APPENDIX A

EXISTING CONDITION RATIONAL METHOD HYDROLOGY (ONSITE AND OFFSITE)

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 09/05/22 File:x100.out

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

English (in-lb) Units used in input data file

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100 W SINCLAIR ST
EXISTING CONDITION
100-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.300(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5000

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

Initial area flow distance = 495.000(Ft.)
Top (of initial area) elevation = 1463.700(Ft.)
Bottom (of initial area) elevation = 1459.900(Ft.)
Difference in elevation = 3.800(Ft.)
Slope = 0.00768 s(percent)= 0.77
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.504 min.
Rainfall intensity = 3.266(In/Hr) for a 100.0 year storm

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COMMERCIAL subarea type
Runoff Coefficient = 0.858
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.654(CFS)
Total initial stream area =        0.590(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       11.000 to Point/Station       11.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.858
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     9.50 min.
Rainfall intensity =      3.266(In/Hr) for a   100.0 year storm
Subarea runoff =      7.456(CFS) for      2.660(Ac.)
Total runoff =      9.110(CFS)      Total area =       3.250(Ac.)


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Process from Point/Station       11.000 to Point/Station       12.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =  1459.900(Ft.)
End of street segment elevation =  1459.100(Ft.)
Length of street segment  =   191.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(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 [2] side(s) of the street
Distance from curb to property line  =  10.000(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 =      9.531(CFS)
Depth of flow =   0.437(Ft.), Average velocity =   1.880(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  15.518(Ft.)
Flow velocity =   1.88(Ft/s)
Travel time =    1.69 min.     TC =   11.20  min.
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 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.856
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      3.009(In/Hr) for a   100.0 year storm
Subarea runoff =      0.773(CFS) for      0.300(Ac.)
Total runoff =      9.883(CFS)      Total area =       3.550(Ac.)
Street flow at end of street =      9.883(CFS)
Half street flow at end of street =      4.942(CFS)
Depth of flow =   0.442(Ft.), Average velocity =   1.897(Ft/s)
Flow width (from curb towards crown)=  15.745(Ft.)


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Process from Point/Station       12.000 to Point/Station       17.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =  1459.100(Ft.)
Downstream point elevation =  1455.200(Ft.)
Channel length thru subarea  =   637.000(Ft.)
Channel base width      =  100.000(Ft.)
Slope or 'Z' of left channel bank =   0.020
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =     11.743(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =     11.743(CFS)
Depth of flow =   0.081(Ft.), Average velocity =   1.449(Ft/s)
Channel flow top width =  100.083(Ft.)
Flow Velocity =    1.45(Ft/s)
Travel time  =    7.32 min.
Time of concentration =   18.52 min.

Sub-Channel No. 1 Critical depth =      0.075(Ft.)
  '     '       '     Critical flow top width =    100.077(Ft.)
  '     '       '     Critical flow velocity=    1.561(Ft/s)
  '     '       '     Critical flow area =      7.522(Sq.Ft)

 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.852
Decimal fraction soil group A = 0.976
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.024
RI index for soil(AMC 2)  =  33.03
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.340(In/Hr) for a   100.0 year storm
Subarea runoff =      3.627(CFS) for      1.820(Ac.)
Total runoff =     13.510(CFS)      Total area =       5.370(Ac.)
Depth of flow =   0.088(Ft.), Average velocity =   1.533(Ft/s)
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Sub-Channel No. 1 Critical depth =      0.083(Ft.)
  '     '       '     Critical flow top width =    100.085(Ft.)
  '     '       '     Critical flow velocity=    1.627(Ft/s)
  '     '       '     Critical flow area =      8.304(Sq.Ft)


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Process from Point/Station       12.000 to Point/Station       17.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.370(Ac.)
Runoff from this stream =     13.510(CFS)
Time of concentration =   18.52 min.
Rainfall intensity =     2.340(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   779.000(Ft.)
Top (of initial area) elevation =  1464.300(Ft.)
Bottom (of initial area) elevation =  1458.400(Ft.)
Difference in elevation =     5.900(Ft.)
Slope =    0.00757  s(percent)=       0.76
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.425 min.
Rainfall intensity =      2.979(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.856
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     10.457(CFS)
Total initial stream area =        4.100(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       14.000 to Point/Station       14.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.856
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
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Time of concentration =    11.43 min.
Rainfall intensity =      2.979(In/Hr) for a   100.0 year storm
Subarea runoff =      6.096(CFS) for      2.390(Ac.)
Total runoff =     16.553(CFS)      Total area =       6.490(Ac.)


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Process from Point/Station       14.000 to Point/Station       17.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------
Upstream point elevation =  1458.400(Ft.)
Downstream point elevation =  1455.200(Ft.)
Channel length thru subarea  =   402.000(Ft.)
Channel base width      =  100.000(Ft.)
Slope or 'Z' of left channel bank =   0.020
Slope or 'Z' of right channel bank =   0.020
Estimated mean flow rate at midpoint of channel =     18.429(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =     18.429(CFS)
Depth of flow =   0.098(Ft.), Average velocity =   1.878(Ft/s)
Channel flow top width =  100.004(Ft.)
Flow Velocity =    1.88(Ft/s)
Travel time  =    3.57 min.
Time of concentration =   14.99 min.

Sub-Channel No. 1 Critical depth =      0.102(Ft.)
  '     '       '     Critical flow top width =    100.004(Ft.)
  '     '       '     Critical flow velocity=    1.815(Ft/s)
  '     '       '     Critical flow area =     10.156(Sq.Ft)

 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.853
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.601(In/Hr) for a   100.0 year storm
Subarea runoff =      3.683(CFS) for      1.660(Ac.)
Total runoff =     20.235(CFS)      Total area =       8.150(Ac.)
Depth of flow =   0.104(Ft.), Average velocity =   1.949(Ft/s)

Sub-Channel No. 1 Critical depth =      0.108(Ft.)
  '     '       '     Critical flow top width =    100.004(Ft.)
  '     '       '     Critical flow velocity=    1.867(Ft/s)
  '     '       '     Critical flow area =     10.840(Sq.Ft)



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Process from Point/Station       14.000 to Point/Station       17.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
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In Main Stream number: 2
Stream flow area =      8.150(Ac.)
Runoff from this stream =     20.235(CFS)
Time of concentration =   14.99 min.
Rainfall intensity =     2.601(In/Hr)
Program is now starting with Main Stream No. 3


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Process from Point/Station       13.000 to Point/Station       16.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   392.000(Ft.)
Top (of initial area) elevation =  1464.300(Ft.)
Bottom (of initial area) elevation =  1460.200(Ft.)
Difference in elevation =     4.100(Ft.)
Slope =    0.01046  s(percent)=       1.05
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.138 min.
Rainfall intensity =      3.530(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.860
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      3.916(CFS)
Total initial stream area =        1.290(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       16.000 to Point/Station       17.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =  1460.200(Ft.)
End of street segment elevation =  1455.200(Ft.)
Length of street segment  =  1048.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  25.000(Ft.)
Distance from crown to crossfall grade break  =  24.990(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  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   0.010(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 =      8.914(CFS)
Depth of flow =   0.570(Ft.), Average velocity =   2.120(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    3.52(Ft.)
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Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  20.199(Ft.)
Flow velocity =   2.12(Ft/s)
Travel time =    8.24 min.     TC =   16.38  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.852
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.488(In/Hr) for a   100.0 year storm
Subarea runoff =      9.923(CFS) for      4.680(Ac.)
Total runoff =     13.838(CFS)      Total area =       5.970(Ac.)
Street flow at end of street =     13.838(CFS)
Half street flow at end of street =     13.838(CFS)
Depth of flow =   0.638(Ft.), Average velocity =   2.292(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    6.90(Ft.)
Flow width (from curb towards crown)=  23.580(Ft.)


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Process from Point/Station       16.000 to Point/Station       17.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      5.970(Ac.)
Runoff from this stream =     13.838(CFS)
Time of concentration =   16.38 min.
Rainfall intensity =     2.488(In/Hr)
Summary of stream data:

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


1       13.510     18.52               2.340
2       20.235     14.99               2.601
3       13.838     16.38               2.488
Largest stream flow has longer or shorter time of concentration
Qp =     20.235 + sum of
        Qa          Tb/Ta
        13.510 *    0.809 =     10.936
        Qa          Tb/Ta
        13.838 *    0.915 =     12.669
Qp =     43.840

Total of 3 main streams to confluence:
Flow rates before confluence point:
      13.510      20.235      13.838
Area of streams before confluence:
        5.370        8.150        5.970
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Results of confluence:
Total flow rate = 43.840(CFS)
Time of concentration = 14.993 min.
Effective stream area after confluence = 19.490(Ac.)
End of computations, total study area = 19.49 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 32.1

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 09/05/22 File:x10.out

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

English (in-lb) Units used in input data file

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100 W SINCLAIR ST
EXISTING CONDITION
10-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.300(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.829(In/Hr)
Slope of intensity duration curve = 0.5000

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

Initial area flow distance = 495.000(Ft.)
Top (of initial area) elevation = 1463.700(Ft.)
Bottom (of initial area) elevation = 1459.900(Ft.)
Difference in elevation = 3.800(Ft.)
Slope = 0.00768 s(percent)= 0.77
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.504 min.
Rainfall intensity = 2.083(In/Hr) for a 10.0 year storm

```
COMMERCIAL subarea type
Runoff Coefficient = 0.848
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.042(CFS)
Total initial stream area =        0.590(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       11.000 to Point/Station       11.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.848
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =     9.50 min.
Rainfall intensity =      2.083(In/Hr) for a    10.0 year storm
Subarea runoff =      4.700(CFS) for      2.660(Ac.)
Total runoff =      5.742(CFS)      Total area =       3.250(Ac.)


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Process from Point/Station       11.000 to Point/Station       12.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =  1459.900(Ft.)
End of street segment elevation =  1459.100(Ft.)
Length of street segment  =   191.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(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 [2] side(s) of the street
Distance from curb to property line  =  10.000(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 =      6.007(CFS)
Depth of flow =   0.384(Ft.), Average velocity =   1.683(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  12.876(Ft.)
Flow velocity =   1.68(Ft/s)
Travel time =    1.89 min.     TC =   11.40  min.
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 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.846
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.902(In/Hr) for a    10.0 year storm
Subarea runoff =      0.483(CFS) for      0.300(Ac.)
Total runoff =      6.225(CFS)      Total area =       3.550(Ac.)
Street flow at end of street =      6.225(CFS)
Half street flow at end of street =      3.113(CFS)
Depth of flow =   0.388(Ft.), Average velocity =   1.697(Ft/s)
Flow width (from curb towards crown)=  13.066(Ft.)


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Process from Point/Station       12.000 to Point/Station       17.000
**** IMPROVED CHANNEL TRAVEL TIME ****
------------------------------------------------------------------------
Upstream point elevation =  1459.100(Ft.)
Downstream point elevation =  1455.200(Ft.)
Channel length thru subarea  =   637.000(Ft.)
Channel base width      =  100.000(Ft.)
Slope or 'Z' of left channel bank =   0.020
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      7.351(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =      7.351(CFS)
Depth of flow =   0.061(Ft.), Average velocity =   1.202(Ft/s)
Channel flow top width =  100.062(Ft.)
Flow Velocity =    1.20(Ft/s)
Travel time  =    8.83 min.
Time of concentration =   20.23 min.

Sub-Channel No. 1 Critical depth =      0.055(Ft.)
  '     '       '     Critical flow top width =    100.056(Ft.)
  '     '       '     Critical flow velocity=    1.332(Ft/s)
  '     '       '     Critical flow area =      5.519(Sq.Ft)

 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.841
Decimal fraction soil group A = 0.976
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.024
RI index for soil(AMC 2)  =  33.03
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.428(In/Hr) for a    10.0 year storm
Subarea runoff =      2.186(CFS) for      1.820(Ac.)
Total runoff =      8.411(CFS)      Total area =       5.370(Ac.)
Depth of flow =   0.066(Ft.), Average velocity =   1.269(Ft/s)
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Sub-Channel No. 1 Critical depth =      0.061(Ft.)
  '     '       '     Critical flow top width =    100.062(Ft.)
  '     '       '     Critical flow velocity=    1.389(Ft/s)
  '     '       '     Critical flow area =      6.057(Sq.Ft)


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Process from Point/Station       12.000 to Point/Station       17.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      5.370(Ac.)
Runoff from this stream =      8.411(CFS)
Time of concentration =   20.23 min.
Rainfall intensity =     1.428(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station       13.000 to Point/Station       14.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   779.000(Ft.)
Top (of initial area) elevation =  1464.300(Ft.)
Bottom (of initial area) elevation =  1458.400(Ft.)
Difference in elevation =     5.900(Ft.)
Slope =    0.00757  s(percent)=       0.76
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.425 min.
Rainfall intensity =      1.900(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.846
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      6.591(CFS)
Total initial stream area =        4.100(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       14.000 to Point/Station       14.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.846
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
```

```
Time of concentration =    11.43 min.
Rainfall intensity =      1.900(In/Hr) for a    10.0 year storm
Subarea runoff =      3.842(CFS) for      2.390(Ac.)
Total runoff =     10.434(CFS)      Total area =       6.490(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       17.000
**** IMPROVED CHANNEL TRAVEL TIME ****
----------------------------------------------------------------------
Upstream point elevation =  1458.400(Ft.)
Downstream point elevation =  1455.200(Ft.)
Channel length thru subarea  =   402.000(Ft.)
Channel base width      =  100.000(Ft.)
Slope or 'Z' of left channel bank =   0.020
Slope or 'Z' of right channel bank =   0.020
Estimated mean flow rate at midpoint of channel =     11.592(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =     11.592(CFS)
Depth of flow =   0.074(Ft.), Average velocity =   1.560(Ft/s)
Channel flow top width =  100.003(Ft.)
Flow Velocity =    1.56(Ft/s)
Travel time  =    4.29 min.
Time of concentration =   15.72 min.

Sub-Channel No. 1 Critical depth =      0.075(Ft.)
  '     '       '     Critical flow top width =    100.003(Ft.)
  '     '       '     Critical flow velocity=    1.542(Ft/s)
  '     '       '     Critical flow area =      7.520(Sq.Ft)

 Adding area flow to channel
COMMERCIAL subarea type
Runoff Coefficient = 0.843
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.620(In/Hr) for a    10.0 year storm
Subarea runoff =      2.266(CFS) for      1.660(Ac.)
Total runoff =     12.700(CFS)      Total area =       8.150(Ac.)
Depth of flow =   0.078(Ft.), Average velocity =   1.618(Ft/s)

Sub-Channel No. 1 Critical depth =      0.079(Ft.)
  '     '       '     Critical flow top width =    100.003(Ft.)
  '     '       '     Critical flow velocity=    1.606(Ft/s)
  '     '       '     Critical flow area =      7.910(Sq.Ft)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       17.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
```

```
In Main Stream number: 2
Stream flow area =      8.150(Ac.)
Runoff from this stream =     12.700(CFS)
Time of concentration =   15.72 min.
Rainfall intensity =     1.620(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       16.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   392.000(Ft.)
Top (of initial area) elevation =  1464.300(Ft.)
Bottom (of initial area) elevation =  1460.200(Ft.)
Difference in elevation =     4.100(Ft.)
Slope =    0.01046  s(percent)=       1.05
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.138 min.
Rainfall intensity =      2.251(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.850
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.468(CFS)
Total initial stream area =        1.290(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =  1460.200(Ft.)
End of street segment elevation =  1455.200(Ft.)
Length of street segment  =  1048.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  25.000(Ft.)
Distance from crown to crossfall grade break  =  24.990(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  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   0.010(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 =      5.602(CFS)
Depth of flow =   0.500(Ft.), Average velocity =   2.019(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.655(Ft.)
```

```
Flow velocity =   2.02(Ft/s)
Travel time =    8.65 min.     TC =   16.79  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.842
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      1.567(In/Hr) for a    10.0 year storm
Subarea runoff =      6.177(CFS) for      4.680(Ac.)
Total runoff =      8.645(CFS)      Total area =       5.970(Ac.)
Street flow at end of street =      8.645(CFS)
Half street flow at end of street =      8.645(CFS)
Depth of flow =   0.566(Ft.), Average velocity =   2.110(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    3.29(Ft.)
Flow width (from curb towards crown)=  19.969(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       17.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      5.970(Ac.)
Runoff from this stream =      8.645(CFS)
Time of concentration =   16.79 min.
Rainfall intensity =     1.567(In/Hr)
Summary of stream data:

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


1        8.411     20.23               1.428
2       12.700     15.72               1.620
3        8.645     16.79               1.567
Largest stream flow has longer or shorter time of concentration
Qp =     12.700 + sum of
        Qa          Tb/Ta
         8.411 *    0.777 =      6.536
        Qa          Tb/Ta
         8.645 *    0.936 =      8.093
Qp =     27.329

Total of 3 main streams to confluence:
Flow rates before confluence point:
       8.411      12.700       8.645
Area of streams before confluence:
        5.370        8.150        5.970


Results of confluence:
```

Total flow rate = 27.329(CFS)
Time of concentration = 15.719 min.
Effective stream area after confluence = 19.490(Ac.)
End of computations, total study area = 19.49 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 32.1

APPENDIX B

PROPOSED CONDITION RATIONAL METHOD HYDROLOGY (ONSITE AND OFFSITE)

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 09/12/22 File:1.out

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

English (in-lb) Units used in input data file

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100 W SINCLAIR ST
PROPOSED CONDITION
100-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.300(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.300(In/Hr)
Slope of intensity duration curve = 0.5000

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

Initial area flow distance = 654.000(Ft.)
Top (of initial area) elevation = 1465.400(Ft.)
Bottom (of initial area) elevation = 1461.500(Ft.)
Difference in elevation = 3.900(Ft.)
Slope = 0.00596 s(percent)= 0.60
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.175 min.
Rainfall intensity = 3.012(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type

```
Runoff Coefficient = 0.856
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      8.900(CFS)
Total initial stream area =        3.450(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       11.000 to Point/Station       12.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1457.500(Ft.)
Downstream point/station elevation =  1456.400(Ft.)
Pipe length  =   209.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.900(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     8.900(CFS)
Normal flow depth in pipe =   13.88(In.)
Flow top width inside pipe =   19.89(In.)
Critical Depth =   13.31(In.)
Pipe flow velocity =      5.28(Ft/s)
Travel time through pipe =    0.66 min.
Time of concentration (TC) =    11.84 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       12.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.856
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.84 min.
Rainfall intensity =      2.927(In/Hr) for a   100.0 year storm
Subarea runoff =      4.083(CFS) for      1.630(Ac.)
Total runoff =     12.982(CFS)      Total area =       5.080(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       13.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1456.400(Ft.)
Downstream point/station elevation =  1455.400(Ft.)
Pipe length  =   208.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.982(CFS)
Nearest computed pipe diameter  =     24.00(In.)
```

```
Calculated individual pipe flow  =    12.982(CFS)
Normal flow depth in pipe =   16.66(In.)
Flow top width inside pipe =   22.11(In.)
Critical Depth =   15.54(In.)
Pipe flow velocity =      5.58(Ft/s)
Travel time through pipe =    0.62 min.
Time of concentration (TC) =    12.46 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       13.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.855
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    12.46 min.
Rainfall intensity =      2.853(In/Hr) for a   100.0 year storm
Subarea runoff =      5.221(CFS) for      2.140(Ac.)
Total runoff =     18.204(CFS)      Total area =       7.220(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1455.400(Ft.)
Downstream point/station elevation =  1453.500(Ft.)
Pipe length  =   342.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.204(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    18.204(CFS)
Normal flow depth in pipe =   18.07(In.)
Flow top width inside pipe =   25.41(In.)
Critical Depth =   17.91(In.)
Pipe flow velocity =      6.43(Ft/s)
Travel time through pipe =    0.89 min.
Time of concentration (TC) =    13.34 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      7.220(Ac.)
Runoff from this stream =     18.204(CFS)
Time of concentration =   13.34 min.
Rainfall intensity =     2.757(In/Hr)
Program is now starting with Main Stream No. 2
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.100 to Point/Station       13.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   268.000(Ft.)
Top (of initial area) elevation =  1462.000(Ft.)
Bottom (of initial area) elevation =  1460.700(Ft.)
Difference in elevation =     1.300(Ft.)
Slope =    0.00485  s(percent)=       0.49
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.151 min.
Rainfall intensity =      3.527(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.860
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.699(CFS)
Total initial stream area =        0.890(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.200 to Point/Station       14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1457.200(Ft.)
Downstream point/station elevation =  1453.500(Ft.)
Pipe length  =    19.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.699(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.699(CFS)
Normal flow depth in pipe =    3.79(In.)
Flow top width inside pipe =    8.89(In.)
Critical Depth =    8.47(In.)
Pipe flow velocity =     15.28(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     8.17 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.200 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      0.890(Ac.)
Runoff from this stream =      2.699(CFS)
Time of concentration =    8.17 min.
Rainfall intensity =     3.523(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
```

```
 No.       (CFS)       (min)                 (In/Hr)


1       18.204     13.34               2.757
2        2.699      8.17               3.523
Largest stream flow has longer time of concentration
Qp =     18.204 + sum of
        Qb         Ia/Ib
         2.699 *    0.783 =      2.112
Qp =     20.316

Total of 2 main streams to confluence:
Flow rates before confluence point:
      18.204       2.699
Area of streams before confluence:
        7.220        0.890


Results of confluence:
Total flow rate =     20.316(CFS)
Time of concentration =    13.343 min.
Effective stream area after confluence  =      8.110(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1453.500(Ft.)
Downstream point/station elevation =  1452.000(Ft.)
Pipe length  =   325.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    20.316(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    20.316(CFS)
Normal flow depth in pipe =   21.33(In.)
Flow top width inside pipe =   22.00(In.)
Critical Depth =   18.92(In.)
Pipe flow velocity =      6.03(Ft/s)
Travel time through pipe =    0.90 min.
Time of concentration (TC) =    14.24 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      8.110(Ac.)
Runoff from this stream =     20.316(CFS)
Time of concentration =   14.24 min.
Rainfall intensity =     2.668(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.100 to Point/Station       14.200
```

**** INITIAL AREA EVALUATION ****

Initial area flow distance = 207.000(Ft.)
Top (of initial area) elevation = 1462.600(Ft.)
Bottom (of initial area) elevation = 1460.600(Ft.)
Difference in elevation = 2.000(Ft.)
Slope = 0.00966 s(percent)= 0.97
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.405 min.
Rainfall intensity = 3.979(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.866
Decimal fraction soil group A = 0.910
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.090
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 35.33
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 1.757(CFS)
Total initial stream area = 0.510(Ac.)
Pervious area fraction = 0.100

++
Process from Point/Station 14.200 to Point/Station 15.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1452.100(Ft.)
Downstream point/station elevation = 1452.000(Ft.)
Pipe length = 19.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.757(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 1.757(CFS)
Normal flow depth in pipe = 7.25(In.)
Flow top width inside pipe = 11.74(In.)
Critical Depth = 6.76(In.)
Pipe flow velocity = 3.54(Ft/s)
Travel time through pipe = 0.09 min.
Time of concentration (TC) = 6.49 min.

