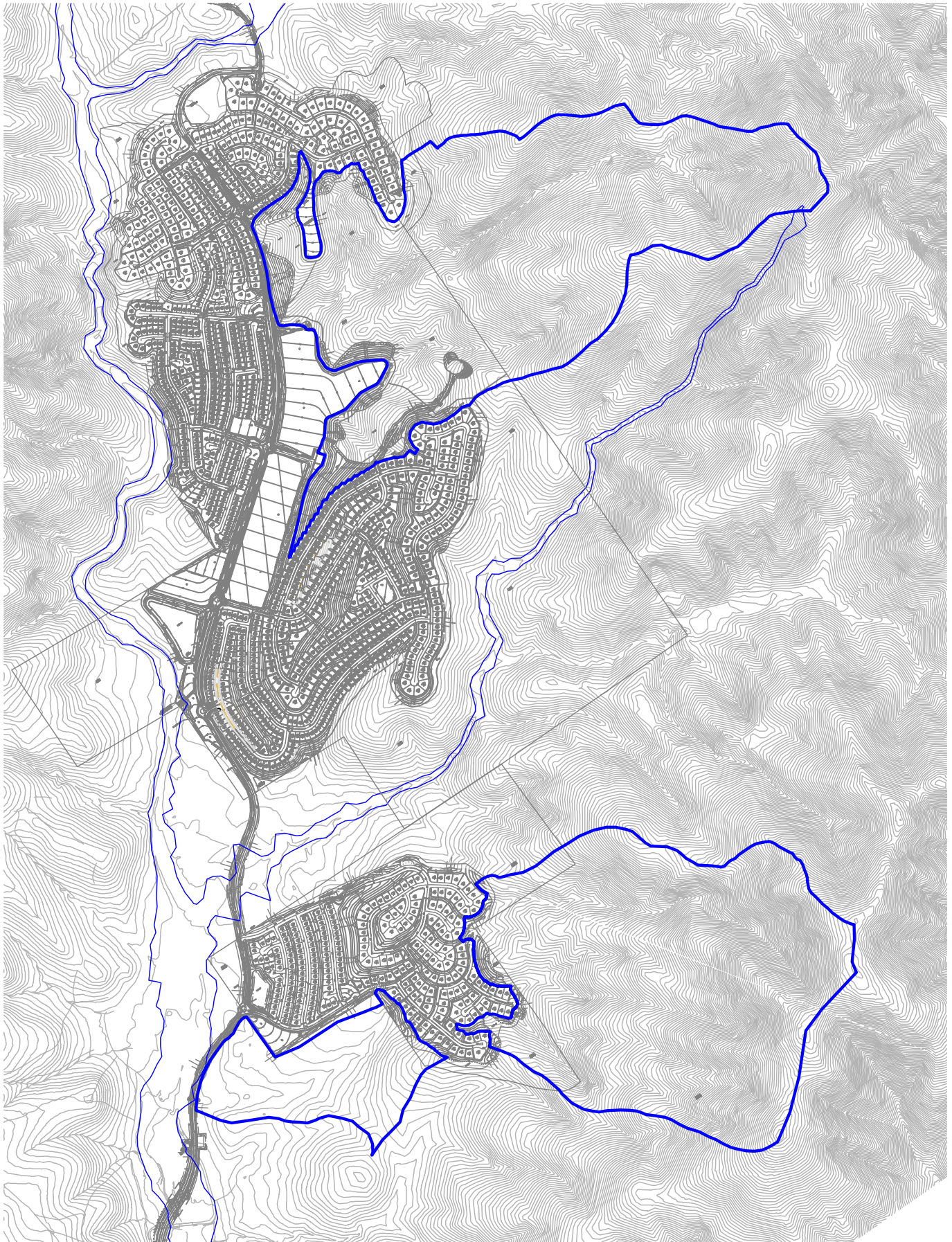# CHAPTER 4

4.1.3 – Rational Method Hydrologic Analysis (AES 2015)

