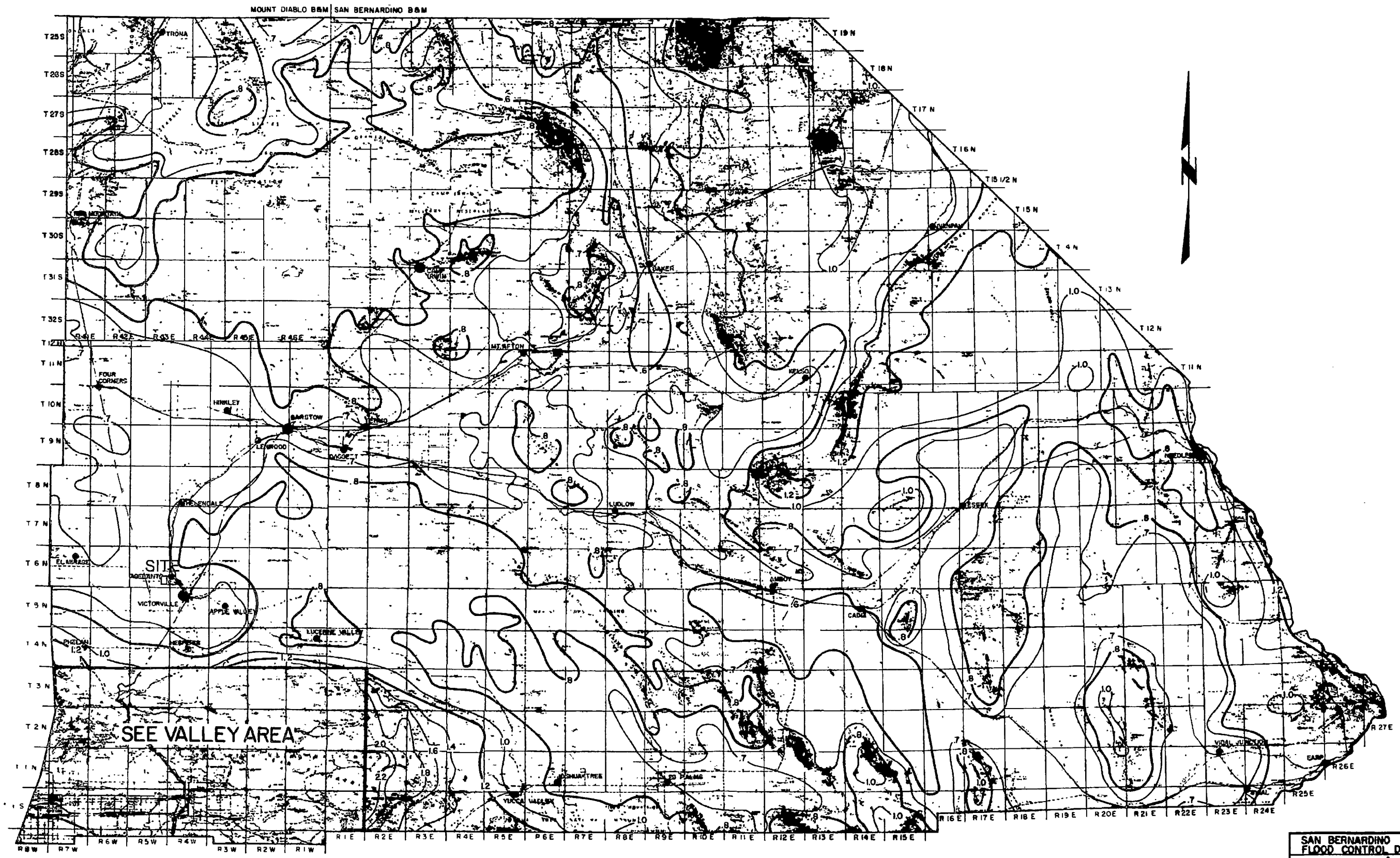


SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

HYDROLOGIC SOILS GROUP MAP FOR SOUTHCENTRAL AREA

FIGURE C-11



REDUCED DRAWING

0 1 2 3

3 INCHES ON ORIGINAL

LEGEND:

1.0 ISOLINES PRECIPITATION (INCHES)

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

DESERT AREA

ISOHYETALS

X_1 - 2 YEAR 6 HOUR

BASED ON U.S.D.C. NOAA ATLAS 2, 1973

APPROVED BY

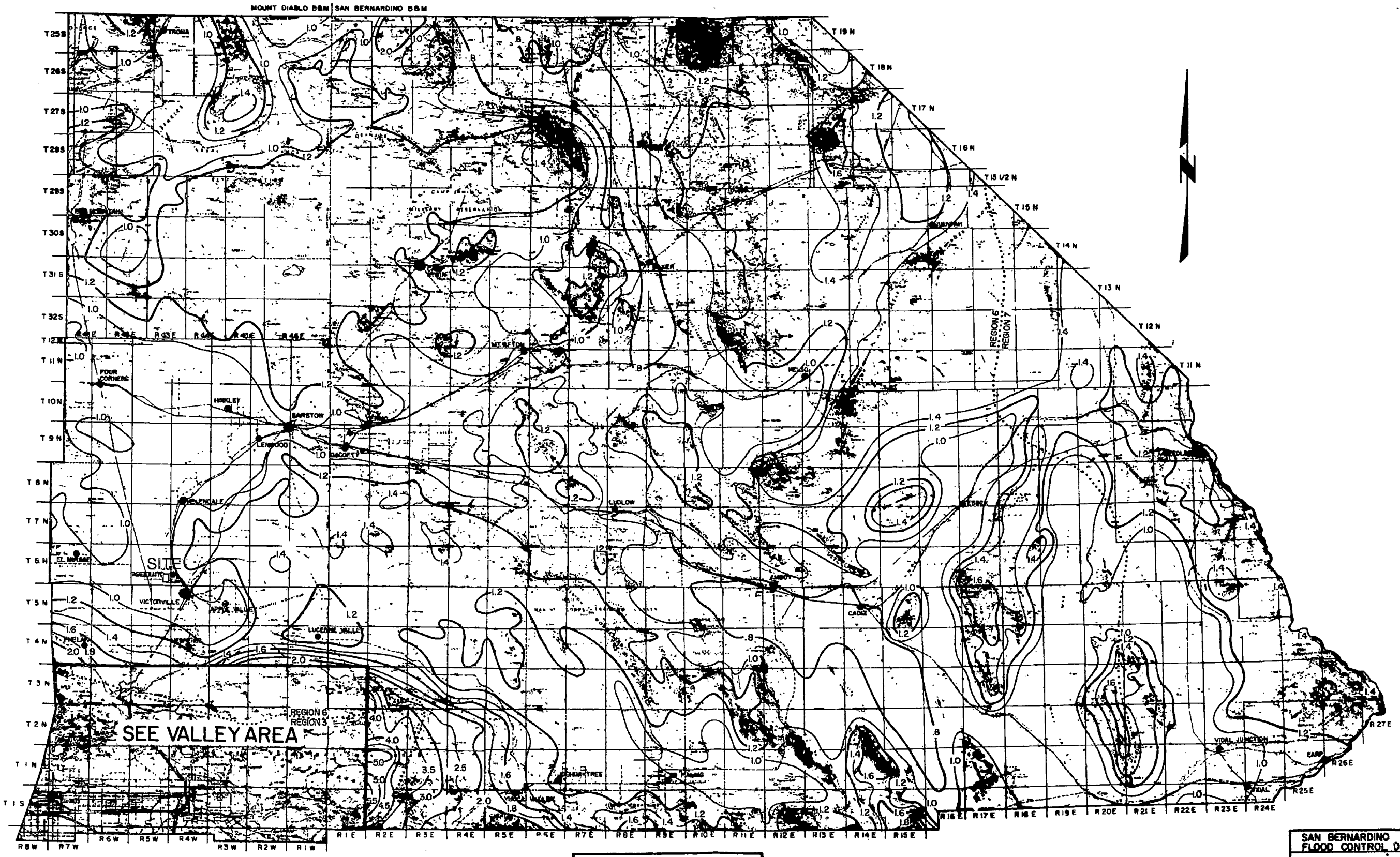
FLOOD CONTROL ENGINEER

DATE	SCALE	FILE NO.	DRWG. NO.
1982	1" = 6 MI.	WRD-1	7 of 12

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

FIGURE B-7



SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

REDUCED DRAWING

0 1 2 3

3 INCHES ON ORIGINAL

LEGEND:

1.2 ISOLINES PRECIPITATION (INCHES)

SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT

DESERT AREA

ISOHYETALS

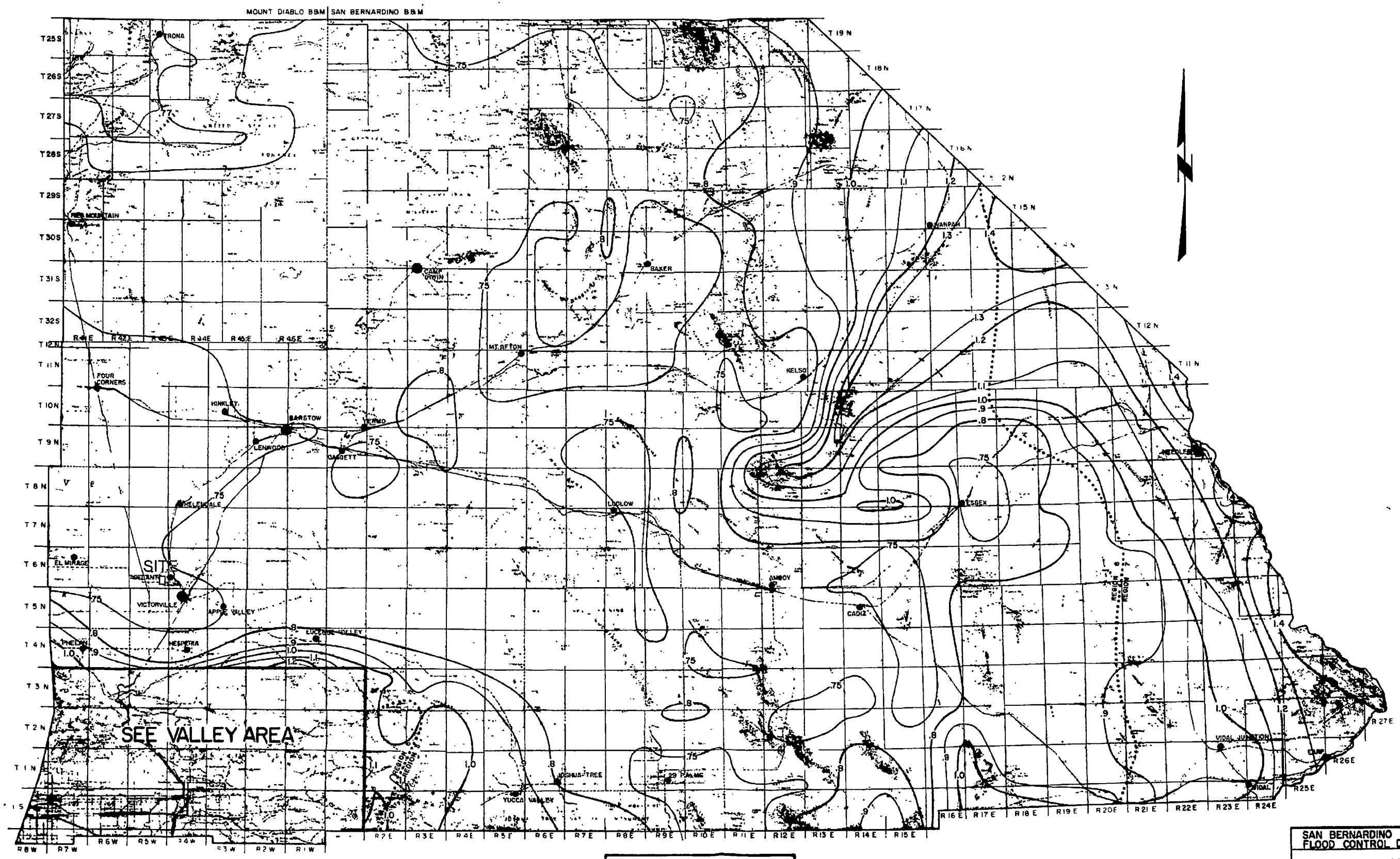
X_2 - 2 YEAR 24 HOUR

BASED ON U.S.D.C., N.O.A.A. ATLAS 2, 1973

APPROVED BY: FLOOD CONTROL ENGINEER

DATE	SCALE	FILE NO.	DRAWING NO.
1982	1" = 6 MI.	WRD-1	8 of 12

FIGURE B-8



REDUCED DRAWING

0 1 2 3

3 INCHES ON ORIGINAL

LEGEND:

3.5 ISOLINES PRECIPITATION (INCHES)

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

DESERT AREA

ISOHYETALS

Y_{10} - 10 YEAR 1 HOUR

BASED ON U.S.D.C., N.O.A.A. ATLAS 2, 1973

APPROVED BY

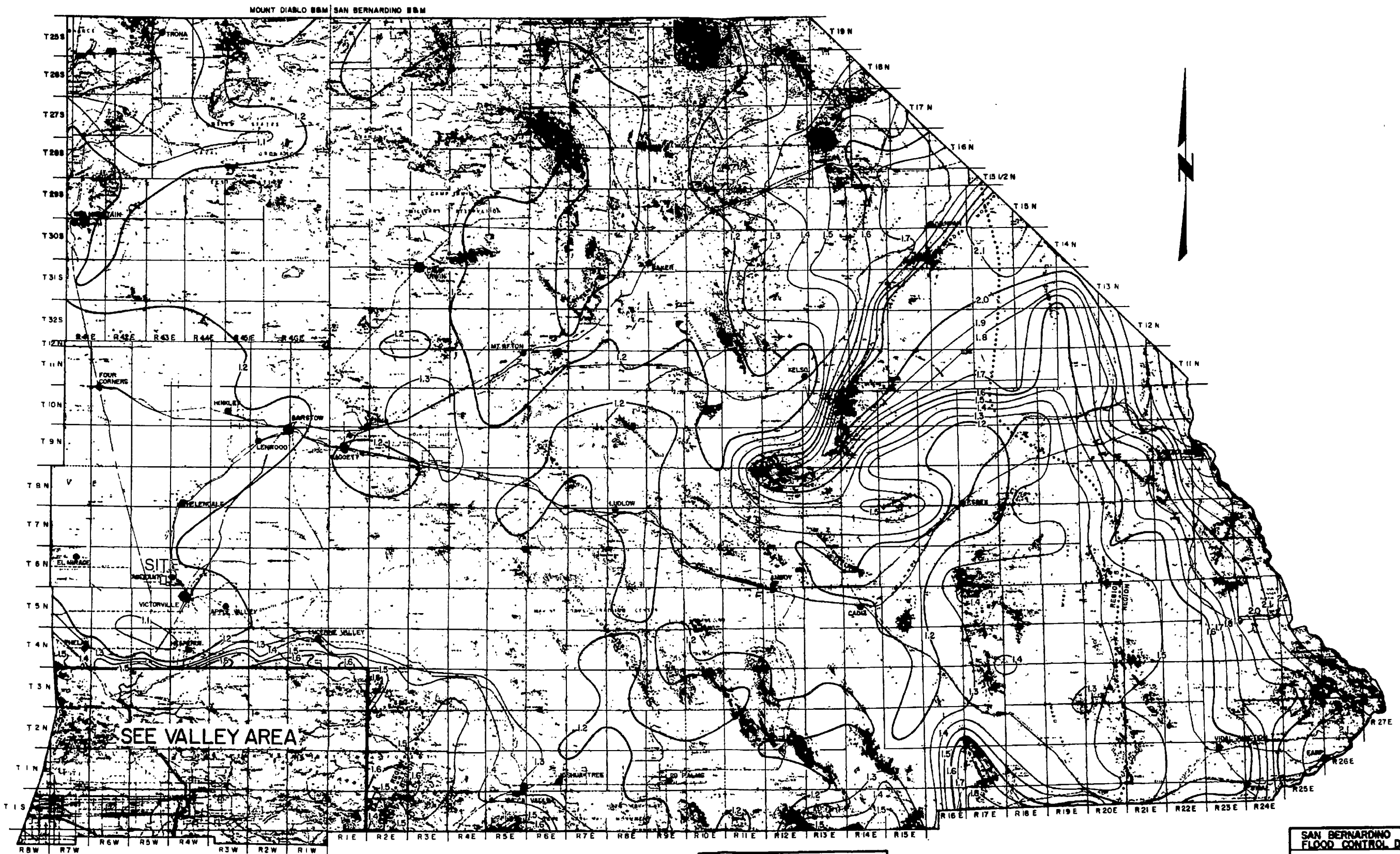
FLOOD CONTROL ENGINEER

DATE	SCALE	FILE NO.	DRWG. NO.