++
Process from Point/Station 14.200 to Point/Station 15.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area = 0.510(Ac.)
Runoff from this stream = 1.757(CFS)
Time of concentration = 6.49 min.
Rainfall intensity = 3.951(In/Hr)
Summary of stream data:

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

```
1       20.316     14.24               2.668
2        1.757      6.49               3.951
Largest stream flow has longer time of concentration
Qp =     20.316 + sum of
        Qb         Ia/Ib
         1.757 *    0.675 =      1.186
Qp =     21.503

Total of 2 main streams to confluence:
Flow rates before confluence point:
      20.316       1.757
Area of streams before confluence:
        8.110        0.510


Results of confluence:
Total flow rate =     21.503(CFS)
Time of concentration =    14.241 min.
Effective stream area after confluence  =      8.620(Ac.)


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Process from Point/Station       15.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1452.000(Ft.)
Downstream point/station elevation =  1450.400(Ft.)
Pipe length  =   325.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    21.503(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    21.503(CFS)
Normal flow depth in pipe =   21.89(In.)
Flow top width inside pipe =   21.15(In.)
Critical Depth =   19.47(In.)
Pipe flow velocity =      6.23(Ft/s)
Travel time through pipe =    0.87 min.
Time of concentration (TC) =    15.11 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       16.000
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.853
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.11 min.
Rainfall intensity =      2.590(In/Hr) for a   100.0 year storm
Subarea runoff =      4.419(CFS) for      2.000(Ac.)
Total runoff =     25.922(CFS)      Total area =      10.620(Ac.)
```

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Process from Point/Station       16.000 to Point/Station       17.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1450.400(Ft.)
Downstream point/station elevation =  1450.000(Ft.)
Pipe length  =    92.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    25.922(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    25.922(CFS)
Normal flow depth in pipe =   23.53(In.)
Flow top width inside pipe =   24.68(In.)
Critical Depth =   20.84(In.)
Pipe flow velocity =      6.27(Ft/s)
Travel time through pipe =    0.24 min.
Time of concentration (TC) =    15.35 min.


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Process from Point/Station       16.000 to Point/Station       17.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     10.620(Ac.)
Runoff from this stream =     25.922(CFS)
Time of concentration =   15.35 min.
Rainfall intensity =     2.570(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       16.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   307.000(Ft.)
Top (of initial area) elevation =  1464.700(Ft.)
Bottom (of initial area) elevation =  1458.500(Ft.)
Difference in elevation =     6.200(Ft.)
Slope =    0.02020  s(percent)=       2.02
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.966 min.
Rainfall intensity =      3.815(In/Hr) for a   100.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.823
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =      1.162(CFS)
Total initial stream area =        0.370(Ac.)
Pervious area fraction = 0.200


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Process from Point/Station       16.200 to Point/Station       17.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1450.500(Ft.)
Downstream point/station elevation =  1450.000(Ft.)
Pipe length  =   105.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.162(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.162(CFS)
Normal flow depth in pipe =    5.81(In.)
Flow top width inside pipe =   11.99(In.)
Critical Depth =    5.45(In.)
Pipe flow velocity =      3.09(Ft/s)
Travel time through pipe =    0.57 min.
Time of concentration (TC) =     7.53 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.200 to Point/Station       17.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      0.370(Ac.)
Runoff from this stream =      1.162(CFS)
Time of concentration =    7.53 min.
Rainfall intensity =     3.669(In/Hr)
Summary of stream data:

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


1       25.922     15.35               2.570
2        1.162      7.53               3.669
Largest stream flow has longer time of concentration
Qp =     25.922 + sum of
        Qb         Ia/Ib
         1.162 *    0.700 =      0.814
Qp =     26.736

Total of 2 main streams to confluence:
Flow rates before confluence point:
      25.922       1.162
Area of streams before confluence:
       10.620        0.370


Results of confluence:
Total flow rate =     26.736(CFS)
Time of concentration =    15.355 min.
Effective stream area after confluence  =     10.990(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station       18.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =  1450.000(Ft.)
Downstream point/station elevation =  1448.900(Ft.)
Pipe length  =   227.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    26.736(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    26.736(CFS)
Normal flow depth in pipe =   23.02(In.)
Flow top width inside pipe =   25.36(In.)
Critical Depth =   21.16(In.)
Pipe flow velocity =      6.61(Ft/s)
Travel time through pipe =    0.57 min.
Time of concentration (TC) =    15.93 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       18.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.852
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.93 min.
Rainfall intensity =      2.523(In/Hr) for a   100.0 year storm
Subarea runoff =      6.151(CFS) for      2.860(Ac.)
Total runoff =     32.887(CFS)      Total area =      13.850(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       18.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     13.850(Ac.)
Runoff from this stream =     32.887(CFS)
Time of concentration =   15.93 min.
Rainfall intensity =     2.523(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       17.100
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   834.000(Ft.)
Top (of initial area) elevation =  1465.400(Ft.)
Bottom (of initial area) elevation =  1457.800(Ft.)
Difference in elevation =     7.600(Ft.)
Slope =    0.00911  s(percent)=       0.91
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.315 min.
```

```
Rainfall intensity =      2.994(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.856
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     14.636(CFS)
Total initial stream area =        5.710(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.100 to Point/Station       18.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1457.800(Ft.)
Downstream point/station elevation =  1448.900(Ft.)
Pipe length  =    25.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    14.636(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =    14.636(CFS)
Normal flow depth in pipe =    7.31(In.)
Flow top width inside pipe =   11.71(In.)
Critical depth could not be calculated.
Pipe flow velocity =     29.18(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =    11.33 min.


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Process from Point/Station       18.000 to Point/Station       18.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.710(Ac.)
Runoff from this stream =     14.636(CFS)
Time of concentration =   11.33 min.
Rainfall intensity =     2.992(In/Hr)
Summary of stream data:

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


1       32.887     15.93               2.523
2       14.636     11.33               2.992
Largest stream flow has longer time of concentration
Qp =     32.887 + sum of
        Qb         Ia/Ib
        14.636 *    0.843 =     12.344
Qp =     45.231

Total of 2 main streams to confluence:
```

```
Flow rates before confluence point:
      32.887      14.636
Area of streams before confluence:
       13.850        5.710


Results of confluence:
Total flow rate =     45.231(CFS)
Time of concentration =    15.927 min.
Effective stream area after confluence  =     19.560(Ac.)
End of computations, total study area =           19.56 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.102
Area averaged RI index number =  32.1
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 09/12/22 File:10.out

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

English (in-lb) Units used in input data file

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100 W SINCLAIR ST
PROPOSED CONDITION
10-YEAR STORM ANALYSIS

Program License Serial Number 6405

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.300(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.829(In/Hr)
Slope of intensity duration curve = 0.5000

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

Initial area flow distance = 654.000(Ft.)
Top (of initial area) elevation = 1465.400(Ft.)
Bottom (of initial area) elevation = 1461.500(Ft.)
Difference in elevation = 3.900(Ft.)
Slope = 0.00596 s(percent)= 0.60
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.175 min.
Rainfall intensity = 1.921(In/Hr) for a 10.0 year storm

```
COMMERCIAL subarea type
Runoff Coefficient = 0.846
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      5.610(CFS)
Total initial stream area =        3.450(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       12.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1457.500(Ft.)
Downstream point/station elevation =  1456.400(Ft.)
Pipe length  =   209.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.610(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     5.610(CFS)
Normal flow depth in pipe =   11.48(In.)
Flow top width inside pipe =   17.30(In.)
Critical Depth =   10.95(In.)
Pipe flow velocity =      4.72(Ft/s)
Travel time through pipe =    0.74 min.
Time of concentration (TC) =    11.91 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       12.000 to Point/Station       12.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.846
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.91 min.
Rainfall intensity =      1.861(In/Hr) for a    10.0 year storm
Subarea runoff =      2.565(CFS) for      1.630(Ac.)
Total runoff =      8.175(CFS)      Total area =       5.080(Ac.)


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Process from Point/Station       12.000 to Point/Station       13.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1456.400(Ft.)
Downstream point/station elevation =  1455.400(Ft.)
Pipe length  =   208.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.175(CFS)
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Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     8.175(CFS)
Normal flow depth in pipe =   13.50(In.)
Flow top width inside pipe =   20.12(In.)
Critical Depth =   12.73(In.)
Pipe flow velocity =      5.01(Ft/s)
Travel time through pipe =    0.69 min.
Time of concentration (TC) =    12.61 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       13.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.845
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    12.61 min.
Rainfall intensity =      1.809(In/Hr) for a    10.0 year storm
Subarea runoff =      3.271(CFS) for      2.140(Ac.)
Total runoff =     11.446(CFS)      Total area =       7.220(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1455.400(Ft.)
Downstream point/station elevation =  1453.500(Ft.)
Pipe length  =   342.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.446(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    11.446(CFS)
Normal flow depth in pipe =   16.64(In.)
Flow top width inside pipe =   17.03(In.)
Critical Depth =   15.14(In.)
Pipe flow velocity =      5.59(Ft/s)
Travel time through pipe =    1.02 min.
Time of concentration (TC) =    13.63 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      7.220(Ac.)
Runoff from this stream =     11.446(CFS)
Time of concentration =   13.63 min.
Rainfall intensity =     1.740(In/Hr)
Program is now starting with Main Stream No. 2
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.100 to Point/Station       13.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   268.000(Ft.)
Top (of initial area) elevation =  1462.000(Ft.)
Bottom (of initial area) elevation =  1460.700(Ft.)
Difference in elevation =     1.300(Ft.)
Slope =    0.00485  s(percent)=       0.49
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.151 min.
Rainfall intensity =      2.250(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.850
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.701(CFS)
Total initial stream area =        0.890(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.200 to Point/Station       14.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1457.200(Ft.)
Downstream point/station elevation =  1453.500(Ft.)
Pipe length  =    19.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.701(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     1.701(CFS)
Normal flow depth in pipe =    3.65(In.)
Flow top width inside pipe =    5.86(In.)
Critical depth could not be calculated.
Pipe flow velocity =     13.59(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     8.17 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.200 to Point/Station       14.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      0.890(Ac.)
Runoff from this stream =      1.701(CFS)
Time of concentration =    8.17 min.
Rainfall intensity =     2.246(In/Hr)
Summary of stream data:
```

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


1       11.446     13.63               1.740
2        1.701      8.17               2.246
Largest stream flow has longer time of concentration
Qp =     11.446 + sum of
        Qb         Ia/Ib
         1.701 *    0.775 =      1.318
Qp =     12.764

Total of 2 main streams to confluence:
Flow rates before confluence point:
      11.446       1.701
Area of streams before confluence:
        7.220        0.890


Results of confluence:
Total flow rate =     12.764(CFS)
Time of concentration =    13.625 min.
Effective stream area after confluence  =      8.110(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1453.500(Ft.)
Downstream point/station elevation =  1452.000(Ft.)
Pipe length  =   325.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.764(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    12.764(CFS)
Normal flow depth in pipe =   16.69(In.)
Flow top width inside pipe =   22.09(In.)
Critical Depth =   15.43(In.)
Pipe flow velocity =      5.47(Ft/s)
Travel time through pipe =    0.99 min.
Time of concentration (TC) =    14.62 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station       15.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      8.110(Ac.)
Runoff from this stream =     12.764(CFS)
Time of concentration =   14.62 min.
Rainfall intensity =     1.680(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station       14.100 to Point/Station       14.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   207.000(Ft.)
Top (of initial area) elevation =  1462.600(Ft.)
Bottom (of initial area) elevation =  1460.600(Ft.)
Difference in elevation =     2.000(Ft.)
Slope =    0.00966  s(percent)=       0.97
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.405 min.
Rainfall intensity =      2.538(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.856
Decimal fraction soil group A = 0.910
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.090
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  35.33
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.108(CFS)
Total initial stream area =        0.510(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.200 to Point/Station       15.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1452.100(Ft.)
Downstream point/station elevation =  1452.000(Ft.)
Pipe length  =    19.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.108(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.108(CFS)
Normal flow depth in pipe =    6.82(In.)
Flow top width inside pipe =    7.71(In.)
Critical Depth =    5.80(In.)
Pipe flow velocity =      3.08(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =     6.51 min.


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Process from Point/Station       14.200 to Point/Station       15.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      0.510(Ac.)
Runoff from this stream =      1.108(CFS)
Time of concentration =    6.51 min.
Rainfall intensity =     2.518(In/Hr)
Summary of stream data:

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

```
1       12.764     14.62               1.680
2        1.108      6.51               2.518
Largest stream flow has longer time of concentration
Qp =     12.764 + sum of
        Qb         Ia/Ib
         1.108 *    0.667 =      0.739
Qp =     13.503

Total of 2 main streams to confluence:
Flow rates before confluence point:
      12.764       1.108
Area of streams before confluence:
        8.110        0.510


Results of confluence:
Total flow rate =     13.503(CFS)
Time of concentration =    14.616 min.
Effective stream area after confluence  =      8.620(Ac.)


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Process from Point/Station       15.000 to Point/Station       16.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1452.000(Ft.)
Downstream point/station elevation =  1450.400(Ft.)
Pipe length  =   325.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.503(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    13.503(CFS)
Normal flow depth in pipe =   17.02(In.)
Flow top width inside pipe =   21.80(In.)
Critical Depth =   15.88(In.)
Pipe flow velocity =      5.67(Ft/s)
Travel time through pipe =    0.95 min.
Time of concentration (TC) =    15.57 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       16.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.843
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.57 min.
Rainfall intensity =      1.628(In/Hr) for a    10.0 year storm
Subarea runoff =      2.744(CFS) for      2.000(Ac.)
Total runoff =     16.246(CFS)      Total area =      10.620(Ac.)
```

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Process from Point/Station       16.000 to Point/Station       17.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1450.400(Ft.)
Downstream point/station elevation =  1450.000(Ft.)
Pipe length  =    92.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.246(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    16.246(CFS)
Normal flow depth in pipe =   18.19(In.)
Flow top width inside pipe =   25.32(In.)
Critical Depth =   16.88(In.)
Pipe flow velocity =      5.70(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =    15.84 min.


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Process from Point/Station       16.000 to Point/Station       17.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     10.620(Ac.)
Runoff from this stream =     16.246(CFS)
Time of concentration =   15.84 min.
Rainfall intensity =     1.614(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station       16.100 to Point/Station       16.200
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   307.000(Ft.)
Top (of initial area) elevation =  1464.700(Ft.)
Bottom (of initial area) elevation =  1458.500(Ft.)
Difference in elevation =     6.200(Ft.)
Slope =    0.02020  s(percent)=       2.02
TC = k(0.323)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.966 min.
Rainfall intensity =      2.433(In/Hr) for a    10.0 year storm
APARTMENT subarea type
Runoff Coefficient = 0.803
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.200; Impervious fraction =  0.800
Initial subarea runoff =      0.723(CFS)
Total initial stream area =        0.370(Ac.)
Pervious area fraction = 0.200
```

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Process from Point/Station       16.200 to Point/Station       17.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1450.500(Ft.)
Downstream point/station elevation =  1450.000(Ft.)
Pipe length  =   105.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.723(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     0.723(CFS)
Normal flow depth in pipe =    5.20(In.)
Flow top width inside pipe =    8.89(In.)
Critical Depth =    4.65(In.)
Pipe flow velocity =      2.74(Ft/s)
Travel time through pipe =    0.64 min.
Time of concentration (TC) =     7.61 min.


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Process from Point/Station       16.200 to Point/Station       17.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      0.370(Ac.)
Runoff from this stream =      0.723(CFS)
Time of concentration =    7.61 min.
Rainfall intensity =     2.329(In/Hr)
Summary of stream data:

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


1       16.246     15.84               1.614
2        0.723      7.61               2.329
Largest stream flow has longer time of concentration
Qp =     16.246 + sum of
        Qb         Ia/Ib
         0.723 *    0.693 =      0.501
Qp =     16.747

Total of 2 main streams to confluence:
Flow rates before confluence point:
      16.246       0.723
Area of streams before confluence:
       10.620        0.370


Results of confluence:
Total flow rate =     16.747(CFS)
Time of concentration =    15.840 min.
Effective stream area after confluence  =     10.990(Ac.)


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Process from Point/Station       17.000 to Point/Station       18.000
```

```
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1450.000(Ft.)
Downstream point/station elevation =  1448.900(Ft.)
Pipe length  =   227.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.747(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    16.747(CFS)
Normal flow depth in pipe =   17.88(In.)
Flow top width inside pipe =   25.54(In.)
Critical Depth =   17.15(In.)
Pipe flow velocity =      5.99(Ft/s)
Travel time through pipe =    0.63 min.
Time of concentration (TC) =    16.47 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       18.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.842
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    16.47 min.
Rainfall intensity =      1.582(In/Hr) for a    10.0 year storm
Subarea runoff =      3.812(CFS) for      2.860(Ac.)
Total runoff =     20.559(CFS)      Total area =      13.850(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       18.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     13.850(Ac.)
Runoff from this stream =     20.559(CFS)
Time of concentration =   16.47 min.
Rainfall intensity =     1.582(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       17.100
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   834.000(Ft.)
Top (of initial area) elevation =  1465.400(Ft.)
Bottom (of initial area) elevation =  1457.800(Ft.)
Difference in elevation =     7.600(Ft.)
Slope =    0.00911  s(percent)=       0.91
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   11.315 min.
Rainfall intensity =      1.909(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.846
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  32.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      9.226(CFS)
Total initial stream area =        5.710(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.100 to Point/Station       18.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1457.800(Ft.)
Downstream point/station elevation =  1448.900(Ft.)
Pipe length  =    25.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.226(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     9.226(CFS)
Normal flow depth in pipe =    6.90(In.)
Flow top width inside pipe =    7.61(In.)
Critical depth could not be calculated.
Pipe flow velocity =     25.39(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    11.33 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station       18.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      5.710(Ac.)
Runoff from this stream =      9.226(CFS)
Time of concentration =   11.33 min.
Rainfall intensity =     1.908(In/Hr)
Summary of stream data:

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


1       20.559     16.47               1.582
2        9.226     11.33               1.908
Largest stream flow has longer time of concentration
Qp =     20.559 + sum of
        Qb         Ia/Ib
         9.226 *    0.829 =      7.652
Qp =     28.211
```

```
Total of 2 main streams to confluence:
Flow rates before confluence point:
      20.559       9.226
Area of streams before confluence:
       13.850        5.710


Results of confluence:
Total flow rate =     28.211(CFS)
Time of concentration =    16.471 min.
Effective stream area after confluence  =     19.560(Ac.)
End of computations, total study area =           19.56 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.102
Area averaged RI index number =  32.1
```

APPENDIX C

Hydraulic Calculations

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

Study date 09/09/22 File: 21100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

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100 W SINCLAIR ST
ONSITE PROPOSED CONDITION
100-YEAR, 1-HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 19.56(Ac.) = 0.031 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 19.56(Ac.) = 0.031 Sq. Mi.
Length along longest watercourse = 2845.00(Ft.)
Length along longest watercourse measured to centroid = 1734.00(Ft.)
Length along longest watercourse = 0.539 Mi.
Length along longest watercourse measured to centroid = 0.328 Mi.
Difference in elevation = 16.50(Ft.)
Slope along watercourse = 30.6221 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.097 Hr.
Lag time = 5.84 Min.
25% of lag time = 1.46 Min.
40% of lag time = 2.34 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
19.56	0.47	9.19

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
19.56	1.23	24.06

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.470(In)
Area Averaged 100-Year Rainfall = 1.230(In)

Point rain (area averaged) = 1.230(In)
Areal adjustment factor = 99.98 %
Adjusted average point rain = 1.230(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
19.560	32.10	0.898

Total Area Entered = 19.56(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
32.1	32.1	0.741	0.898	0.142	1.000	0.142
					Sum (F) =	0.142

Area averaged mean soil loss (F) (In/Hr) = 0.142
Minimum soil loss rate ((In/Hr)) = 0.071
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.182

Slope of intensity-duration curve for a 1 hour storm =0.5000

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	85.640	14.902	2.938
2	0.167	171.279	46.109	9.089
3	0.250	256.919	18.421	3.631
4	0.333	342.559	7.891	1.555
5	0.417	428.198	4.672	0.921
6	0.500	513.838	2.920	0.576
7	0.583	599.478	2.073	0.409
8	0.667	685.117	1.374	0.271
9	0.750	770.757	0.916	0.181
10	0.833	856.396	0.721	0.142
		Sum = 100.000	Sum=	19.713

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.620	(0.142)	0.113	0.507
2	0.17	4.30	0.635	(0.142)	0.115	0.519
3	0.25	5.00	0.738	(0.142)	0.134	0.604
4	0.33	5.00	0.738	(0.142)	0.134	0.604
5	0.42	5.80	0.856	0.142	(0.155)	0.714
6	0.50	6.50	0.959	0.142	(0.174)	0.817
7	0.58	7.40	1.092	0.142	(0.198)	0.950
8	0.67	8.60	1.269	0.142	(0.230)	1.127
9	0.75	12.30	1.815	0.142	(0.330)	1.673
10	0.83	29.10	4.294	0.142	(0.780)	4.152
11	0.92	6.80	1.004	0.142	(0.182)	0.861
12	1.00	5.00	0.738	(0.142)	0.134	0.604

(Loss Rate Not Used)

Sum = 100.0 Sum = 13.1

Flood volume = Effective rainfall 1.09(In)
times area 19.6(Ac.)/[(In)/(Ft.)] = 1.8(Ac.Ft)
Total soil loss = 0.14(In)
Total soil loss = 0.221(Ac.Ft)
Total rainfall = 1.23(In)
Flood volume = 77704.3 Cubic Feet
Total soil loss = 9613.7 Cubic Feet

Peak flow rate of this hydrograph = 50.110(CFS)

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1 - 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	15.0	30.0	45.0	60.0
0+ 5	0.0103	1.49	Q				
0+10	0.0526	6.14	|V Q				
0+15	0.1100	8.34	| V Q				
0+20	0.1785	9.94	| V Q				
0+25	0.2546	11.06	| V Q				
0+30	0.3428	12.80	| VQ				
0+35	0.4448	14.82	| Q				
0+40	0.5639	17.28	| QV				
0+45	0.7111	21.37	| QV				
0+50	0.9503	34.73	| |V Q				
0+55	1.2954	50.11	| | V| Q				
1+ 0	1.4993	29.61	| | Q| V				
1+ 5	1.6239	18.10	| Q | V				
1+10	1.6879	9.29	| Q | V				
1+15	1.7251	5.40	| Q | V				
1+20	1.7495	3.54	| Q | V				
1+25	1.7653	2.29	|Q | V				
1+30	1.7754	1.47	Q | V				
1+35	1.7817	0.91	Q | V				
1+40	1.7833	0.23	Q | V				
1+45	1.7838	0.09	Q | V				