Eastern Slopes Drainage Area bypassing WQ Basins

LAND EXCHANGE ALTERNATIVE
EASTERN SLOPES DRAINAGE AREA ROUTED THROUGH SITE
(NOT TRIBUTARY TO ANY WQ BASIN)

K:\1235\Hyd\ACAD\HYDRO\TM- Land Exchange EIR\1235- HYDRO V14- PROP.dwg[]May-02-2017:18:05

W.O.# 3087-0002

```
 _____
 *************************************************************************

              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
              Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                       2003,1985,1981 HYDROLOGY MANUAL
            (c) Copyright 1982-2010 Advanced Engineering Software (aes)
                Ver. 17.0 Release Date: 07/01/2010  License ID 1239


                            Analysis prepared by:

                    Hunsaker & Associates San Diego, Inc.
                            9707 Waples Street
                            San Diego, CA  92121


  ************************* DESCRIPTION OF STUDY *************************
  * VILLAGE 14 TM HYDROLOGY ANALYSIS                                    *
  * OFFSITE SLOPES CONVEYED THROUGH SITE BUT NOT THROUGH WQ BASINS.     *
  * 100- YEAR RETURN INTERVAL.  W.O. 2421-31.                           *
  ***********************************************************************

    FILE NAME: R:\1235\HYD\CALCS\AES\TM\OFF.DAT
    TIME/DATE OF STUDY: 16:41 06/01/2015
  -------------------------------------------------------------------------
    USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
  -------------------------------------------------------------------------
    2003 SAN DIEGO MANUAL CRITERIA

    USER SPECIFIED STORM EVENT(YEAR) = 100.00
    6-HOUR DURATION PRECIPITATION (INCHES) =  3.100
    SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
    SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
    SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
    NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
   *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
      HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
      WIDTH  CROSSFALL  IN- / OUT-/PARK- HEIGHT  WIDTH  LIP   HIKE  FACTOR
  NO.  (FT)    (FT)     SIDE / SIDE/ WAY   (FT)    (FT)  (FT)  (FT)   (n)
  === ===== ========= ================= ===== ===== ===== ===== =======
   1  16.0      8.0    0.020/0.020/0.020  0.50   2.00 0.0313 0.125 0.0150
   2  12.0      6.0    0.020/0.020/0.020  0.50   1.50 0.0313 0.125 0.0130

    GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
      1. Relative Flow-Depth =  0.00 FEET
         as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
      2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
     *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
      OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

  *************************************************************************
    FLOW PROCESS FROM NODE   850.00 TO NODE   851.00 IS CODE =  21
  -------------------------------------------------------------------------
    >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  =========================================================================
   *USER SPECIFIED(SUBAREA):
   NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   1890.00
   DOWNSTREAM ELEVATION(FEET) =  1880.00
   ELEVATION DIFFERENCE(FEET) =     10.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.061
   SUBAREA RUNOFF(CFS) =      1.61
   TOTAL AREA(ACRES) =       0.65   TOTAL RUNOFF(CFS) =      1.61

  *************************************************************************
    FLOW PROCESS FROM NODE   851.00 TO NODE   852.00 IS CODE =  53
  -------------------------------------------------------------------------
    >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
    >>>>>TRAVELTIME THRU SUBAREA<<<<<
  =========================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   1880.00  DOWNSTREAM(FEET) =   1425.00
   CHANNEL LENGTH THRU SUBAREA(FEET) = 1052.00   CHANNEL SLOPE = 0.4325
   CHANNEL FLOW THRU SUBAREA(CFS) =      1.61
   FLOW VELOCITY(FEET/SEC) =   4.31 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
   TRAVEL TIME(MIN.) =   4.07   Tc(MIN.) =   10.33
   LONGEST FLOWPATH FROM NODE    850.00 TO NODE    852.00 =   1152.00 FEET.

  *************************************************************************
    FLOW PROCESS FROM NODE   851.00 TO NODE   852.00 IS CODE =  81
  -------------------------------------------------------------------------
    >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
  =========================================================================