1982	1" = 6 MI.	WRD-1	9 of 13

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

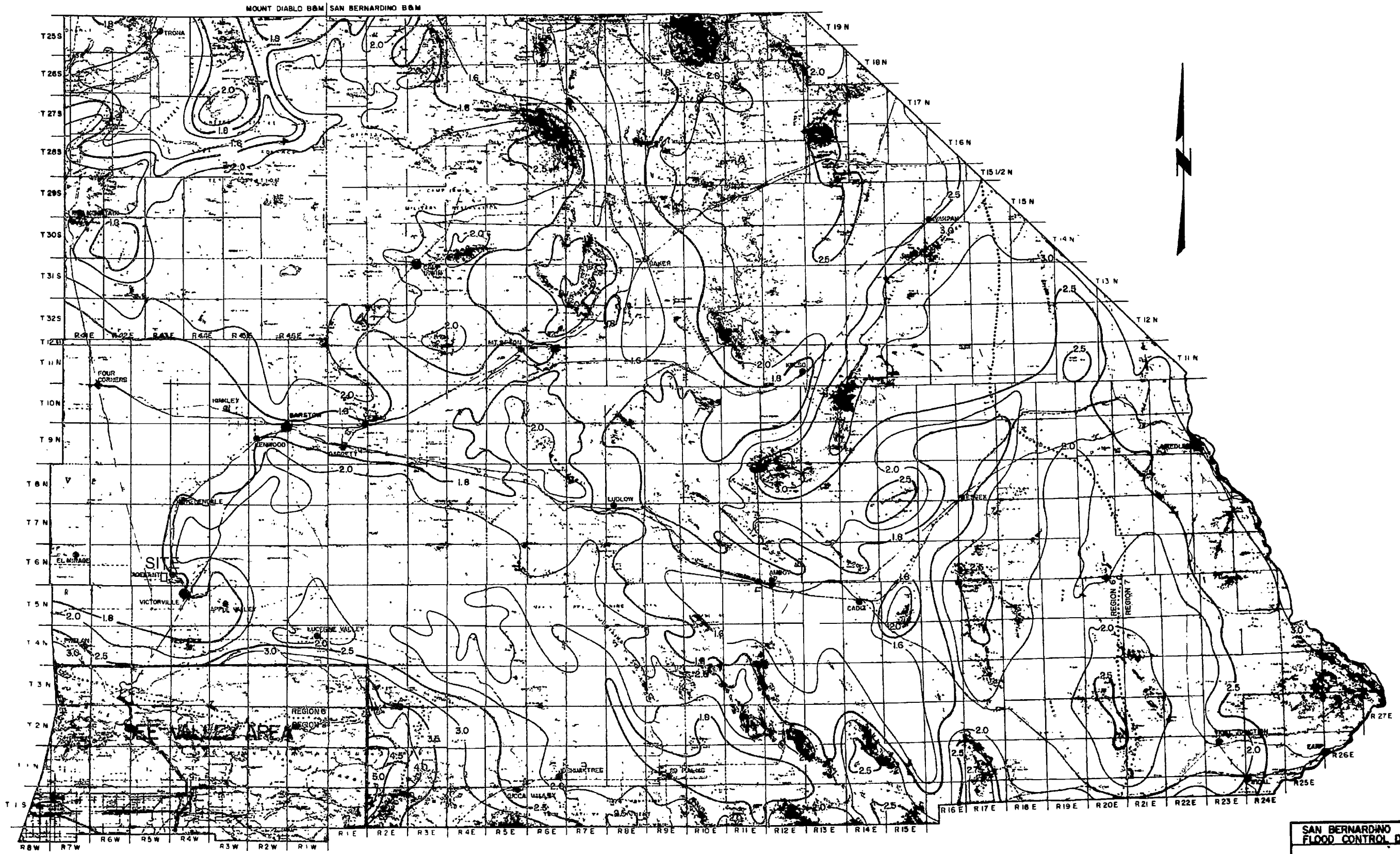
FIGURE B-9



SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

FIGURE B-10



REDUCED DRAWING

0 1 2 3

3 INCHES ON ORIGINAL

LEGEND:

2.0 ISOLINES PRECIPITATION (INCHES)

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

DESERT AREA

ISOHYETALS

X_3 - 100 YEAR 6 HOUR

BASED ON U.S.D.C., N.O.A.A. ATLAS 2, 1973

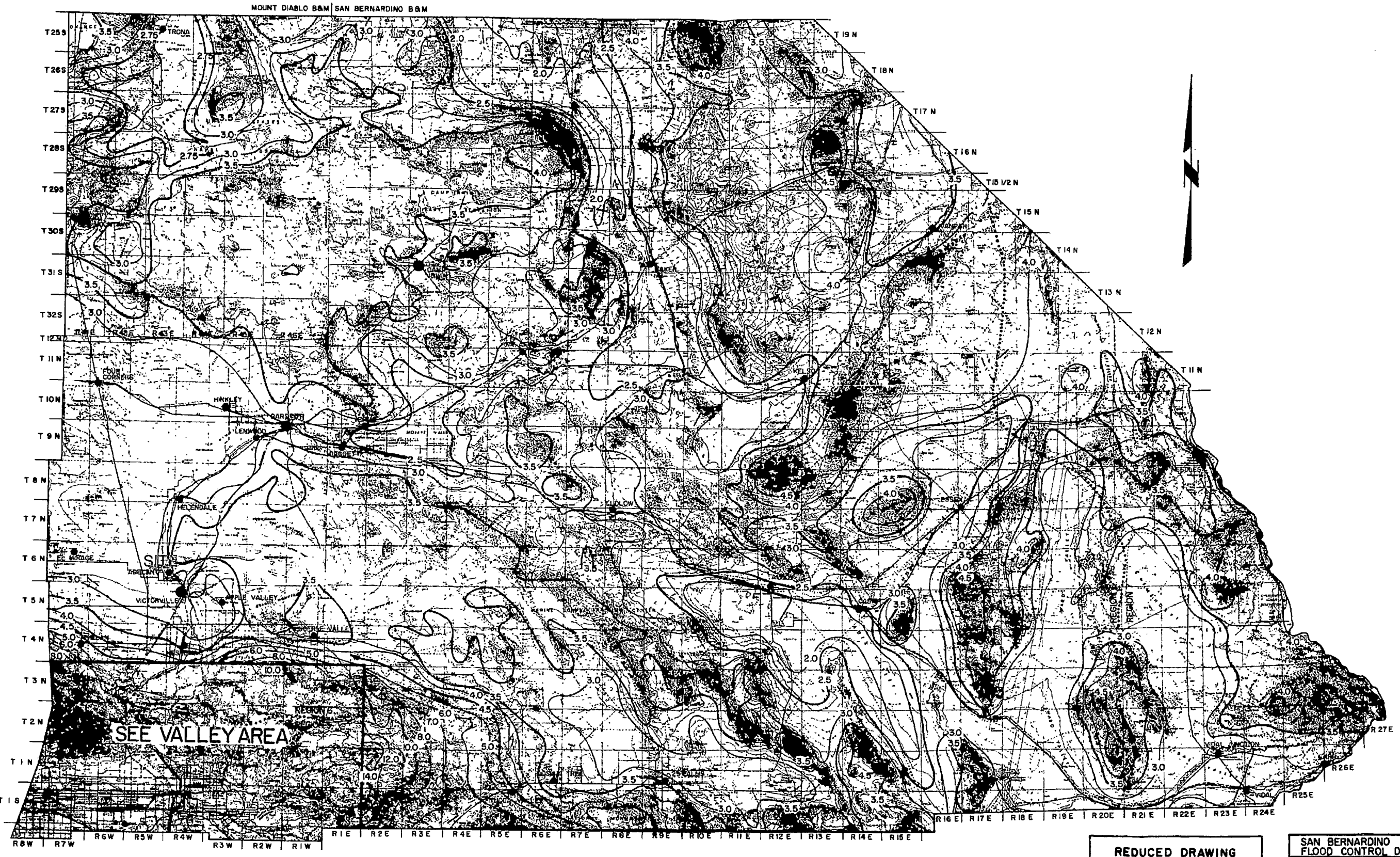
APPROVED BY: FLOOD CONTROL ENGINEER

DATE	SCALE	FILE NO.	DRWG. NO.
1982	1" = 6 MI	WRD-1	11 of 12

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

FIGURE B-11



REDUCED DRAWING

0 1 2 3

3 INCHES ON ORIGINAL

LEGEND:
3.5 ISOLINES PRECIPITATION (INCHES)

SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT

DESERT AREA

ISOHYETALS
X_4 -100 YEAR 24 HOUR
BASED ON U.S.D.C., N.O.A.A. ATLAS 2, 1973

APPROVED BY
FLOOD CONTROL ENGINEER

DATE	SCALE	FILE NO.	DRWG. NO.
1982	1" = 6 MI.	WRD-1	12 of 12

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

FIGURE B-12

Appendix F
Catch Basin Calculations

PRELIMINARY CATCH BASIN SIZING

	Orifice Not Use
h= 0.5	h= 2 g= 32.2
C= 3.3	C= 0.62
Weir Control Equation, Q = CP $h^{1.5}$	Orifice Control Equation = CA*$(2gh)^{1/2}$
L=Q/(C*h^1.5)	L=((Q^2)/(C2*h^3*2*g))^0.5

Catch Basin	Area (ac)	Approx Flow Q	Weir Length of opening P=L	Not Used Orifice **Outlet Box, L**	USE	
CB#1	4.5	18.4	15.8		48"X48"	
CB#2	2.4	7.3	6.3		36"X24"	*
CB#3	2.4	7.3	6.3		36"X24"	*
CB#4	2.3	6.1	5.2		24"X24"	*
CB#5	2.3	6.1	5.2		24"X24"	*
CB#6	2.3	6.1	5.2		24"X24"	*
CB#7	1.2	4.8	4.1		18"X18"	
CB#8	1.4	4.4	3.8		18"X18"	
CB#9	0.1	0.3	0.2		12"X12"	**
CB#10	0.2	0.5	0.4		12"X12"	**
CB#11	1.0	2.5	2.1		18"X18"	**
CB#12	0.8	2.0	1.7		12"X12"	**
CB#13	1.6	5.1	4.4		W=7'	*
CB#14	1.6	5.1	4.4		W=7'	*
CB#15	1.5	4.8	4.1		W=7'	*
CB#16	4.1	12.0	10.3		W=10'	
CB#17	7.2	21.2	18.2		W=14'	
CB#18	7.4	18.5	15.9		W=14'	**
	44.3					

* PRORATED Q
**PRORATED FACTOR 2.5 CFS/AC PER HYDROLOGY CALCS.

AES HYDRAULIC ELEMENTS 1 (HELE 1)

CATCH BASINS 13, 14 & 15

****

>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<

Curb Inlet Capacities are approximated based on the Bureau of

Public Roads nomograph plots for flowby basins and sump basins.

BASIN INFLOW(CFS) = 5.10

BASIN OPENING(FEET) = 0.67

DEPTH OF WATER(FEET) = 0.50

>>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) = 4.67

==========

USE W=7' FOR CB'S 13, 14 & 15

CB#16

****

>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<

Curb Inlet Capacities are approximated based on the Bureau of

Public Roads nomograph plots for flowby basins and sump basins.

BASIN INFLOW(CFS) = 12.00

BASIN OPENING(FEET) = 0.67

DEPTH OF WATER(FEET) = 0.67

>>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) = 7.09

==========

USE CB = 10'

CB#17

****

>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<

Curb Inlet Capacities are approximated based on the Bureau of

Public Roads nomograph plots for flowby basins and sump basins.

BASIN INFLOW(CFS) = 21.20

BASIN OPENING(FEET) = 0.67

DEPTH OF WATER(FEET) = 0.67

>>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) = 12.52

==========

USE W=14'

CB#18

****

>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<

Curb Inlet Capacities are approximated based on the Bureau of

Public Roads nomograph plots for flowby basins and sump basins.

BASIN INFLOW(CFS) = 18.50

BASIN OPENING(FEET) = 0.67

DEPTH OF WATER(FEET) = 0.67

>>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) = 10.93

==========

USE W=14'