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

Study date 09/09/22 File: 23100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

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100 W SINCLAIR ST
ONSITE PROPOSED CONDITION
100-YEAR, 3-HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 19.56(Ac.) = 0.031 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 19.56(Ac.) = 0.031 Sq. Mi.
Length along longest watercourse = 2845.00(Ft.)
Length along longest watercourse measured to centroid = 1734.00(Ft.)
Length along longest watercourse = 0.539 Mi.
Length along longest watercourse measured to centroid = 0.328 Mi.
Difference in elevation = 16.50(Ft.)
Slope along watercourse = 30.6221 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.097 Hr.
Lag time = 5.84 Min.
25% of lag time = 1.46 Min.
40% of lag time = 2.34 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
19.56	0.80	15.65

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
19.56	1.88	36.77

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.800(In)
Area Averaged 100-Year Rainfall = 1.880(In)

Point rain (area averaged) = 1.880(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.880(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
19.560	32.10	0.898

Total Area Entered = 19.56(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
32.1	32.1	0.741	0.898	0.142	1.000	0.142
					Sum (F) =	0.142

Area averaged mean soil loss (F) (In/Hr) = 0.142
Minimum soil loss rate ((In/Hr)) = 0.071
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.182

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	85.640	14.902	2.938
2	0.167	171.279	46.109	9.089
3	0.250	256.919	18.421	3.631
4	0.333	342.559	7.891	1.555
5	0.417	428.198	4.672	0.921
6	0.500	513.838	2.920	0.576
7	0.583	599.478	2.073	0.409
8	0.667	685.117	1.374	0.271
9	0.750	770.757	0.916	0.181
10	0.833	856.396	0.721	0.142
			Sum = 100.000	Sum= 19.713

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)	Effective

	(Hr.)	Percent	(In/Hr)	Max		Low	(In/Hr)
1	0.08	1.30	0.293	(0.142)		0.053	0.240
2	0.17	1.30	0.293	(0.142)		0.053	0.240
3	0.25	1.10	0.248	(0.142)		0.045	0.203
4	0.33	1.50	0.338	(0.142)		0.061	0.277
5	0.42	1.50	0.338	(0.142)		0.061	0.277
6	0.50	1.80	0.406	(0.142)		0.074	0.332
7	0.58	1.50	0.338	(0.142)		0.061	0.277
8	0.67	1.80	0.406	(0.142)		0.074	0.332
9	0.75	1.80	0.406	(0.142)		0.074	0.332
10	0.83	1.50	0.338	(0.142)		0.061	0.277
11	0.92	1.60	0.361	(0.142)		0.066	0.295
12	1.00	1.80	0.406	(0.142)		0.074	0.332
13	1.08	2.20	0.496	(0.142)		0.090	0.406
14	1.17	2.20	0.496	(0.142)		0.090	0.406
15	1.25	2.20	0.496	(0.142)		0.090	0.406
16	1.33	2.00	0.451	(0.142)		0.082	0.369
17	1.42	2.60	0.587	(0.142)		0.107	0.480
18	1.50	2.70	0.609	(0.142)		0.111	0.498
19	1.58	2.40	0.541	(0.142)		0.098	0.443
20	1.67	2.70	0.609	(0.142)		0.111	0.498
21	1.75	3.30	0.744	(0.142)		0.135	0.609
22	1.83	3.10	0.699	(0.142)		0.127	0.572
23	1.92	2.90	0.654	(0.142)		0.119	0.535
24	2.00	3.00	0.677	(0.142)		0.123	0.554
25	2.08	3.10	0.699	(0.142)		0.127	0.572
26	2.17	4.20	0.947	0.142	(	0.172)	0.805
27	2.25	5.00	1.128	0.142	(	0.205)	0.986
28	2.33	3.50	0.790	0.142	(	0.143)	0.647
29	2.42	6.80	1.534	0.142	(	0.279)	1.392
30	2.50	7.30	1.647	0.142	(	0.299)	1.505
31	2.58	8.20	1.850	0.142	(	0.336)	1.708
32	2.67	5.90	1.331	0.142	(	0.242)	1.189
33	2.75	2.00	0.451	(0.142)		0.082	0.369
34	2.83	1.80	0.406	(0.142)		0.074	0.332
35	2.92	1.80	0.406	(0.142)		0.074	0.332
36	3.00	0.60	0.135	(0.142)		0.025	0.111

(Loss Rate Not Used)

Sum = 100.0 Sum = 19.1

Flood volume = Effective rainfall 1.60(In)
times area 19.6(Ac.)/[(In)/(Ft.)] = 2.6(Ac.Ft)
Total soil loss = 0.28(In)
Total soil loss = 0.464(Ac.Ft)
Total rainfall = 1.88(In)
Flood volume = 113261.4 Cubic Feet
Total soil loss = 20212.5 Cubic Feet

Peak flow rate of this hydrograph = 28.481(CFS)

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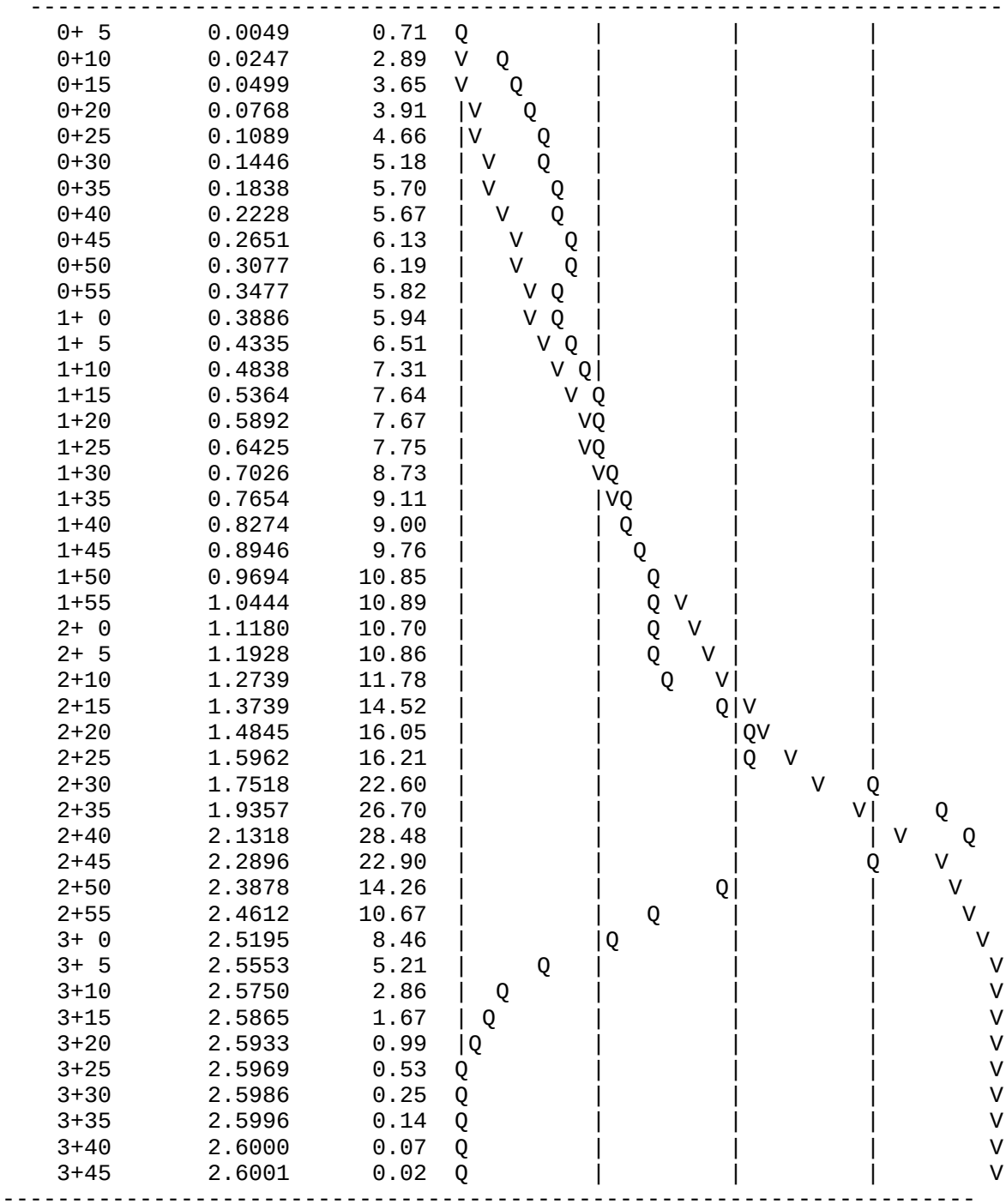
3 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m) Volume Ac.Ft Q(CFS) 0 7.5 15.0 22.5 30.0



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

Study date 09/09/22 File: 26100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

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100 W SINCLAIR ST
ONSITE PROPOSED CONDITION
100-YEAR, 6-HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 19.56(Ac.) = 0.031 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 19.56(Ac.) = 0.031 Sq. Mi.
Length along longest watercourse = 2845.00(Ft.)
Length along longest watercourse measured to centroid = 1734.00(Ft.)
Length along longest watercourse = 0.539 Mi.
Length along longest watercourse measured to centroid = 0.328 Mi.
Difference in elevation = 16.50(Ft.)
Slope along watercourse = 30.6221 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.097 Hr.
Lag time = 5.84 Min.
25% of lag time = 1.46 Min.
40% of lag time = 2.34 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
19.56	1.03	20.15

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
19.56	2.50	48.90

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.030(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
19.560	32.10	0.898

Total Area Entered = 19.56(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
32.1	32.1	0.741	0.898	0.142	1.000	0.142
					Sum (F) =	0.142

Area averaged mean soil loss (F) (In/Hr) = 0.142
Minimum soil loss rate ((In/Hr)) = 0.071
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.182

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	85.640	14.902	2.938
2	0.167	171.279	46.109	9.089
3	0.250	256.919	18.421	3.631
4	0.333	342.559	7.891	1.555
5	0.417	428.198	4.672	0.921
6	0.500	513.838	2.920	0.576
7	0.583	599.478	2.073	0.409
8	0.667	685.117	1.374	0.271
9	0.750	770.757	0.916	0.181
10	0.833	856.396	0.721	0.142
			Sum = 100.000	Sum= 19.713

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)	Effective

	(Hr.)	Percent	(In/Hr)	Max	Low	(In/Hr)
1	0.08	0.50	0.150	(0.142)	0.027	0.123
2	0.17	0.60	0.180	(0.142)	0.033	0.147
3	0.25	0.60	0.180	(0.142)	0.033	0.147
4	0.33	0.60	0.180	(0.142)	0.033	0.147
5	0.42	0.60	0.180	(0.142)	0.033	0.147
6	0.50	0.70	0.210	(0.142)	0.038	0.172
7	0.58	0.70	0.210	(0.142)	0.038	0.172
8	0.67	0.70	0.210	(0.142)	0.038	0.172
9	0.75	0.70	0.210	(0.142)	0.038	0.172
10	0.83	0.70	0.210	(0.142)	0.038	0.172
11	0.92	0.70	0.210	(0.142)	0.038	0.172
12	1.00	0.80	0.240	(0.142)	0.044	0.196
13	1.08	0.80	0.240	(0.142)	0.044	0.196
14	1.17	0.80	0.240	(0.142)	0.044	0.196
15	1.25	0.80	0.240	(0.142)	0.044	0.196
16	1.33	0.80	0.240	(0.142)	0.044	0.196
17	1.42	0.80	0.240	(0.142)	0.044	0.196
18	1.50	0.80	0.240	(0.142)	0.044	0.196
19	1.58	0.80	0.240	(0.142)	0.044	0.196
20	1.67	0.80	0.240	(0.142)	0.044	0.196
21	1.75	0.80	0.240	(0.142)	0.044	0.196
22	1.83	0.80	0.240	(0.142)	0.044	0.196
23	1.92	0.80	0.240	(0.142)	0.044	0.196
24	2.00	0.90	0.270	(0.142)	0.049	0.221
25	2.08	0.80	0.240	(0.142)	0.044	0.196
26	2.17	0.90	0.270	(0.142)	0.049	0.221
27	2.25	0.90	0.270	(0.142)	0.049	0.221
28	2.33	0.90	0.270	(0.142)	0.049	0.221
29	2.42	0.90	0.270	(0.142)	0.049	0.221
30	2.50	0.90	0.270	(0.142)	0.049	0.221
31	2.58	0.90	0.270	(0.142)	0.049	0.221
32	2.67	0.90	0.270	(0.142)	0.049	0.221
33	2.75	1.00	0.300	(0.142)	0.054	0.246
34	2.83	1.00	0.300	(0.142)	0.054	0.246
35	2.92	1.00	0.300	(0.142)	0.054	0.246
36	3.00	1.00	0.300	(0.142)	0.054	0.246
37	3.08	1.00	0.300	(0.142)	0.054	0.246
38	3.17	1.10	0.330	(0.142)	0.060	0.270
39	3.25	1.10	0.330	(0.142)	0.060	0.270
40	3.33	1.10	0.330	(0.142)	0.060	0.270
41	3.42	1.20	0.360	(0.142)	0.065	0.295
42	3.50	1.30	0.390	(0.142)	0.071	0.319
43	3.58	1.40	0.420	(0.142)	0.076	0.344
44	3.67	1.40	0.420	(0.142)	0.076	0.344
45	3.75	1.50	0.450	(0.142)	0.082	0.368
46	3.83	1.50	0.450	(0.142)	0.082	0.368
47	3.92	1.60	0.480	(0.142)	0.087	0.393
48	4.00	1.60	0.480	(0.142)	0.087	0.393
49	4.08	1.70	0.510	(0.142)	0.093	0.417
50	4.17	1.80	0.540	(0.142)	0.098	0.442
51	4.25	1.90	0.570	(0.142)	0.104	0.466
52	4.33	2.00	0.600	(0.142)	0.109	0.491
53	4.42	2.10	0.630	(0.142)	0.114	0.516
54	4.50	2.10	0.630	(0.142)	0.114	0.516
55	4.58	2.20	0.660	(0.142)	0.120	0.540
56	4.67	2.30	0.690	(0.142)	0.125	0.565

57	4.75	2.40	0.720	(0.142)	0.131	0.589
58	4.83	2.40	0.720	(0.142)	0.131	0.589
59	4.92	2.50	0.750	(0.142)	0.136	0.614
60	5.00	2.60	0.780	(0.142)	0.142	0.638
61	5.08	3.10	0.930	0.142	(0.169)	0.788
62	5.17	3.60	1.080	0.142	(0.196)	0.938
63	5.25	3.90	1.170	0.142	(0.212)	1.028
64	5.33	4.20	1.260	0.142	(0.229)	1.118
65	5.42	4.70	1.410	0.142	(0.256)	1.268
66	5.50	5.60	1.680	0.142	(0.305)	1.538
67	5.58	1.90	0.570	(0.142)	0.104	0.466
68	5.67	0.90	0.270	(0.142)	0.049	0.221
69	5.75	0.60	0.180	(0.142)	0.033	0.147
70	5.83	0.50	0.150	(0.142)	0.027	0.123
71	5.92	0.30	0.090	(0.142)	0.016	0.074
72	6.00	0.20	0.060	(0.142)	0.011	0.049

(Loss Rate Not Used)

Sum = 100.0 Sum = 25.1

Flood volume = Effective rainfall 2.09(In)
times area 19.6(Ac.)/[(In)/(Ft.)] = 3.4(Ac.Ft)
Total soil loss = 0.41(In)
Total soil loss = 0.670(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 148306.2 Cubic Feet
Total soil loss = 29188.9 Cubic Feet

Peak flow rate of this hydrograph = 23.878(CFS)

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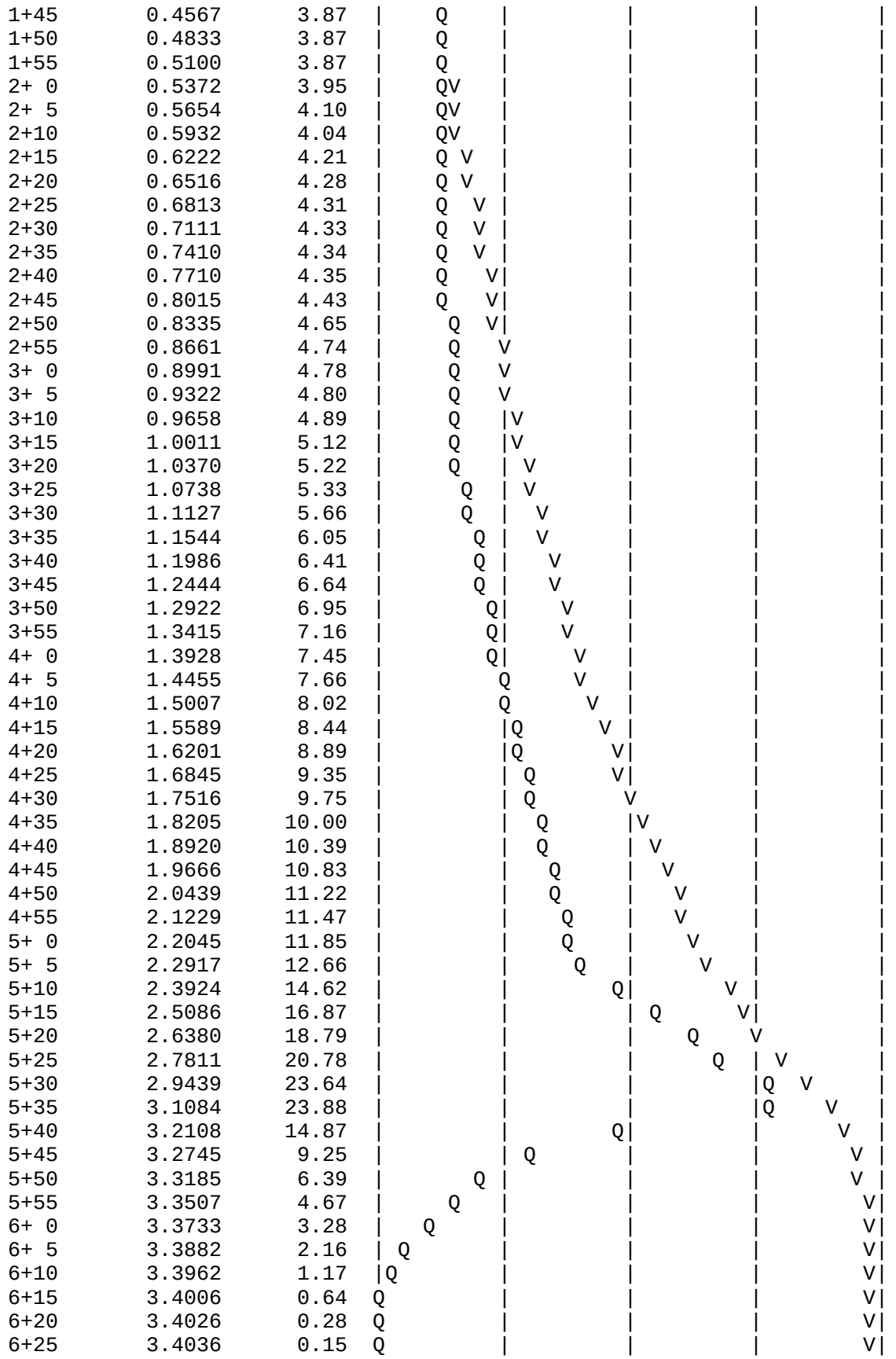
6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0025	0.36	Q				
0+10	0.0132	1.55	V Q				
0+15	0.0284	2.22	V Q				
0+20	0.0456	2.50	V Q				
0+25	0.0639	2.65	V Q				
0+30	0.0833	2.82	V Q				
0+35	0.1047	3.10	|V Q				
0+40	0.1269	3.24	|V Q				
0+45	0.1497	3.30	|V Q				
0+50	0.1727	3.35	| V Q				
0+55	0.1959	3.36	| V Q				
1+ 0	0.2197	3.45	| V Q				
1+ 5	0.2450	3.68	| V Q				
1+10	0.2709	3.77	| V Q				
1+15	0.2972	3.81	| V Q				
1+20	0.3236	3.83	| V Q				
1+25	0.3501	3.85	| VQ				
1+30	0.3767	3.86	| VQ				
1+35	0.4033	3.87	| VQ				
1+40	0.4300	3.87	| Q				



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    6+30       3.4042      0.08  Q          |          |          |        V|
    6+35       3.4045      0.04  Q          |          |          |        V|
    6+40       3.4046      0.02  Q          |          |          |        V|
    6+45       3.4046      0.01  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

Study date 09/09/22 File: 224100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6405

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100 W SINCLAIR ST
ONSITE PROPOSED CONDITION
100-YEAR, 24-HOUR STORM EVENT ANALYSIS

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

Drainage Area = 19.56(Ac.) = 0.031 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 19.56(Ac.) = 0.031 Sq. Mi.
Length along longest watercourse = 2845.00(Ft.)
Length along longest watercourse measured to centroid = 1734.00(Ft.)
Length along longest watercourse = 0.539 Mi.
Length along longest watercourse measured to centroid = 0.328 Mi.
Difference in elevation = 16.50(Ft.)
Slope along watercourse = 30.6221 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.097 Hr.
Lag time = 5.84 Min.
25% of lag time = 1.46 Min.
40% of lag time = 2.34 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
19.56	1.70	33.25

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
19.56	4.38	85.67

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 4.380(In)

Point rain (area averaged) = 4.380(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.380(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
19.560	32.10	0.898

Total Area Entered = 19.56(Ac.)

RI AMC2	RI AMC-2	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
32.1	32.1	0.741	0.898	0.142	1.000	0.142
					Sum (F) =	0.142

Area averaged mean soil loss (F) (In/Hr) = 0.142
Minimum soil loss rate ((In/Hr)) = 0.071
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.182

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	85.640	14.902	2.938
2	0.167	171.279	46.109	9.089
3	0.250	256.919	18.421	3.631
4	0.333	342.559	7.891	1.555
5	0.417	428.198	4.672	0.921
6	0.500	513.838	2.920	0.576
7	0.583	599.478	2.073	0.409
8	0.667	685.117	1.374	0.271
9	0.750	770.757	0.916	0.181
10	0.833	856.396	0.721	0.142
			Sum = 100.000	Sum= 19.713

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)	Effective

	(Hr.)	Percent	(In/Hr)	Max		Low	(In/Hr)
1	0.08	0.07	0.035	(	0.252)	0.006	0.029
2	0.17	0.07	0.035	(	0.251)	0.006	0.029
3	0.25	0.07	0.035	(	0.250)	0.006	0.029
4	0.33	0.10	0.053	(	0.249)	0.010	0.043
5	0.42	0.10	0.053	(	0.248)	0.010	0.043
6	0.50	0.10	0.053	(	0.247)	0.010	0.043
7	0.58	0.10	0.053	(	0.246)	0.010	0.043
8	0.67	0.10	0.053	(	0.245)	0.010	0.043
9	0.75	0.10	0.053	(	0.244)	0.010	0.043
10	0.83	0.13	0.070	(	0.243)	0.013	0.057
11	0.92	0.13	0.070	(	0.242)	0.013	0.057
12	1.00	0.13	0.070	(	0.241)	0.013	0.057
13	1.08	0.10	0.053	(	0.240)	0.010	0.043
14	1.17	0.10	0.053	(	0.239)	0.010	0.043
15	1.25	0.10	0.053	(	0.239)	0.010	0.043
16	1.33	0.10	0.053	(	0.238)	0.010	0.043
17	1.42	0.10	0.053	(	0.237)	0.010	0.043
18	1.50	0.10	0.053	(	0.236)	0.010	0.043
19	1.58	0.10	0.053	(	0.235)	0.010	0.043
20	1.67	0.10	0.053	(	0.234)	0.010	0.043
21	1.75	0.10	0.053	(	0.233)	0.010	0.043
22	1.83	0.13	0.070	(	0.232)	0.013	0.057
23	1.92	0.13	0.070	(	0.231)	0.013	0.057
24	2.00	0.13	0.070	(	0.230)	0.013	0.057
25	2.08	0.13	0.070	(	0.229)	0.013	0.057
26	2.17	0.13	0.070	(	0.228)	0.013	0.057
27	2.25	0.13	0.070	(	0.227)	0.013	0.057
28	2.33	0.13	0.070	(	0.226)	0.013	0.057
29	2.42	0.13	0.070	(	0.225)	0.013	0.057
30	2.50	0.13	0.070	(	0.224)	0.013	0.057
31	2.58	0.17	0.088	(	0.224)	0.016	0.072
32	2.67	0.17	0.088	(	0.223)	0.016	0.072
33	2.75	0.17	0.088	(	0.222)	0.016	0.072
34	2.83	0.17	0.088	(	0.221)	0.016	0.072
35	2.92	0.17	0.088	(	0.220)	0.016	0.072
36	3.00	0.17	0.088	(	0.219)	0.016	0.072
37	3.08	0.17	0.088	(	0.218)	0.016	0.072
38	3.17	0.17	0.088	(	0.217)	0.016	0.072
39	3.25	0.17	0.088	(	0.216)	0.016	0.072
40	3.33	0.17	0.088	(	0.215)	0.016	0.072
41	3.42	0.17	0.088	(	0.214)	0.016	0.072
42	3.50	0.17	0.088	(	0.214)	0.016	0.072
43	3.58	0.17	0.088	(	0.213)	0.016	0.072
44	3.67	0.17	0.088	(	0.212)	0.016	0.072
45	3.75	0.17	0.088	(	0.211)	0.016	0.072
46	3.83	0.20	0.105	(	0.210)	0.019	0.086
47	3.92	0.20	0.105	(	0.209)	0.019	0.086
48	4.00	0.20	0.105	(	0.208)	0.019	0.086
49	4.08	0.20	0.105	(	0.207)	0.019	0.086
50	4.17	0.20	0.105	(	0.206)	0.019	0.086
51	4.25	0.20	0.105	(	0.206)	0.019	0.086
52	4.33	0.23	0.123	(	0.205)	0.022	0.100
53	4.42	0.23	0.123	(	0.204)	0.022	0.100
54	4.50	0.23	0.123	(	0.203)	0.022	0.100
55	4.58	0.23	0.123	(	0.202)	0.022	0.100
56	4.67	0.23	0.123	(	0.201)	0.022	0.100

57	4.75	0.23	0.123	(0.200)	0.022	0.100
58	4.83	0.27	0.140	(0.200)	0.025	0.115
59	4.92	0.27	0.140	(0.199)	0.025	0.115
60	5.00	0.27	0.140	(0.198)	0.025	0.115
61	5.08	0.20	0.105	(0.197)	0.019	0.086
62	5.17	0.20	0.105	(0.196)	0.019	0.086
63	5.25	0.20	0.105	(0.195)	0.019	0.086
64	5.33	0.23	0.123	(0.194)	0.022	0.100
65	5.42	0.23	0.123	(0.194)	0.022	0.100
66	5.50	0.23	0.123	(0.193)	0.022	0.100
67	5.58	0.27	0.140	(0.192)	0.025	0.115
68	5.67	0.27	0.140	(0.191)	0.025	0.115
69	5.75	0.27	0.140	(0.190)	0.025	0.115
70	5.83	0.27	0.140	(0.189)	0.025	0.115
71	5.92	0.27	0.140	(0.188)	0.025	0.115
72	6.00	0.27	0.140	(0.188)	0.025	0.115
73	6.08	0.30	0.158	(0.187)	0.029	0.129
74	6.17	0.30	0.158	(0.186)	0.029	0.129
75	6.25	0.30	0.158	(0.185)	0.029	0.129
76	6.33	0.30	0.158	(0.184)	0.029	0.129
77	6.42	0.30	0.158	(0.183)	0.029	0.129
78	6.50	0.30	0.158	(0.183)	0.029	0.129
79	6.58	0.33	0.175	(0.182)	0.032	0.143
80	6.67	0.33	0.175	(0.181)	0.032	0.143
81	6.75	0.33	0.175	(0.180)	0.032	0.143
82	6.83	0.33	0.175	(0.179)	0.032	0.143
83	6.92	0.33	0.175	(0.179)	0.032	0.143
84	7.00	0.33	0.175	(0.178)	0.032	0.143
85	7.08	0.33	0.175	(0.177)	0.032	0.143
86	7.17	0.33	0.175	(0.176)	0.032	0.143
87	7.25	0.33	0.175	(0.175)	0.032	0.143
88	7.33	0.37	0.193	(0.175)	0.035	0.158
89	7.42	0.37	0.193	(0.174)	0.035	0.158
90	7.50	0.37	0.193	(0.173)	0.035	0.158
91	7.58	0.40	0.210	(0.172)	0.038	0.172
92	7.67	0.40	0.210	(0.171)	0.038	0.172
93	7.75	0.40	0.210	(0.171)	0.038	0.172
94	7.83	0.43	0.228	(0.170)	0.041	0.186
95	7.92	0.43	0.228	(0.169)	0.041	0.186
96	8.00	0.43	0.228	(0.168)	0.041	0.186
97	8.08	0.50	0.263	(0.167)	0.048	0.215
98	8.17	0.50	0.263	(0.167)	0.048	0.215
99	8.25	0.50	0.263	(0.166)	0.048	0.215
100	8.33	0.50	0.263	(0.165)	0.048	0.215
101	8.42	0.50	0.263	(0.164)	0.048	0.215
102	8.50	0.50	0.263	(0.164)	0.048	0.215
103	8.58	0.53	0.280	(0.163)	0.051	0.229
104	8.67	0.53	0.280	(0.162)	0.051	0.229
105	8.75	0.53	0.280	(0.161)	0.051	0.229
106	8.83	0.57	0.298	(0.161)	0.054	0.244
107	8.92	0.57	0.298	(0.160)	0.054	0.244
108	9.00	0.57	0.298	(0.159)	0.054	0.244
109	9.08	0.63	0.333	(0.158)	0.060	0.272
110	9.17	0.63	0.333	(0.157)	0.060	0.272
111	9.25	0.63	0.333	(0.157)	0.060	0.272
112	9.33	0.67	0.350	(0.156)	0.064	0.287
113	9.42	0.67	0.350	(0.155)	0.064	0.287

114	9.50	0.67	0.350	(0.155)	0.064	0.287
115	9.58	0.70	0.368	(0.154)	0.067	0.301
116	9.67	0.70	0.368	(0.153)	0.067	0.301
117	9.75	0.70	0.368	(0.152)	0.067	0.301
118	9.83	0.73	0.385	(0.152)	0.070	0.315
119	9.92	0.73	0.385	(0.151)	0.070	0.315
120	10.00	0.73	0.385	(0.150)	0.070	0.315
121	10.08	0.50	0.263	(0.149)	0.048	0.215
122	10.17	0.50	0.263	(0.149)	0.048	0.215
123	10.25	0.50	0.263	(0.148)	0.048	0.215
124	10.33	0.50	0.263	(0.147)	0.048	0.215
125	10.42	0.50	0.263	(0.146)	0.048	0.215
126	10.50	0.50	0.263	(0.146)	0.048	0.215
127	10.58	0.67	0.350	(0.145)	0.064	0.287
128	10.67	0.67	0.350	(0.144)	0.064	0.287
129	10.75	0.67	0.350	(0.144)	0.064	0.287
130	10.83	0.67	0.350	(0.143)	0.064	0.287
131	10.92	0.67	0.350	(0.142)	0.064	0.287
132	11.00	0.67	0.350	(0.142)	0.064	0.287
133	11.08	0.63	0.333	(0.141)	0.060	0.272
134	11.17	0.63	0.333	(0.140)	0.060	0.272
135	11.25	0.63	0.333	(0.139)	0.060	0.272
136	11.33	0.63	0.333	(0.139)	0.060	0.272
137	11.42	0.63	0.333	(0.138)	0.060	0.272
138	11.50	0.63	0.333	(0.137)	0.060	0.272
139	11.58	0.57	0.298	(0.137)	0.054	0.244
140	11.67	0.57	0.298	(0.136)	0.054	0.244
141	11.75	0.57	0.298	(0.135)	0.054	0.244
142	11.83	0.60	0.315	(0.135)	0.057	0.258
143	11.92	0.60	0.315	(0.134)	0.057	0.258
144	12.00	0.60	0.315	(0.133)	0.057	0.258
145	12.08	0.83	0.438	(0.133)	0.080	0.358
146	12.17	0.83	0.438	(0.132)	0.080	0.358
147	12.25	0.83	0.438	(0.131)	0.080	0.358
148	12.33	0.87	0.456	(0.131)	0.083	0.373
149	12.42	0.87	0.456	(0.130)	0.083	0.373
150	12.50	0.87	0.456	(0.129)	0.083	0.373
151	12.58	0.93	0.491	(0.129)	0.089	0.401
152	12.67	0.93	0.491	(0.128)	0.089	0.401
153	12.75	0.93	0.491	(0.127)	0.089	0.401
154	12.83	0.97	0.508	(0.127)	0.092	0.416
155	12.92	0.97	0.508	(0.126)	0.092	0.416
156	13.00	0.97	0.508	(0.126)	0.092	0.416
157	13.08	1.13	0.596	(0.125)	0.108	0.487
158	13.17	1.13	0.596	(0.124)	0.108	0.487
159	13.25	1.13	0.596	(0.124)	0.108	0.487
160	13.33	1.13	0.596	(0.123)	0.108	0.487
161	13.42	1.13	0.596	(0.122)	0.108	0.487
162	13.50	1.13	0.596	(0.122)	0.108	0.487
163	13.58	0.77	0.403	(0.121)	0.073	0.330
164	13.67	0.77	0.403	(0.121)	0.073	0.330
165	13.75	0.77	0.403	(0.120)	0.073	0.330
166	13.83	0.77	0.403	(0.119)	0.073	0.330
167	13.92	0.77	0.403	(0.119)	0.073	0.330
168	14.00	0.77	0.403	(0.118)	0.073	0.330
169	14.08	0.90	0.473	(0.117)	0.086	0.387
170	14.17	0.90	0.473	(0.117)	0.086	0.387

171	14.25	0.90	0.473	(0.116)	0.086	0.387
172	14.33	0.87	0.456	(0.116)	0.083	0.373
173	14.42	0.87	0.456	(0.115)	0.083	0.373
174	14.50	0.87	0.456	(0.114)	0.083	0.373
175	14.58	0.87	0.456	(0.114)	0.083	0.373
176	14.67	0.87	0.456	(0.113)	0.083	0.373
177	14.75	0.87	0.456	(0.113)	0.083	0.373
178	14.83	0.83	0.438	(0.112)	0.080	0.358
179	14.92	0.83	0.438	(0.112)	0.080	0.358
180	15.00	0.83	0.438	(0.111)	0.080	0.358
181	15.08	0.80	0.420	(0.110)	0.076	0.344
182	15.17	0.80	0.420	(0.110)	0.076	0.344
183	15.25	0.80	0.420	(0.109)	0.076	0.344
184	15.33	0.77	0.403	(0.109)	0.073	0.330
185	15.42	0.77	0.403	(0.108)	0.073	0.330
186	15.50	0.77	0.403	(0.108)	0.073	0.330
187	15.58	0.63	0.333	(0.107)	0.060	0.272
188	15.67	0.63	0.333	(0.107)	0.060	0.272
189	15.75	0.63	0.333	(0.106)	0.060	0.272
190	15.83	0.63	0.333	(0.105)	0.060	0.272
191	15.92	0.63	0.333	(0.105)	0.060	0.272
192	16.00	0.63	0.333	(0.104)	0.060	0.272
193	16.08	0.13	0.070	(0.104)	0.013	0.057
194	16.17	0.13	0.070	(0.103)	0.013	0.057
195	16.25	0.13	0.070	(0.103)	0.013	0.057
196	16.33	0.13	0.070	(0.102)	0.013	0.057
197	16.42	0.13	0.070	(0.102)	0.013	0.057
198	16.50	0.13	0.070	(0.101)	0.013	0.057
199	16.58	0.10	0.053	(0.101)	0.010	0.043
200	16.67	0.10	0.053	(0.100)	0.010	0.043
201	16.75	0.10	0.053	(0.100)	0.010	0.043
202	16.83	0.10	0.053	(0.099)	0.010	0.043
203	16.92	0.10	0.053	(0.099)	0.010	0.043
204	17.00	0.10	0.053	(0.098)	0.010	0.043
205	17.08	0.17	0.088	(0.098)	0.016	0.072
206	17.17	0.17	0.088	(0.097)	0.016	0.072
207	17.25	0.17	0.088	(0.097)	0.016	0.072
208	17.33	0.17	0.088	(0.096)	0.016	0.072
209	17.42	0.17	0.088	(0.096)	0.016	0.072
210	17.50	0.17	0.088	(0.095)	0.016	0.072
211	17.58	0.17	0.088	(0.095)	0.016	0.072
212	17.67	0.17	0.088	(0.094)	0.016	0.072
213	17.75	0.17	0.088	(0.094)	0.016	0.072
214	17.83	0.13	0.070	(0.093)	0.013	0.057
215	17.92	0.13	0.070	(0.093)	0.013	0.057
216	18.00	0.13	0.070	(0.092)	0.013	0.057
217	18.08	0.13	0.070	(0.092)	0.013	0.057
218	18.17	0.13	0.070	(0.092)	0.013	0.057
219	18.25	0.13	0.070	(0.091)	0.013	0.057
220	18.33	0.13	0.070	(0.091)	0.013	0.057
221	18.42	0.13	0.070	(0.090)	0.013	0.057
222	18.50	0.13	0.070	(0.090)	0.013	0.057
223	18.58	0.10	0.053	(0.089)	0.010	0.043
224	18.67	0.10	0.053	(0.089)	0.010	0.043
225	18.75	0.10	0.053	(0.088)	0.010	0.043
226	18.83	0.07	0.035	(0.088)	0.006	0.029
227	18.92	0.07	0.035	(0.088)	0.006	0.029

228	19.00	0.07	0.035	(0.087)	0.006	0.029
229	19.08	0.10	0.053	(0.087)	0.010	0.043
230	19.17	0.10	0.053	(0.086)	0.010	0.043
231	19.25	0.10	0.053	(0.086)	0.010	0.043
232	19.33	0.13	0.070	(0.086)	0.013	0.057
233	19.42	0.13	0.070	(0.085)	0.013	0.057
234	19.50	0.13	0.070	(0.085)	0.013	0.057
235	19.58	0.10	0.053	(0.084)	0.010	0.043
236	19.67	0.10	0.053	(0.084)	0.010	0.043
237	19.75	0.10	0.053	(0.084)	0.010	0.043
238	19.83	0.07	0.035	(0.083)	0.006	0.029
239	19.92	0.07	0.035	(0.083)	0.006	0.029
240	20.00	0.07	0.035	(0.083)	0.006	0.029
241	20.08	0.10	0.053	(0.082)	0.010	0.043
242	20.17	0.10	0.053	(0.082)	0.010	0.043
243	20.25	0.10	0.053	(0.081)	0.010	0.043
244	20.33	0.10	0.053	(0.081)	0.010	0.043
245	20.42	0.10	0.053	(0.081)	0.010	0.043
246	20.50	0.10	0.053	(0.080)	0.010	0.043
247	20.58	0.10	0.053	(0.080)	0.010	0.043
248	20.67	0.10	0.053	(0.080)	0.010	0.043
249	20.75	0.10	0.053	(0.079)	0.010	0.043
250	20.83	0.07	0.035	(0.079)	0.006	0.029
251	20.92	0.07	0.035	(0.079)	0.006	0.029
252	21.00	0.07	0.035	(0.078)	0.006	0.029
253	21.08	0.10	0.053	(0.078)	0.010	0.043
254	21.17	0.10	0.053	(0.078)	0.010	0.043
255	21.25	0.10	0.053	(0.078)	0.010	0.043
256	21.33	0.07	0.035	(0.077)	0.006	0.029
257	21.42	0.07	0.035	(0.077)	0.006	0.029
258	21.50	0.07	0.035	(0.077)	0.006	0.029
259	21.58	0.10	0.053	(0.076)	0.010	0.043
260	21.67	0.10	0.053	(0.076)	0.010	0.043
261	21.75	0.10	0.053	(0.076)	0.010	0.043
262	21.83	0.07	0.035	(0.076)	0.006	0.029
263	21.92	0.07	0.035	(0.075)	0.006	0.029
264	22.00	0.07	0.035	(0.075)	0.006	0.029
265	22.08	0.10	0.053	(0.075)	0.010	0.043
266	22.17	0.10	0.053	(0.075)	0.010	0.043
267	22.25	0.10	0.053	(0.074)	0.010	0.043
268	22.33	0.07	0.035	(0.074)	0.006	0.029
269	22.42	0.07	0.035	(0.074)	0.006	0.029
270	22.50	0.07	0.035	(0.074)	0.006	0.029
271	22.58	0.07	0.035	(0.073)	0.006	0.029
272	22.67	0.07	0.035	(0.073)	0.006	0.029
273	22.75	0.07	0.035	(0.073)	0.006	0.029
274	22.83	0.07	0.035	(0.073)	0.006	0.029
275	22.92	0.07	0.035	(0.073)	0.006	0.029
276	23.00	0.07	0.035	(0.072)	0.006	0.029
277	23.08	0.07	0.035	(0.072)	0.006	0.029
278	23.17	0.07	0.035	(0.072)	0.006	0.029
279	23.25	0.07	0.035	(0.072)	0.006	0.029
280	23.33	0.07	0.035	(0.072)	0.006	0.029
281	23.42	0.07	0.035	(0.072)	0.006	0.029
282	23.50	0.07	0.035	(0.072)	0.006	0.029
283	23.58	0.07	0.035	(0.071)	0.006	0.029
284	23.67	0.07	0.035	(0.071)	0.006	0.029

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285  23.75     0.07      0.035       (  0.071)       0.006        0.029
286  23.83     0.07      0.035       (  0.071)       0.006        0.029
287  23.92     0.07      0.035       (  0.071)       0.006        0.029
288  24.00     0.07      0.035       (  0.071)       0.006        0.029
            (Loss Rate Not Used)
    Sum =     100.0                                    Sum =    43.0
     Flood volume = Effective rainfall      3.58(In)
      times area      19.6(Ac.)/[(In)/(Ft.)] =       5.8(Ac.Ft)
     Total soil loss =      0.80(In)
     Total soil loss =     1.296(Ac.Ft)
     Total rainfall =      4.38(In)
     Flood volume =      254506.3 Cubic Feet
     Total soil loss =       56474.0 Cubic Feet
     ---------------------------------------------------------------------
      Peak flow rate of this hydrograph =      9.541(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        2.5       5.0       7.5      10.0
 ---------------------------------------------------------------------------
   0+ 5       0.0006      0.08  Q         |         |         |         |
   0+10       0.0030      0.35  VQ        |         |         |         |
   0+15       0.0061      0.45  VQ        |         |         |         |
   0+20       0.0097      0.54  V Q       |         |         |         |
   0+25       0.0145      0.69  V Q       |         |         |         |
   0+30       0.0198      0.76  V  Q      |         |         |         |
   0+35       0.0252      0.80  V  Q      |         |         |         |
   0+40       0.0309      0.82  V  Q      |         |         |         |
   0+45       0.0366      0.83  V  Q      |         |         |         |
   0+50       0.0426      0.88  V  Q      |         |         |         |
   0+55       0.0496      1.02  V   Q     |         |         |         |
   1+ 0       0.0570      1.07  V   Q     |         |         |         |
   1+ 5       0.0643      1.05  V   Q     |         |         |         |
   1+10       0.0707      0.94  V  Q      |         |         |         |
   1+15       0.0769      0.89  V  Q      |         |         |         |
   1+20       0.0829      0.88  V  Q      |         |         |         |
   1+25       0.0889      0.87  V  Q      |         |         |         |
   1+30       0.0948      0.86  V  Q      |         |         |         |
   1+35       0.1007      0.86  V  Q      |         |         |         |
   1+40       0.1066      0.85  V  Q      |         |         |         |
   1+45       0.1124      0.85  V  Q      |         |         |         |
   1+50       0.1186      0.89  V  Q      |         |         |         |
   1+55       0.1256      1.02  V   Q     |         |         |         |
   2+ 0       0.1330      1.07  V   Q     |         |         |         |
   2+ 5       0.1405      1.10  V   Q     |         |         |         |
   2+10       0.1482      1.11  |V  Q     |         |         |         |
   2+15       0.1558      1.12  |V  Q     |         |         |         |
   2+20       0.1636      1.12  |V  Q     |         |         |         |
   2+25       0.1713      1.13  |V  Q     |         |         |         |
   2+30       0.1791      1.13  |V  Q     |         |         |         |
   2+35       0.1872      1.17  |V  Q     |         |         |         |
   2+40       0.1962      1.30  |V   Q    |         |         |         |
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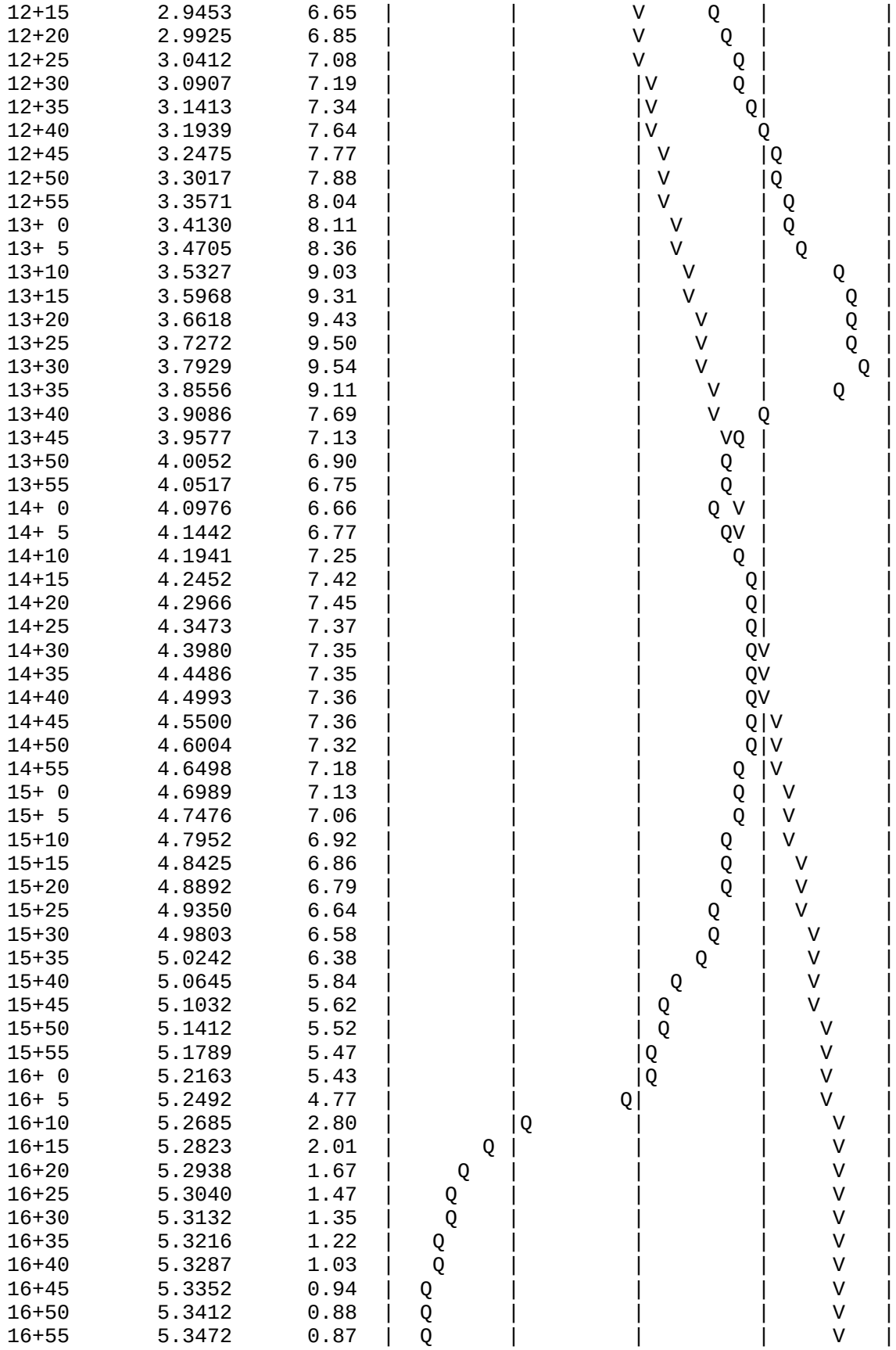
2+45	0.2055	1.36	V Q			
2+50	0.2150	1.38	V Q			
2+55	0.2246	1.39	V Q			
3+ 0	0.2342	1.40	V Q			
3+ 5	0.2439	1.41	V Q			
3+10	0.2536	1.41	V Q			
3+15	0.2633	1.41	V Q			
3+20	0.2731	1.41	V Q			
3+25	0.2828	1.41	V Q			
3+30	0.2925	1.41	V Q			
3+35	0.3023	1.41	V Q			
3+40	0.3120	1.41	V Q			
3+45	0.3218	1.41	V Q			
3+50	0.3318	1.46	V Q			
3+55	0.3427	1.59	V Q			
4+ 0	0.3540	1.64	V Q			
4+ 5	0.3654	1.66	V Q			
4+10	0.3770	1.67	V Q			
4+15	0.3885	1.68	V Q			
4+20	0.4005	1.73	V Q			
4+25	0.4133	1.86	V Q			
4+30	0.4265	1.92	V Q			
4+35	0.4399	1.94	V Q			
4+40	0.4534	1.96	V Q			
4+45	0.4669	1.97	V Q			
4+50	0.4808	2.01	V Q			
4+55	0.4956	2.15	V Q			
5+ 0	0.5107	2.20	V Q			
5+ 5	0.5255	2.14	V Q			
5+10	0.5385	1.89	V Q			
5+15	0.5509	1.80	V Q			
5+20	0.5633	1.80	V Q			
5+25	0.5765	1.91	V Q			
5+30	0.5899	1.95	V Q			
5+35	0.6037	2.00	V Q			
5+40	0.6184	2.14	V Q			
5+45	0.6335	2.19	V Q			
5+50	0.6488	2.22	V Q			
5+55	0.6642	2.24	V Q			
6+ 0	0.6797	2.25	V Q			
6+ 5	0.6955	2.30	V Q			
6+10	0.7122	2.43	V Q			
6+15	0.7293	2.48	V Q			
6+20	0.7466	2.51	V Q			
6+25	0.7640	2.52	V Q			
6+30	0.7814	2.53	V Q			
6+35	0.7992	2.58	V Q			
6+40	0.8179	2.71	V Q			
6+45	0.8369	2.77	V Q			
6+50	0.8562	2.79	V Q			
6+55	0.8755	2.81	V Q			
7+ 0	0.8949	2.81	V Q			
7+ 5	0.9143	2.82	V Q			
7+10	0.9337	2.82	V Q			
7+15	0.9532	2.83	V Q			
7+20	0.9729	2.87	V Q			
7+25	0.9936	3.00	V Q			

7+30	1.0146	3.05	V	Q			
7+35	1.0361	3.12	V	Q			
7+40	1.0585	3.26	V	Q			
7+45	1.0814	3.32	V	Q			
7+50	1.1048	3.39	V	Q			
7+55	1.1291	3.54	V	Q			
8+ 0	1.1540	3.60	V	Q			
8+ 5	1.1795	3.72	V	Q			
8+10	1.2071	3.99	V	Q			
8+15	1.2353	4.11	V	Q			
8+20	1.2640	4.16	V	Q			
8+25	1.2929	4.19	V	Q			
8+30	1.3219	4.21	V	Q			
8+35	1.3513	4.27	V	Q			
8+40	1.3816	4.41	V	Q			
8+45	1.4123	4.46	V	Q			
8+50	1.4435	4.53	V	Q			
8+55	1.4757	4.67	V	Q			
9+ 0	1.5083	4.73	V	Q			
9+ 5	1.5417	4.85	V	Q			
9+10	1.5770	5.13	V	Q			
9+15	1.6131	5.24	V	Q			
9+20	1.6499	5.33	V	Q			
9+25	1.6877	5.50	V	Q			
9+30	1.7260	5.57	V	Q			
9+35	1.7649	5.64	V	Q			
9+40	1.8048	5.80	V	Q			
9+45	1.8452	5.86	V	Q			
9+50	1.8861	5.94	V	Q			
9+55	1.9280	6.08	V	Q			
10+ 0	1.9703	6.15	V	Q			
10+ 5	2.0108	5.88	V	Q			
10+10	2.0452	4.99	V	Q			
10+15	2.0771	4.63	V	Q			
10+20	2.1080	4.48	V	Q			
10+25	2.1382	4.40	V	Q			
10+30	2.1681	4.34	V	Q			
10+35	2.1992	4.51	V	Q			
10+40	2.2346	5.14	V	Q			
10+45	2.2716	5.38	V	Q			
10+50	2.3093	5.48	V	Q			
10+55	2.3475	5.54	V	Q			
11+ 0	2.3860	5.58	V	Q			
11+ 5	2.4243	5.57	V	Q			
11+10	2.4619	5.46	V	Q			
11+15	2.4993	5.42	V	Q			
11+20	2.5365	5.41	V	Q			
11+25	2.5737	5.40	V	Q			
11+30	2.6108	5.39	V	Q			
11+35	2.6473	5.30	V	Q			
11+40	2.6819	5.03	V	Q			
11+45	2.7159	4.93	V	Q			
11+50	2.7497	4.92	V	Q			
11+55	2.7844	5.03	V	Q			
12+ 0	2.8192	5.06	V	Q			
12+ 5	2.8562	5.37	V	Q			
12+10	2.8994	6.28	V	Q			



17+ 0	5.3532	0.86	Q				V
17+ 5	5.3597	0.94	Q				V
17+10	5.3679	1.20	Q				V
17+15	5.3769	1.30	Q				V
17+20	5.3861	1.34	Q				V
17+25	5.3955	1.37	Q				V
17+30	5.4051	1.39	Q				V
17+35	5.4147	1.40	Q				V
17+40	5.4244	1.40	Q				V
17+45	5.4341	1.41	Q				V
17+50	5.4435	1.37	Q				V
17+55	5.4521	1.24	Q				V
18+ 0	5.4603	1.19	Q				V
18+ 5	5.4683	1.17	Q				V
18+10	5.4763	1.15	Q				V
18+15	5.4841	1.15	Q				V
18+20	5.4920	1.14	Q				V
18+25	5.4998	1.14	Q				V
18+30	5.5076	1.13	Q				V
18+35	5.5151	1.09	Q				V
18+40	5.5217	0.96	Q				V
18+45	5.5280	0.91	Q				V
18+50	5.5338	0.84	Q				V
18+55	5.5386	0.70	Q				V
19+ 0	5.5430	0.64	Q				V
19+ 5	5.5475	0.65	Q				V
19+10	5.5527	0.77	Q				V
19+15	5.5583	0.81	Q				V
19+20	5.5642	0.86	Q				V
19+25	5.5711	1.00	Q				V
19+30	5.5784	1.06	Q				V
19+35	5.5856	1.04	Q				V
19+40	5.5921	0.93	Q				V
19+45	5.5982	0.89	Q				V
19+50	5.6039	0.83	Q				V
19+55	5.6087	0.69	Q				V
20+ 0	5.6131	0.64	Q				V
20+ 5	5.6176	0.65	Q				V
20+10	5.6228	0.77	Q				V
20+15	5.6284	0.81	Q				V
20+20	5.6341	0.82	Q				V
20+25	5.6398	0.83	Q				V
20+30	5.6455	0.84	Q				V
20+35	5.6513	0.84	Q				V
20+40	5.6571	0.84	Q				V
20+45	5.6630	0.85	Q				V
20+50	5.6685	0.81	Q				V
20+55	5.6732	0.68	Q				V
21+ 0	5.6775	0.62	Q				V
21+ 5	5.6819	0.64	Q				V
21+10	5.6871	0.76	Q				V
21+15	5.6927	0.80	Q				V
21+20	5.6980	0.78	Q				V
21+25	5.7026	0.66	Q				V
21+30	5.7068	0.61	Q				V
21+35	5.7111	0.64	Q				V
21+40	5.7164	0.76	Q				V

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   21+45       5.7219      0.80  |  Q      |         |         |        V|
   21+50       5.7272      0.78  |  Q      |         |         |        V|
   21+55       5.7318      0.66  | Q       |         |         |        V|
   22+ 0       5.7360      0.61  | Q       |         |         |        V|
   22+ 5       5.7404      0.64  | Q       |         |         |        V|
   22+10       5.7456      0.76  |  Q      |         |         |        V|
   22+15       5.7511      0.80  |  Q      |         |         |        V|
   22+20       5.7565      0.78  |  Q      |         |         |        V|
   22+25       5.7610      0.66  | Q       |         |         |        V|
   22+30       5.7652      0.61  | Q       |         |         |        V|
   22+35       5.7693      0.59  | Q       |         |         |        V|
   22+40       5.7733      0.58  | Q       |         |         |        V|
   22+45       5.7773      0.58  | Q       |         |         |        V|
   22+50       5.7812      0.57  | Q       |         |         |        V|
   22+55       5.7852      0.57  | Q       |         |         |        V|
   23+ 0       5.7891      0.57  | Q       |         |         |        V|
   23+ 5       5.7930      0.57  | Q       |         |         |        V|
   23+10       5.7969      0.57  | Q       |         |         |        V|
   23+15       5.8008      0.57  | Q       |         |         |        V|
   23+20       5.8047      0.57  | Q       |         |         |        V|
   23+25       5.8085      0.57  | Q       |         |         |        V|
   23+30       5.8124      0.57  | Q       |         |         |        V|
   23+35       5.8163      0.57  | Q       |         |         |        V|
   23+40       5.8202      0.57  | Q       |         |         |        V|
   23+45       5.8241      0.57  | Q       |         |         |        V|
   23+50       5.8280      0.57  | Q       |         |         |        V|
   23+55       5.8319      0.57  | Q       |         |         |        V|
   24+ 0       5.8358      0.57  | Q       |         |         |        V|
   24+ 5       5.8391      0.48  |Q        |         |         |        V|
   24+10       5.8406      0.22  Q         |         |         |        V|
   24+15       5.8414      0.12  Q         |         |         |        V|
   24+20       5.8419      0.07  Q         |         |         |        V|
   24+25       5.8423      0.05  Q         |         |         |        V|
   24+30       5.8425      0.03  Q         |         |         |        V|
   24+35       5.8426      0.02  Q         |         |         |        V|
   24+40       5.8426      0.01  Q         |         |         |        V|
   24+45       5.8427      0.00  Q         |         |         |         V
---------------------------------------------------------------------------
```

APPENDIX D

Hydraulic Calculations

D.1: PIPE HYDRAULICS CALCULATIONS

D.2: STREET CAPACITY CALCULATIONS

D.3: INLET CALCULATIONS

D.4: OUTLET CONTROL – WEIR CALCULATIONS

Hydraulic Analysis Report

Project Data

Project Title: 100 W Sinclair St

Designer: DJV

Project Date: Monday, September 12, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: SD PIPE #1

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 2.0000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0150

Flow: 13.0000 cfs

Result Parameters

Depth: 1.5375 ft

Area of Flow: 2.5915 ft^2

Wetted Perimeter: 4.2766 ft

Hydraulic Radius: 0.6060 ft

Average Velocity: 5.0163 ft/s

Top Width: 1.6865 ft

Froude Number: 0.7131

Critical Depth: 1.2969 ft

Critical Velocity: 6.0305 ft/s

Critical Slope: 0.0077 ft/ft

Critical Top Width: 1.91 ft

Calculated Max Shear Stress: 0.4797 lb/ft^2

Calculated Avg Shear Stress: 0.1891 lb/ft^2

Channel Analysis: SD PIPE #2

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 2.5000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0150

Flow: 26.8000 cfs

Result Parameters

Depth: 2.2520 ft

Area of Flow: 4.6563 ft^2

Wetted Perimeter: 6.2520 ft

Hydraulic Radius: 0.7448 ft

Average Velocity: 5.7557 ft/s

Top Width: 1.4946 ft

Froude Number: 0.5747

Critical Depth: 1.7651 ft

Critical Velocity: 7.2339 ft/s

Critical Slope: 0.0079 ft/ft

Critical Top Width: 2.28 ft

Calculated Max Shear Stress: 0.7026 lb/ft^2

Calculated Avg Shear Stress: 0.2324 lb/ft^2

Channel Analysis: SD PIPE #3

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 3.0000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0150

Flow: 32.9000 cfs

Result Parameters

Depth: 2.0389 ft

Area of Flow: 5.1154 ft^2

Wetted Perimeter: 5.8148 ft

Hydraulic Radius: 0.8797 ft

Average Velocity: 6.4315 ft/s

Top Width: 2.7997 ft

Froude Number: 0.8385

Critical Depth: 1.8618 ft

Critical Velocity: 7.1380 ft/s

Critical Slope: 0.0065 ft/ft

Critical Top Width: 2.91 ft

Calculated Max Shear Stress: 0.6361 lb/ft^2

Calculated Avg Shear Stress: 0.2745 lb/ft^2

Channel Analysis: SD PIPE #4

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.5000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0150

Flow: 4.1000 cfs

Result Parameters

Depth: 0.8695 ft

Area of Flow: 1.0621 ft^2

Wetted Perimeter: 2.5963 ft

Hydraulic Radius: 0.4091 ft

Average Velocity: 3.8603 ft/s

Top Width: 1.4808 ft

Froude Number: 0.8033

Critical Depth: 0.7756 ft

Critical Velocity: 4.4468 ft/s

Critical Slope: 0.0072 ft/ft

Critical Top Width: 1.50 ft

Calculated Max Shear Stress: 0.2713 lb/ft^2

Calculated Avg Shear Stress: 0.1276 lb/ft^2

Channel Analysis: SD PIPE #5

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.5000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0150

Flow: 5.2200 cfs

Result Parameters

Depth: 1.0250 ft

Area of Flow: 1.2867 ft^2

Wetted Perimeter: 2.9194 ft

Hydraulic Radius: 0.4407 ft

Average Velocity: 4.0570 ft/s

Top Width: 1.3955 ft

Froude Number: 0.7446

Critical Depth: 0.8796 ft

Critical Velocity: 4.8465 ft/s

Critical Slope: 0.0078 ft/ft

Critical Top Width: 1.48 ft

Calculated Max Shear Stress: 0.3198 lb/ft^2

Calculated Avg Shear Stress: 0.1375 lb/ft^2

Channel Analysis: SD PIPE #6

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.5000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0150

Flow: 2.7000 cfs

Result Parameters

Depth: 0.6777 ft

Area of Flow: 0.7753 ft^2

Wetted Perimeter: 2.2113 ft

Hydraulic Radius: 0.3506 ft

Average Velocity: 3.4827 ft/s

Top Width: 1.4930 ft

Froude Number: 0.8517

Critical Depth: 0.6233 ft

Critical Velocity: 3.8882 ft/s

Critical Slope: 0.0067 ft/ft

Critical Top Width: 1.48 ft

Calculated Max Shear Stress: 0.2114 lb/ft^2

Calculated Avg Shear Stress: 0.1094 lb/ft^2

Channel Analysis: SD PIPE #7

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.0000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0150

Flow: 1.8000 cfs

Result Parameters

Depth: 0.6919 ft

Area of Flow: 0.5797 ft^2

Wetted Perimeter: 1.9646 ft

Hydraulic Radius: 0.2951 ft

Average Velocity: 3.1048 ft/s

Top Width: 0.9235 ft

Froude Number: 0.6906

Critical Depth: 0.5713 ft

Critical Velocity: 3.8814 ft/s

Critical Slope: 0.0088 ft/ft

Critical Top Width: 0.99 ft

Calculated Max Shear Stress: 0.2159 lb/ft^2

Calculated Avg Shear Stress: 0.0921 lb/ft^2

Channel Analysis: SD PIPE #8

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.5000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0150

Flow: 4.4000 cfs

Result Parameters

Depth: 0.9103 ft

Area of Flow: 1.1221 ft^2

Wetted Perimeter: 2.6792 ft

Hydraulic Radius: 0.4188 ft

Average Velocity: 3.9212 ft/s

Top Width: 1.4654 ft

Froude Number: 0.7897

Critical Depth: 0.8042 ft

Critical Velocity: 4.5605 ft/s

Critical Slope: 0.0074 ft/ft

Critical Top Width: 1.50 ft

Calculated Max Shear Stress: 0.2840 lb/ft^2

Calculated Avg Shear Stress: 0.1307 lb/ft^2

Channel Analysis: SD PIPE #9

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.0000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0150

Flow: 1.2000 cfs

Result Parameters

Depth: 0.5290 ft

Area of Flow: 0.4217 ft^2

Wetted Perimeter: 1.6289 ft

Hydraulic Radius: 0.2589 ft

Average Velocity: 2.8456 ft/s

Top Width: 0.9983 ft

Froude Number: 0.7716

Critical Depth: 0.4619 ft

Critical Velocity: 3.3836 ft/s

Critical Slope: 0.0079 ft/ft

Critical Top Width: 1.00 ft

Calculated Max Shear Stress: 0.1651 lb/ft^2

Calculated Avg Shear Stress: 0.0808 lb/ft^2

Channel Analysis: SD PIPE #10

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.5000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0150

Flow: 6.2000 cfs

Result Parameters

Depth: 1.1825 ft

Area of Flow: 1.4943 ft^2

Wetted Perimeter: 3.2781 ft

Hydraulic Radius: 0.4558 ft

Average Velocity: 4.1492 ft/s

Top Width: 1.2255 ft

Froude Number: 0.6622

Critical Depth: 0.9624 ft

Critical Velocity: 5.1759 ft/s

Critical Slope: 0.0084 ft/ft

Critical Top Width: 1.44 ft

Calculated Max Shear Stress: 0.3689 lb/ft^2

Calculated Avg Shear Stress: 0.1422 lb/ft^2

Channel Analysis: SD PIPE #11

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 2.0000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0150

Flow: 14.7000 cfs

Result Parameters

Depth: 1.7795 ft

Area of Flow: 2.9530 ft^2

Wetted Perimeter: 4.9295 ft

Hydraulic Radius: 0.5991 ft

Average Velocity: 4.9780 ft/s

Top Width: 1.2527 ft

Froude Number: 0.5714

Critical Depth: 1.3818 ft

Critical Velocity: 6.3486 ft/s

Critical Slope: 0.0083 ft/ft

Critical Top Width: 1.85 ft

Calculated Max Shear Stress: 0.5552 lb/ft^2

Calculated Avg Shear Stress: 0.1869 lb/ft^2

OUTLET PIPE ANALYSIS

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	53.540	1.659	55.199	21.50	7.72	.93	56.12	.00	1.66	1.50	2.000	.000	.00	1 .0
3.013	.0045					.0085	.03	1.66	1.00	2.00	.013	.00	.00	PIPE
1003.013	53.554	1.755	55.308	21.50	7.36	.84	56.15	.00	1.66	1.31	2.000	.000	.00	1 .0
13.726	.0045					.0080	.11	1.75	.87	2.00	.013	.00	.00	PIPE
1016.739	53.615	1.879	55.494	21.50	7.02	.76	56.26	.00	1.66	.95	2.000	.000	.00	1 .0
22.784	.0045					.0081	.19	1.88	.69	2.00	.013	.00	.00	PIPE
1039.522	53.717	2.000	55.717	21.50	6.84	.73	56.44	.00	1.66	.00	2.000	.000	.00	1 .0
225.648	.0045					.0088	1.98	2.00	.00	2.00	.013	.00	.00	PIPE
1265.170	54.730	3.025	57.755	21.50	6.84	.73	58.48	.00	1.66	.00	2.000	.000	.00	1 .0
TRANS STR	.0061					.0068	.03	3.03	.00		.014	.00	.00	PIPE
1270.070	54.760	3.501	58.261	21.50	4.38	.30	58.56	.00	1.58	.00	2.500	.000	.00	1 .0
2.500	.0040					.0032	.01	3.50	.00	1.84	.014	.00	.00	PIPE
1272.570	54.770	3.499	58.269	21.50	4.38	.30	58.57	.00	1.58	.00	2.500	.000	.00	1 .0
2.500	.0040					.0027	.01	3.50	.00	1.74	.013	.00	.00	PIPE
1275.070	54.780	3.599	58.379	21.50	4.38	.30	58.68	.00	1.58	.00	2.500	.000	.00	1 .0
174.950	.0050					.0027	.48	3.60	.00	1.60	.013	.00	.00	PIPE
1450.020	55.660	3.289	58.949	21.50	4.38	.30	59.25	.00	1.58	.00	2.500	.000	.00	1 .0
13.250	.0045					.0027	.04	3.29	.00	1.66	.013	.00	.00	PIPE

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1463.270	55.720	3.354	59.074	21.50	4.38	.30	59.37	.00	1.58	.00	2.500	.000	.00	1 .0

Hydraulic Analysis Report

Project Data

Project Title: 100 W Sinclair St

Designer: DJV

Project Date: Monday, September 12, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Section D

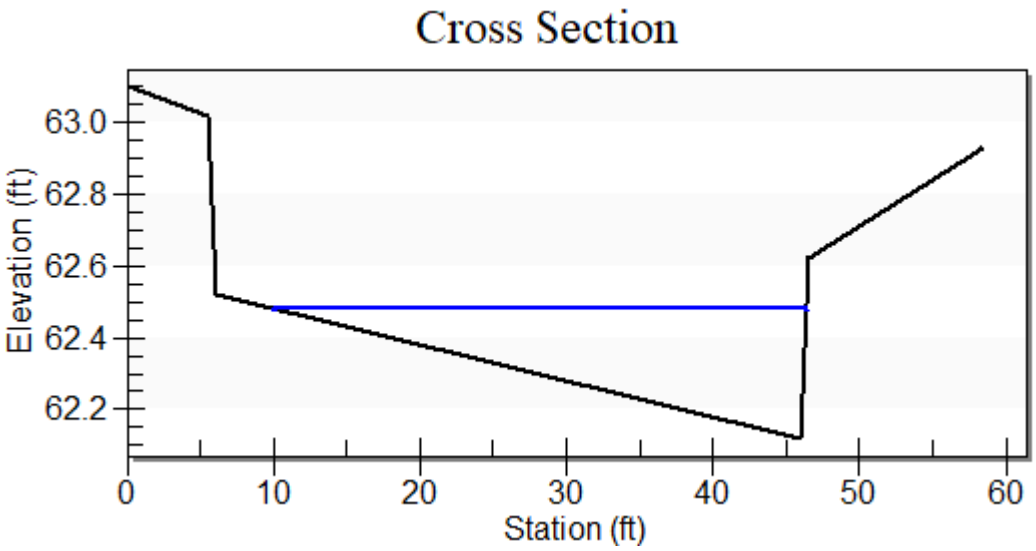
Notes: See Figure 6 for Section Lines

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	63.10	0.0150
5.53	63.02	0.0150
6.03	62.52	0.0150
46.03	62.12	0.0150
46.53	62.62	0.0150
58.42	62.93	-----



Longitudinal Slope: 0.0050 ft/ft

Flow: 14.6000 cfs

Result Parameters

Depth: 0.3602 ft

Area of Flow: 6.5530 ft^2

Wetted Perimeter: 36.5339 ft

Hydraulic Radius: 0.1794 ft

Average Velocity: 2.2280 ft/s

Top Width: 36.3829 ft

Froude Number: 0.9251

Critical Depth: 0.3492 ft

Critical Velocity: 2.3711 ft/s

Critical Slope: 0.0059 ft/ft

Critical Top Width: 35.27 ft

Calculated Max Shear Stress: 0.1124 lb/ft^2

Calculated Avg Shear Stress: 0.0560 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

Hydraulic Analysis Report

Project Data

Project Title: 100 W Sinclair St

Designer: DJV

Project Date: Monday, September 12, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Section E

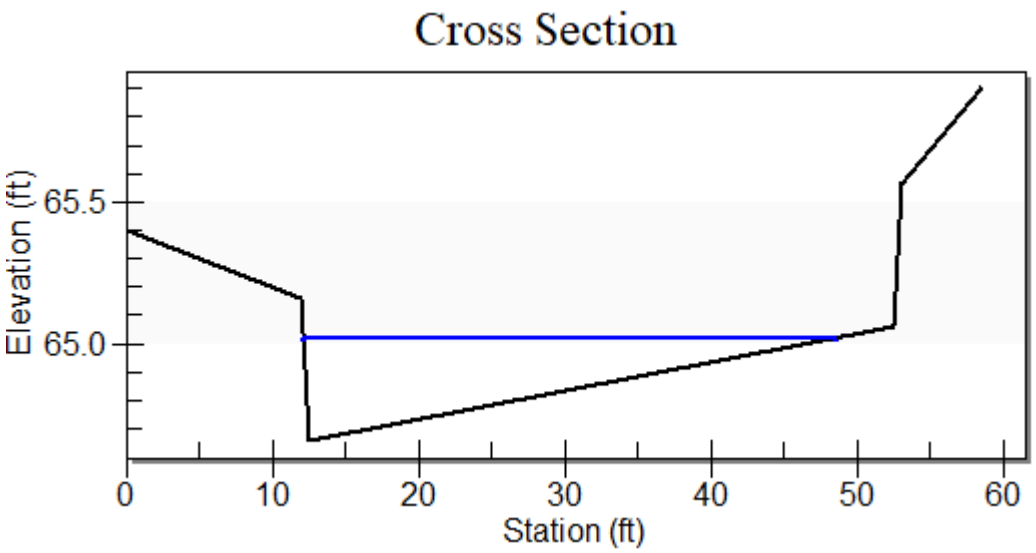
Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	65.40	0.0150
12.03	65.16	0.0150
12.53	64.66	0.0150
52.53	65.06	0.0150
53.03	65.56	0.0150
58.53	65.90	-----



Longitudinal Slope: 0.0050 ft/ft

Flow: 14.6000 cfs

Result Parameters

Depth: 0.3602 ft

Area of Flow: 6.5530 ft^2

Wetted Perimeter: 36.5339 ft

Hydraulic Radius: 0.1794 ft

Average Velocity: 2.2280 ft/s

Top Width: 36.3829 ft

Froude Number: 0.9251

Critical Depth: 0.3491 ft

Critical Velocity: 2.3726 ft/s

Critical Slope: 0.0059 ft/ft

Critical Top Width: 35.26 ft

Calculated Max Shear Stress: 0.1124 lb/ft^2

Calculated Avg Shear Stress: 0.0560 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

Hydraulic Analysis Report

Project Data

Project Title: 100 W Sinclair St

Designer: DJV

Project Date: Monday, September 12, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Section G

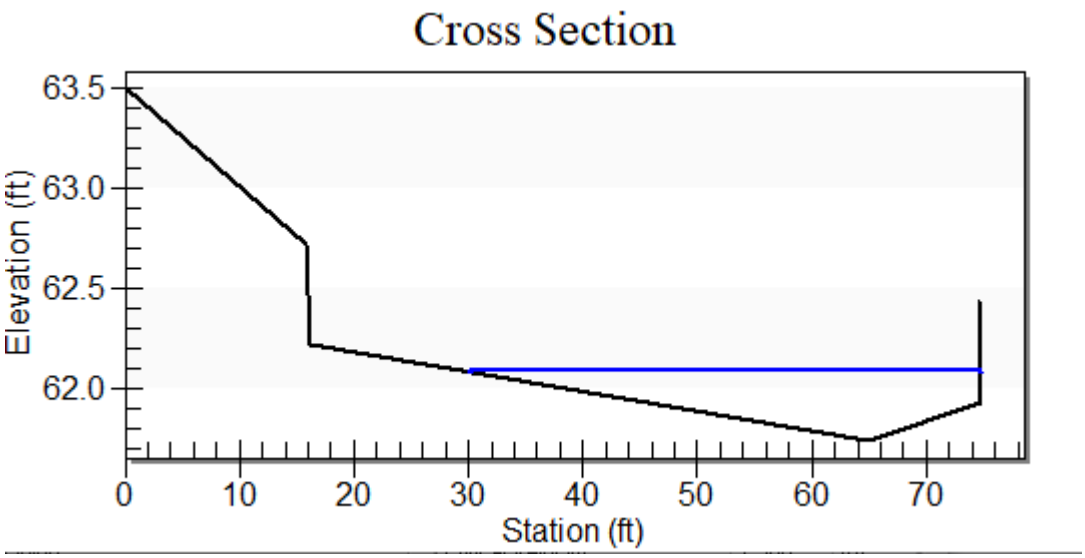
Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	63.50	0.0150
15.76	62.72	0.0150
16.26	62.22	0.0150
65.00	61.74	0.0150
74.76	61.93	0.0150
74.77	62.43	-----



Longitudinal Slope: 0.0040 ft/ft

Flow: 17.3000 cfs

Result Parameters

Depth: 0.3435 ft

Area of Flow: 8.4170 ft^2

Wetted Perimeter: 44.7986 ft

Hydraulic Radius: 0.1879 ft

Average Velocity: 2.0554 ft/s

Top Width: 44.6446 ft

Froude Number: 0.8342

Critical Depth: 0.3180 ft

Critical Velocity: 2.3661 ft/s

Critical Slope: 0.0059 ft/ft

Critical Top Width: 42.05 ft

Calculated Max Shear Stress: 0.0857 lb/ft^2

Calculated Avg Shear Stress: 0.0469 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

Hydraulic Analysis Report

Project Data

Project Title: 100 W Sinclair St

Designer: DJV

Project Date: Monday, September 12, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Section H

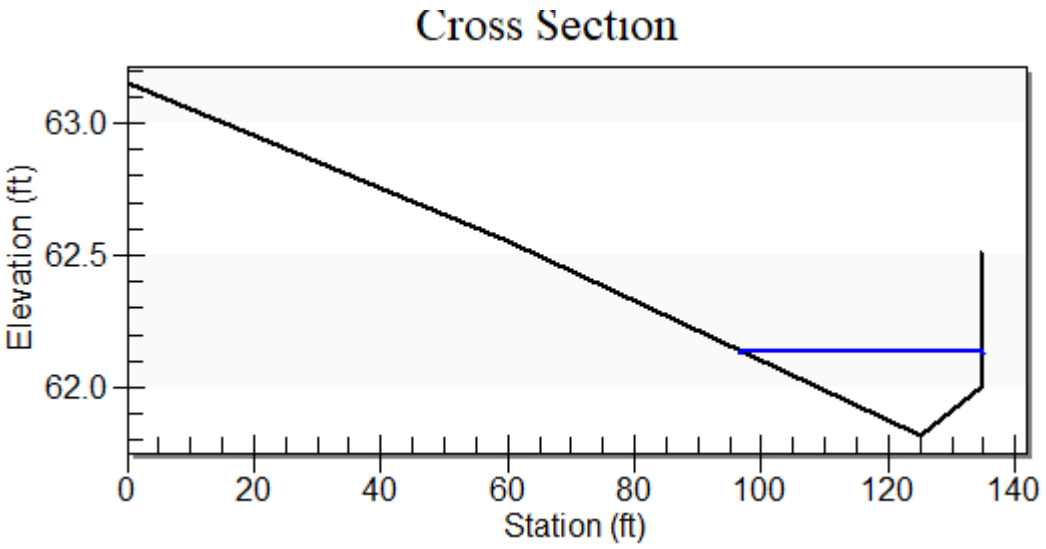
Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	63.15	0.0150
60.00	62.55	0.0150
125.00	61.82	0.0150
134.84	62.01	0.0150
134.90	62.51	-----



Longitudinal Slope: 0.0040 ft/ft

Flow: 13.0000 cfs

Result Parameters

Depth: 0.3168 ft

Area of Flow: 6.6515 ft^2

Wetted Perimeter: 38.1793 ft

Hydraulic Radius: 0.1742 ft

Average Velocity: 1.9544 ft/s

Top Width: 38.0632 ft

Froude Number: 0.8239

Critical Depth: 0.2918 ft

Critical Velocity: 2.2702 ft/s

Critical Slope: 0.0061 ft/ft

Critical Top Width: 35.83 ft

Calculated Max Shear Stress: 0.0791 lb/ft^2

Calculated Avg Shear Stress: 0.0435 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

Hydraulic Analysis Report

Project Data

Project Title: 100 W Sinclair St

Designer: DJV

Project Date: Monday, September 12, 2022

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Section I

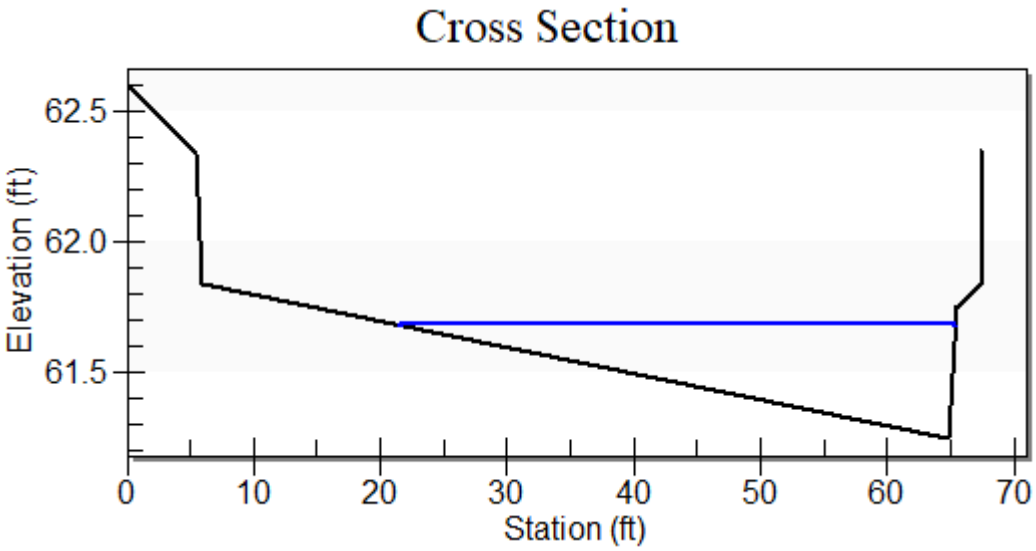
Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	62.60	0.0150
5.42	62.34	0.0150
5.92	61.84	0.0150
24.92	61.65	0.0150
64.92	61.25	0.0150
65.42	61.75	0.0150
67.54	61.85	0.0150
67.55	62.35	-----



Longitudinal Slope: 0.0040 ft/ft

Flow: 21.5000 cfs

Result Parameters

Depth: 0.4343 ft

Area of Flow: 9.5246 ft^2

Wetted Perimeter: 44.0452 ft

Hydraulic Radius: 0.2162 ft

Average Velocity: 2.2573 ft/s

Top Width: 43.8631 ft

Froude Number: 0.8537

Critical Depth: 0.4077 ft

Critical Velocity: 2.5619 ft/s

Critical Slope: 0.0056 ft/ft

Critical Top Width: 41.17 ft

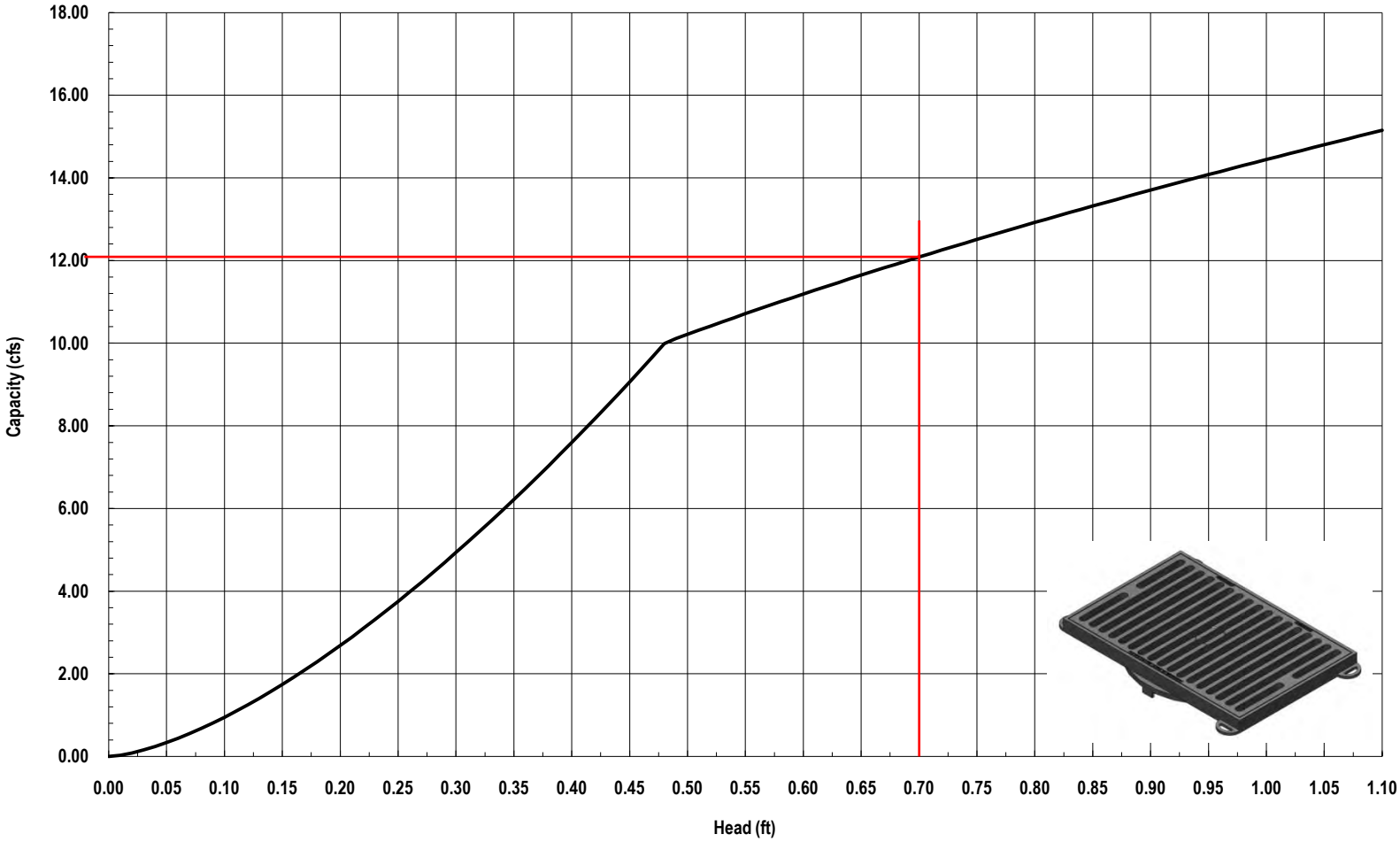
Calculated Max Shear Stress: 0.1084 lb/ft^2

Calculated Avg Shear Stress: 0.0540 lb/ft^2

Composite Manning's n Equation: Lotter method

Manning's n: 0.0150

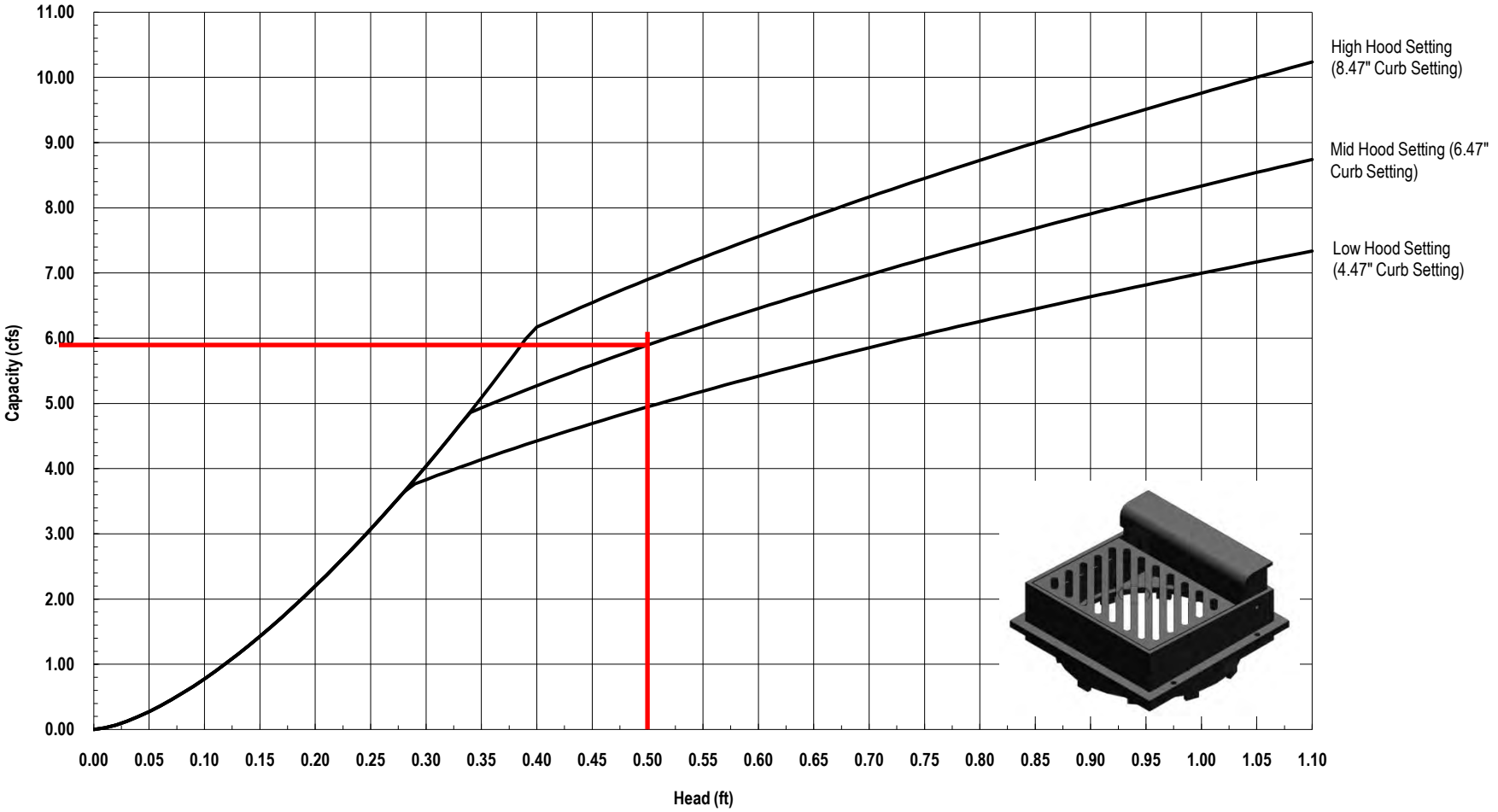
Nyloplast 2' x 3' Road & Highway Grate Inlet Capacity Chart



INLET #1 = 8.9 cfs

Nyloplast®
3130 Verona Avenue • Buford, GA 30518
(866) 888-8479 / (770) 932-2443 • Fax: (770) 932-2490

Nyloplast 2' x 2' Curb Inlet Diagonal Grate Inlet Capacity Chart



INLET #4 = 2.7 cfs
INLET #5 = 1.8 cfs
INLET #6 = 4.5 cfs
INLET #7 = 0.6 cfs
INLET #8 = 0.6 cfs

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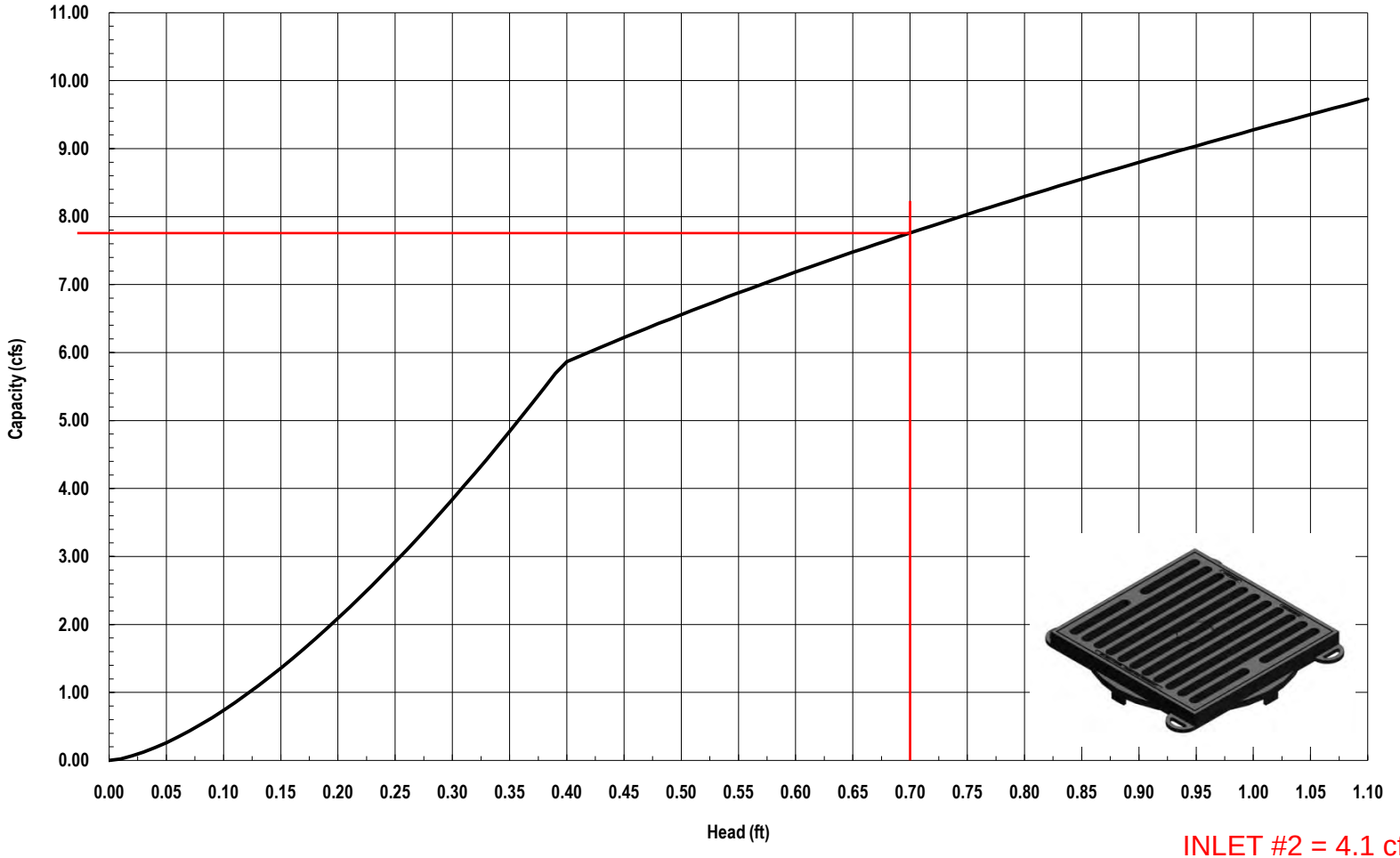
Nyloplast 2' x 2' Road & Highway Grate Inlet Capacity Chart



INLET #2 = 4.1 cfs
INLET #3 = 5.3 cfs

Nyloplast®
3130 Verona Avenue • Buford, GA 30518
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Hydraulic Analysis Report

Project Data

Project Title: 100 W Sinclair St

Designer: DJV

Project Date: Monday, September 12, 2022

Project Units: U.S. Customary Units

Notes:

Weir Analysis: CB110 INLET #9

Notes: 9’ Opening

Input Parameters

Weir Type: Rectangular

Coefficient: 3.1000

Length: 6.0000 ft

Flow: 6.2000 cfs

Result Parameters

Head: 0.4807 ft

Weir Analysis: CB110 INLET #10

Notes: 24’ Opening

Input Parameters

Weir Type: Rectangular

Coefficient: 3.1000

Length: 16.0000 ft

Flow: 14.7000 cfs

Result Parameters

Head: 0.4445 ft

Hydraulic Analysis Report

Project Data

Project Title: 100 W Sinclair St

Designer: DJV

Project Date: Wednesday, September 14, 2022

Project Units: U.S. Customary Units

Notes:

Weir Analysis: Outlet Control Structure - Weir Analysis

Notes:

Input Parameters

Weir Type: Rectangular

Coefficient: 3.2000

Length: 7.0000 ft

Flow: 33.0000 cfs

Result Parameters

Head: 1.2947 ft

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Western Riverside Area, California

September 6, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:2,370 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

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

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
EnA	Exeter sandy loam, 0 to 2 percent slopes	0.0	0.2%
GyA	Greenfield sandy loam, 0 to 2 percent slopes	19.4	99.8%
Totals for Area of Interest		**19.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Western Riverside Area, California

EnA—Exeter sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hctg
Elevation: 20 to 700 feet
Mean annual precipitation: 7 to 20 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Exeter and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Exeter

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 16 inches: sandy loam
H2 - 16 to 37 inches: sandy clay loam
H3 - 37 to 50 inches: indurated
H4 - 50 to 60 inches: stratified sandy loam to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Ramona
Percent of map unit: 4 percent
Hydric soil rating: No

Monserate
Percent of map unit: 4 percent
Hydric soil rating: No

Greenfield
Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed
Percent of map unit: 3 percent
Hydric soil rating: No

GyA—Greenfield sandy loam, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: hcvv
Elevation: 100 to 3,500 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Greenfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Greenfield

Setting
Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile
H1 - 0 to 26 inches: sandy loam
H2 - 26 to 43 inches: fine sandy loam
H3 - 43 to 60 inches: loam
H4 - 60 to 72 inches: stratified loamy sand to sandy loam

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: A
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Hanford

Percent of map unit: 10 percent
Hydric soil rating: No

Arlington

Percent of map unit: 2 percent
Hydric soil rating: No

Pachappa

Percent of map unit: 2 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 1 percent
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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

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

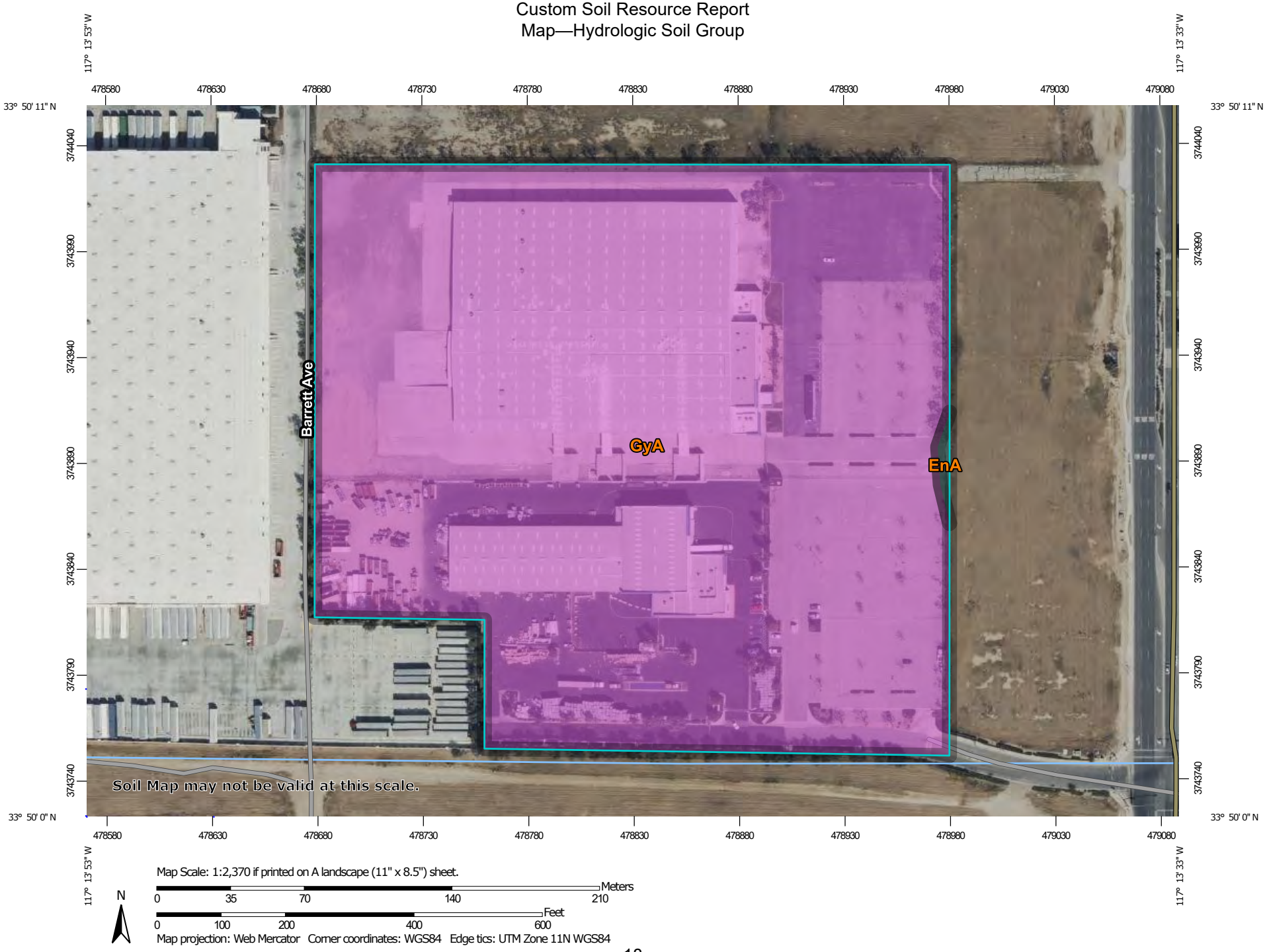
Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

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

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

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

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



Map Scale: 1:2,370 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 35 70 140 210

Feet
0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

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

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

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Survey Area Data: Version 14, Sep 13, 2021

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

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

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

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
EnA	Exeter sandy loam, 0 to 2 percent slopes	C	0.0	0.2%
GyA	Greenfield sandy loam, 0 to 2 percent slopes	A	19.4	99.8%
Totals for Area of Interest			**19.5**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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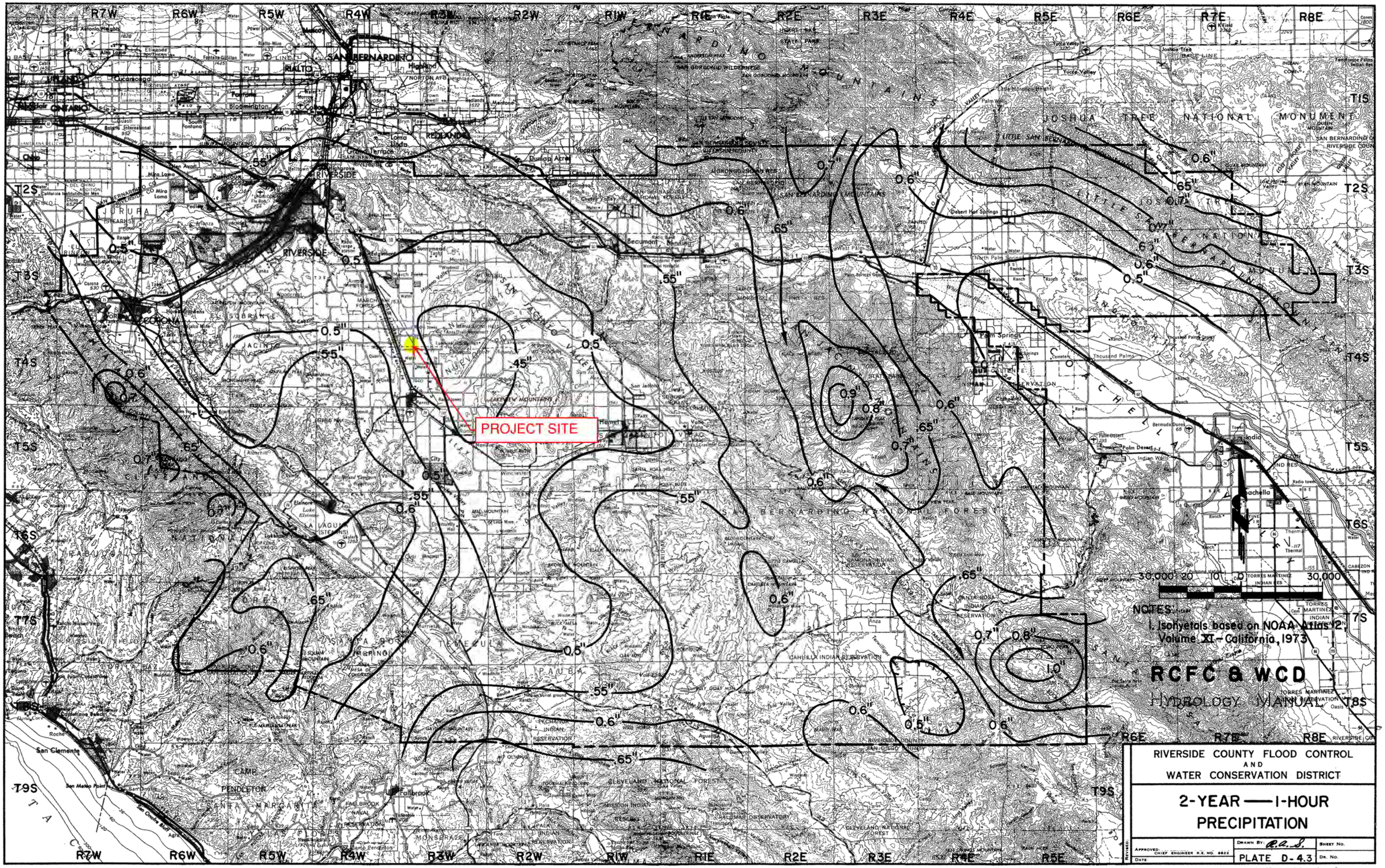

NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973

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HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

2-YEAR — 1-HOUR PRECIPITATION

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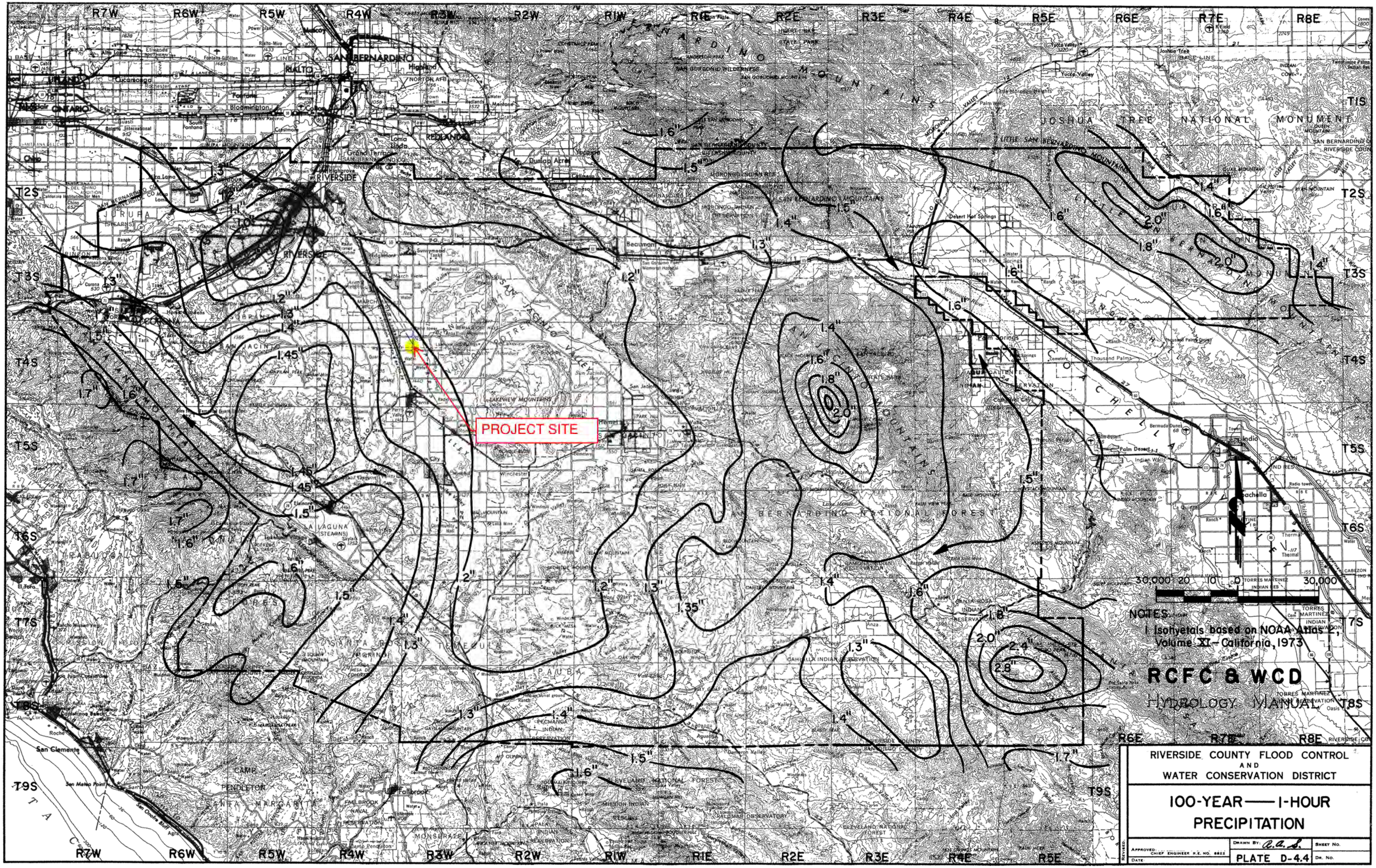
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1 Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
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HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 1-HOUR
PRECIPITATION
PLATE D-4.4
SAN BERNARDINO MOUNTAINS
JOSHUA TREE NATIONAL MONUMENT
SAN BERNARDINO NATIONAL FOREST
RIVERSIDE
SAN BERNARDINO
REDLANDS
ONTARIO
San Clemente
Fallbrook
LA LAGUNA
TEMECULA
30,000 20 10 0 30,000

PROJECT SITE

NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973.

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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

2-YEAR — 3-HOUR PRECIPITATION

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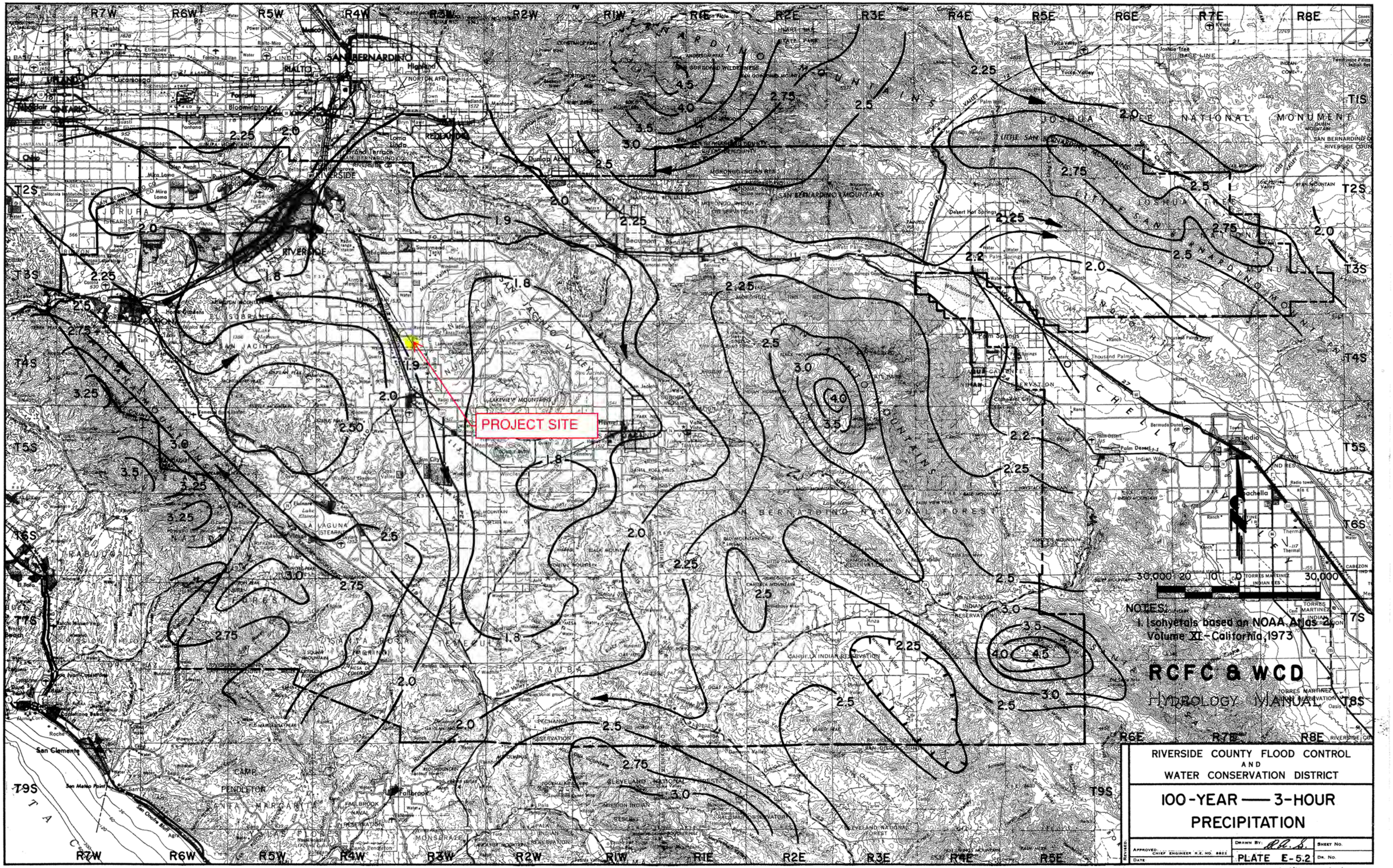
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1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 3-HOUR PRECIPITATION
PLATE E-5.2
SAN BERNARDINO MOUNTAINS
SAN JACINTO MOUNTAINS
SANTA ROSA MOUNTAINS
SAN JACINTO FAULT
SAN ANDREAS FAULT
JOSHUA TREE NATIONAL MONUMENT
CAHUILLA INDIAN RESERVATION
SANTA ROSA INDIAN RESERVATION
TORRES MARTINEZ INDIAN RESERVATION
CABAZON INDIAN RESERVATION
CAMP PENDLETON
SAN BERNARDINO NATIONAL FOREST
CLEVELAND NATIONAL FOREST
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
SAN DIEGO COUNTY
SAN GABRIEL MOUNTAINS
SAN JACINTO VALLEY
TEMECULA
PAUBA
MURRIETA
SAN JACINTO
HEMET
RIVERSIDE
SAN BERNARDINO
RIALTO
COLTON
REDLANDS
LOMA LINDA
MORENO VALLEY
PERRIS
CORONA
NORCO
MIRA LOMA
JURUPA
EASTVALE
ONTARIO
UPLAND
CHINO
CHINO HILLS
MONTCLAIR
POMONA
WALNUT
DIAMOND BAR
LA VERNE
CLAREMONT
SAN DIMAS
GLENDORA
AZUSA
COVINA
WEST COVINA
BALDWIN PARK
ARCADIA
MONROVIA
DUARTE
TEMPLE CITY
ROSEMEAD
EL MONTE
SOUTH EL MONTE
INDUSTRY
LA PUENTE
HACIENDA HEIGHTS
WHITTIER
LA HABRA HEIGHTS
BREA
FULLERTON
LA HABRA
BRENTWOOD
PITTSBURG
ANTIOCH
CONCORD
PLEASANT HILL
WALNUT CREEK
LAFAYETTE
MORAGA
ORINDA
MARTINEZ
PINOLE
HERCULES
RICHMOND
EL CERRITO
ALBANY
BERKELEY
OAKLAND
ALAMEDA
SAN LEANDRO
HAYWARD
SAN MATEO
FOSTER CITY
BELMONT
SAN CARLOS
REDWOOD CITY
MENLO PARK
PALO ALTO
MOUNTAIN VIEW
LOS ALTOS
SUNNYVALE
SANTA CLARA
SAN JOSE
CAMPBELL
LOS GATOS
SARATOGA
CUPERTINO
MILPITAS
FREMONT
NEWARK
UNION CITY
SAN LORENZO
CASTRO VALLEY
SAN RAMON
DANVILLE
ALAMO
OAKLEY
BRENTWOOD
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
R5E
R6E
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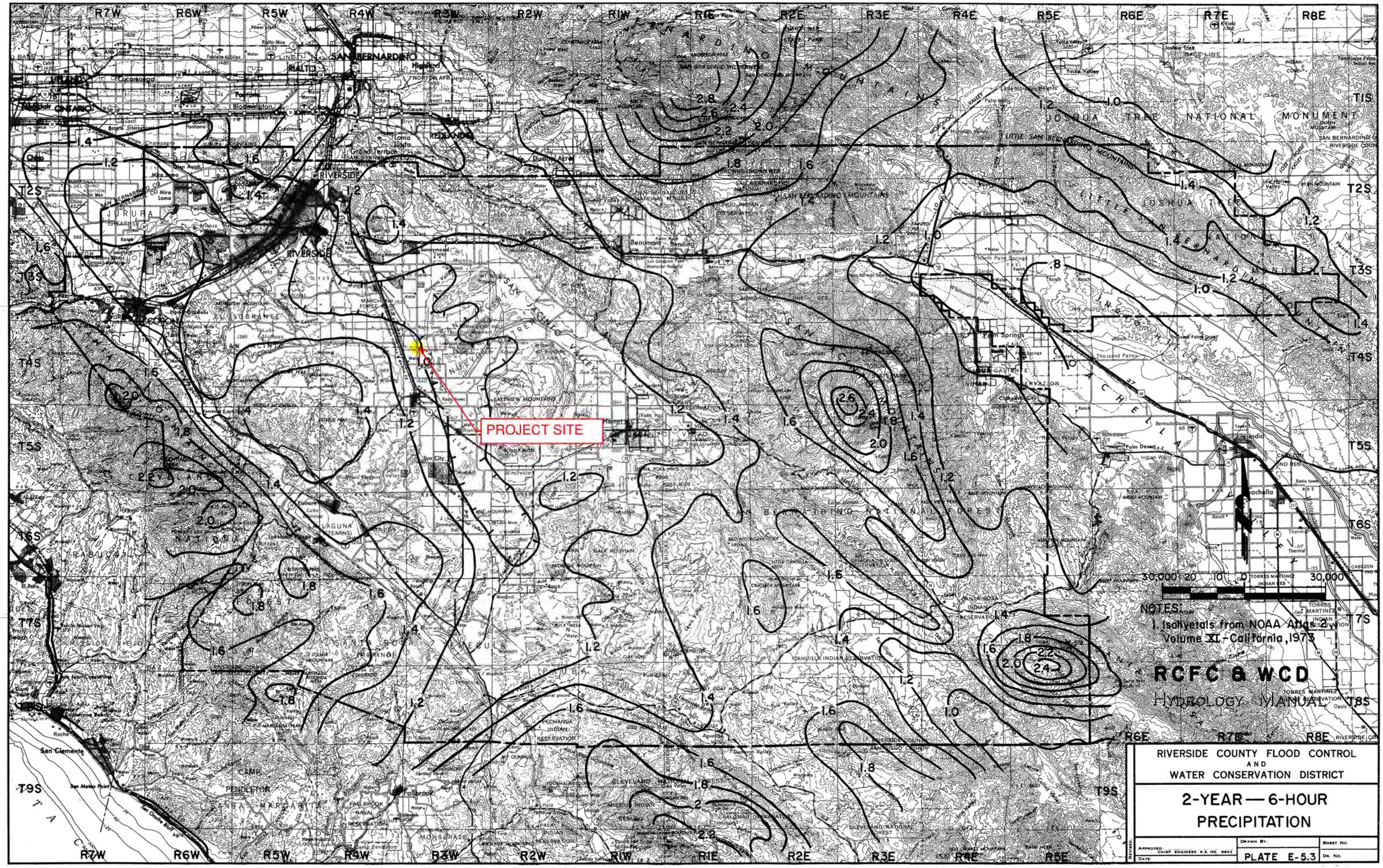
T8S
T9S


PROJECT SITE
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R5W
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R3W
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R1W
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R2E
R3E
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R6E
R7E
R8E
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
SAN BERNARDINO
RIVERSIDE
RIALTO
SAN BERNARDINO MOUNTAINS
JOSHUA TREE NATIONAL MONUMENT
Palm Springs
Beaumont
Banning
Hemet
Temecula
Fallbrook
San Clemente
Indio
Coachella
30,000 0 30,000
NOTES
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973
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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 6-HOUR PRECIPITATION
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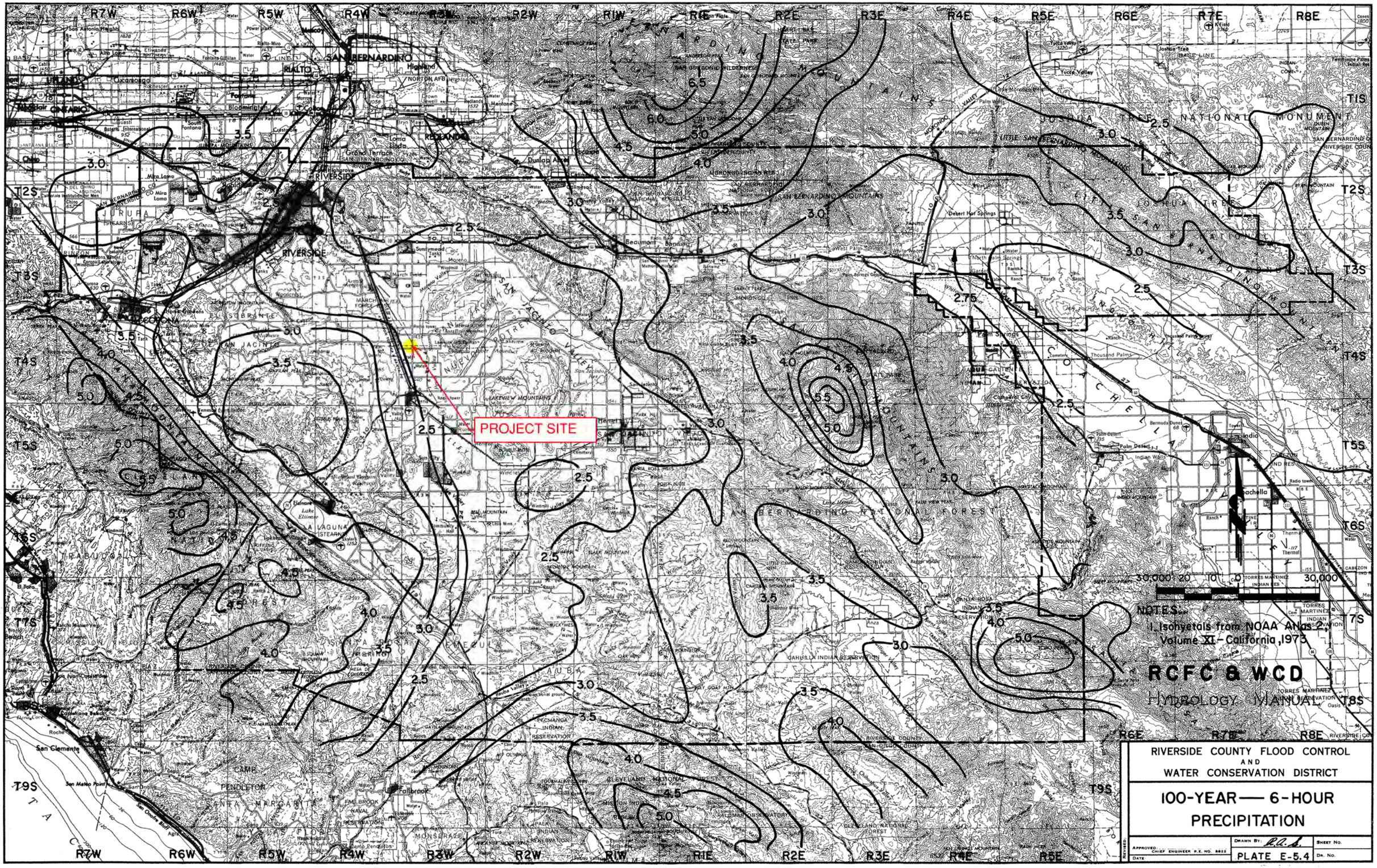
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1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 6-HOUR PRECIPITATION
PLATE E-5.4
SAN BERNARDINO
RIVERSIDE
JOSHUA TREE NATIONAL MONUMENT
SAN JACINTO MOUNTAINS
SAN GABRIEL MOUNTAINS
SANTA ANA MOUNTAINS
PALOMAR MOUNTAIN
CLEVELAND NATIONAL FOREST
SAN BERNARDINO NATIONAL FOREST
CAMP PENDLETON
SANTA MARGARITA
TEMECULA
MURRIETA
SAN JACINTO
HEMET
PERRIS
CORONA
RIALTO
FONTANA
ONTARIO
UPLAND
REDLANDS
LOMA LINDA
MORENO VALLEY
MARCH AFB
NORTON AFB
DUNLAP AREA
BEAUMONT
BANNING
PALM SPRINGS
DESERT HOT SPRINGS
INDIO
COACHELLA
FALLBROOK
SAN CLEMENTE
TEMECULA
MURRIETA
R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E
T2S T3S T4S T5S T6S T7S T8S T9S
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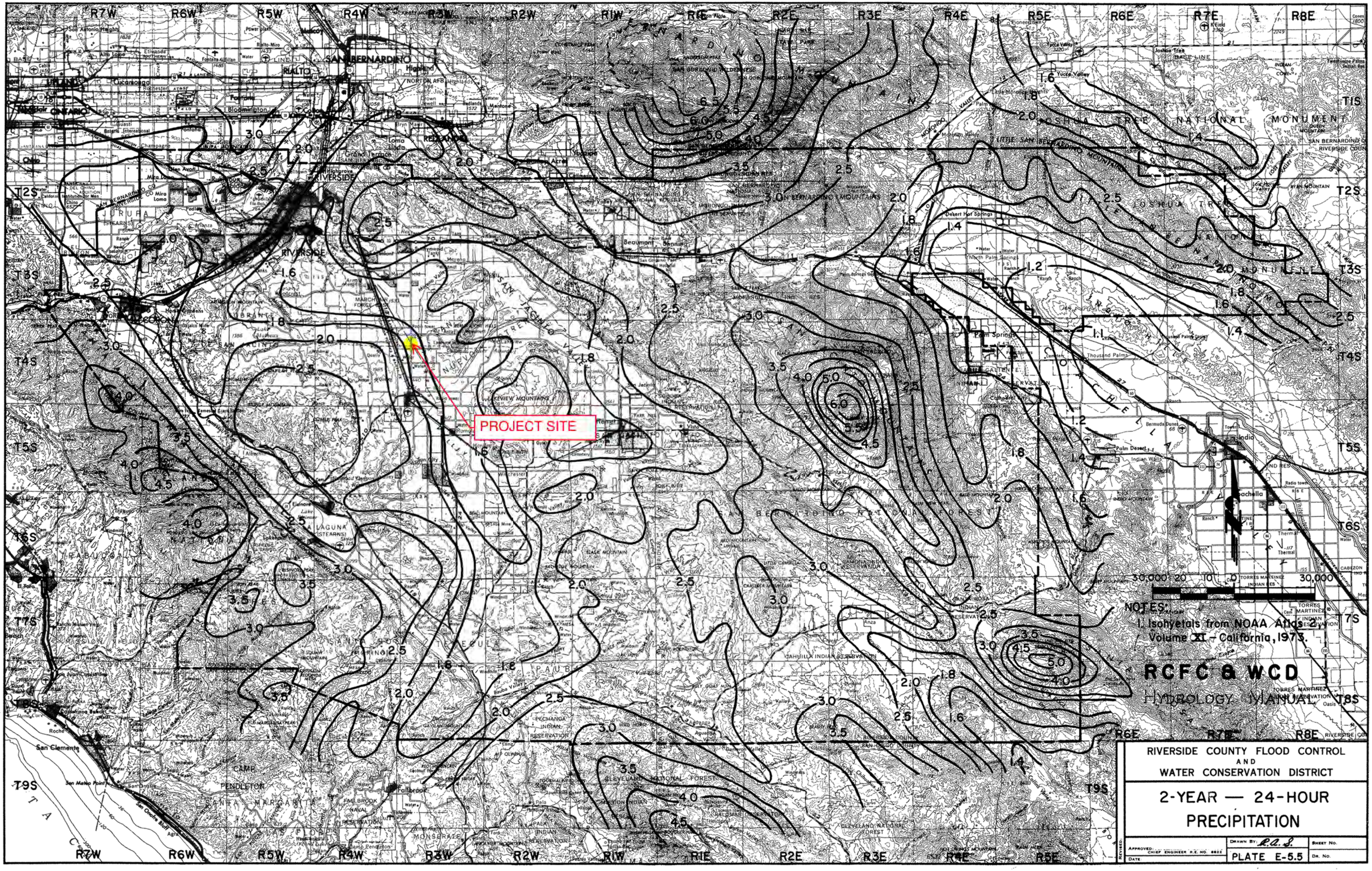
PROJECT SITE
R7W
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R5W
R4W
R3W
R2W
R1W
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R2E
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R5E
R6E
R7E
R8E
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
SAN BERNARDINO
RIVERSIDE
RIALTO
NORTON AFB
Highland
Loma Linda
Mira Loma
Corona
Elsinore
Lake Elsinore
Temecula
Fallbrook
San Clemente
Camp Pendleton
Beaumont
Banning
Yucaipa
Cherry Valley
Palm Springs
Desert Hot Springs
North Palm Springs
Thousand Palms
Indio
Coachella
Indian Wells
Palm Desert
Bermuda Dunes
Yucca Valley
Joshua Tree
SAN BERNARDINO MOUNTAINS
SAN JACINTO MOUNTAINS
SAN JACINTO FAULT
SAN ANDREAS FAULT
JOSHUA TREE NATIONAL MONUMENT
SANTA ROSA PLATEAU
SANTA MARGARITA
VAQUITAS
PECHANGA INDIAN RESERVATION
AGUANGA INDIAN RESERVATION
CAHUILLA INDIAN RESERVATION
MARCH AIR FORCE BASE
CLEVELAND NATIONAL FOREST
30,000 20 10 0 30,000
NOTES:
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973.
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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 24-HOUR PRECIPITATION
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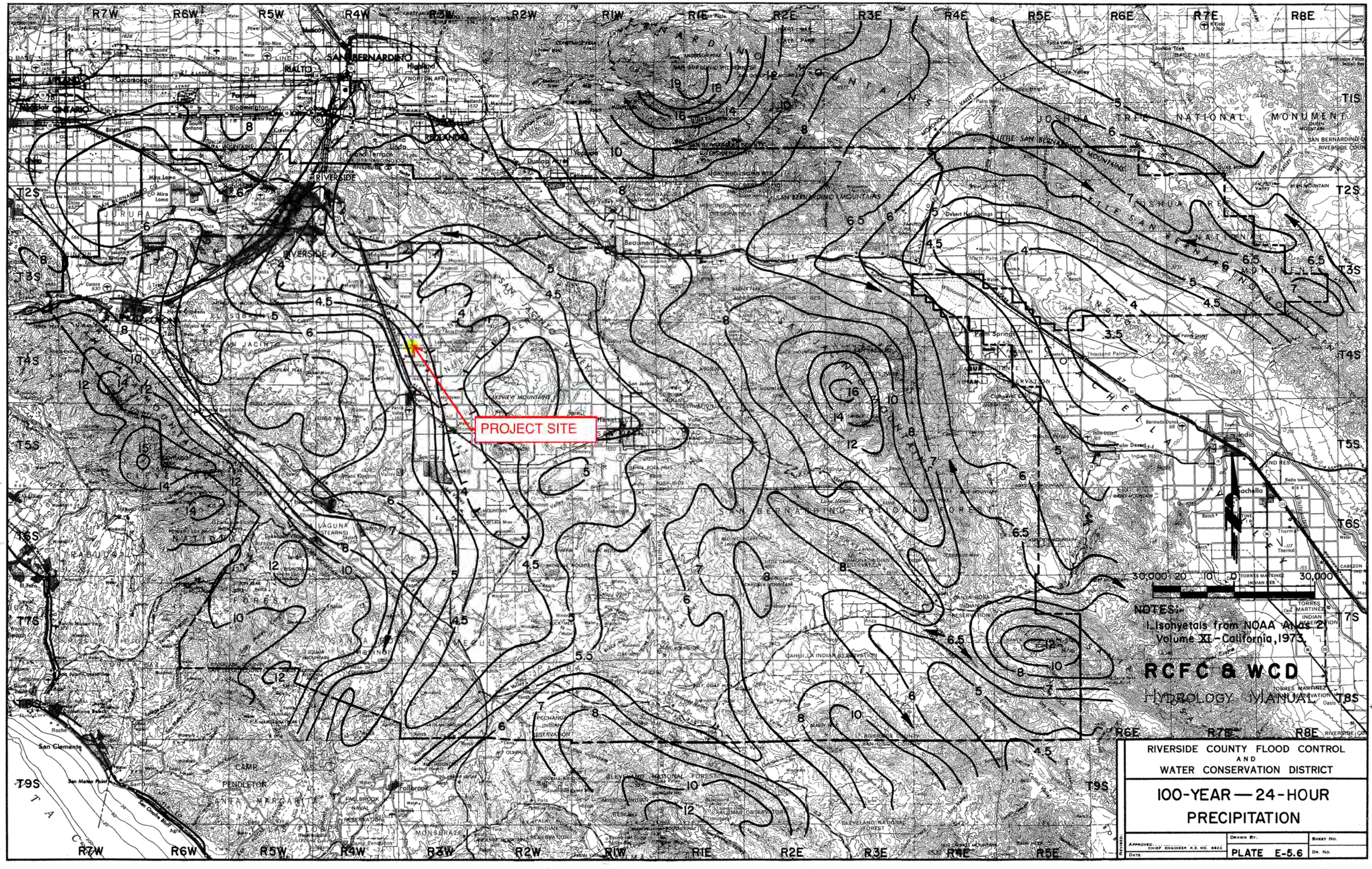
PLATE E-5.5
DR. NO.


PROJECT SITE
R7W
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R8E
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T4S
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T6S
T7S
T8S
T9S
SAN BERNARDINO
RIVERSIDE
RIALTO
JURUPA
NORTON AFB
SAN BERNARDINO MOUNTAINS
JOSHUA TREE NATIONAL MONUMENT
SAN JACINTO MOUNTAINS
SAN JACINTO FAULT
SAN JACINTO VALLEY
SAN JACINTO WILDERNESS
SAN GORGONIO WILDERNESS
SAN ANDREAS FAULT
CAMP PENDLETON
SANTA MARGARITA
LAGUNA MOUNTAINS
CLEVELAND NATIONAL FOREST
PALM SPRINGS
Beaumont
Banning
Hemet
Perris
Corona
Riverside
Temecula
Murrieta
Fallbrook
San Clemente
Indio
Coachella
30,000 20 10 0 30,000
NOTES:
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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR PRECIPITATION
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PLATE E-5.6
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