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.114
   *USER SPECIFIED(SUBAREA):
   NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   18.66   SUBAREA RUNOFF(CFS) =   33.40
  TOTAL AREA(ACRES) =       19.3   TOTAL RUNOFF(CFS) =       34.56
  TC(MIN.) =   10.33

*****************************************************************************
  FLOW PROCESS FROM NODE   852.00 TO NODE    853.00 IS CODE =  52
-----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
=============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1425.00  DOWNSTREAM(FEET) =   1260.00
  CHANNEL LENGTH THRU SUBAREA(FEET) = 1057.00   CHANNEL SLOPE = 0.1561
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =     34.56
  FLOW VELOCITY(FEET/SEC) = 11.02 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =   11.93
  LONGEST FLOWPATH FROM NODE    850.00 TO NODE    853.00 =    2209.00 FEET.

*****************************************************************************
  FLOW PROCESS FROM NODE   852.00 TO NODE    853.00 IS CODE =  81
-----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.661
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   36.90   SUBAREA RUNOFF(CFS) =   60.20
  TOTAL AREA(ACRES) =       56.2   TOTAL RUNOFF(CFS) =       91.70
  TC(MIN.) =   11.93

*****************************************************************************
  FLOW PROCESS FROM NODE   853.00 TO NODE    854.00 IS CODE =  52
-----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
=============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1260.00  DOWNSTREAM(FEET) =   1150.00
  CHANNEL LENGTH THRU SUBAREA(FEET) = 1048.00   CHANNEL SLOPE = 0.1050
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =     91.70
  FLOW VELOCITY(FEET/SEC) = 14.63 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.19   Tc(MIN.) =   13.13
  LONGEST FLOWPATH FROM NODE    850.00 TO NODE    854.00 =    3257.00 FEET.

*****************************************************************************
  FLOW PROCESS FROM NODE   853.00 TO NODE    854.00 IS CODE =  81
-----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.383
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   31.63   SUBAREA RUNOFF(CFS) =   48.52
  TOTAL AREA(ACRES) =       87.8   TOTAL RUNOFF(CFS) =      134.74
  TC(MIN.) =   13.13

*****************************************************************************
  FLOW PROCESS FROM NODE   854.00 TO NODE    855.00 IS CODE =  52
-----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
=============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1150.00  DOWNSTREAM(FEET) =   1040.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  992.00   CHANNEL SLOPE = 0.1109
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =     134.74
  FLOW VELOCITY(FEET/SEC) = 16.43 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.01   Tc(MIN.) =   14.13
  LONGEST FLOWPATH FROM NODE    850.00 TO NODE    855.00 =    4249.00 FEET.

*****************************************************************************
  FLOW PROCESS FROM NODE   854.00 TO NODE    855.00 IS CODE =  81
-----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.179
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   32.36   SUBAREA RUNOFF(CFS) =   47.33
  TOTAL AREA(ACRES) =      120.2   TOTAL RUNOFF(CFS) =      175.80
  TC(MIN.) =   14.13

*****************************************************************************
```

```
  FLOW PROCESS FROM NODE    855.00 TO NODE    856.00 IS CODE =  52
------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1040.00  DOWNSTREAM(FEET) =    880.00
  CHANNEL LENGTH THRU SUBAREA(FEET) = 1077.00   CHANNEL SLOPE = 0.1486
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =     175.80
  FLOW VELOCITY(FEET/SEC) = 17.82 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.01   Tc(MIN.) =   15.14
  LONGEST FLOWPATH FROM NODE    850.00 TO NODE    856.00 =   5326.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    855.00 TO NODE    856.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.997
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   37.32   SUBAREA RUNOFF(CFS) =   52.21
  TOTAL AREA(ACRES) =      157.5   TOTAL RUNOFF(CFS) =     220.38
  TC(MIN.) =   15.14

******************************************************************************
  FLOW PROCESS FROM NODE    856.00 TO NODE    857.00 IS CODE =  52
------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    880.00  DOWNSTREAM(FEET) =    750.00
  CHANNEL LENGTH THRU SUBAREA(FEET) = 1297.00   CHANNEL SLOPE = 0.1002
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =     220.38
  FLOW VELOCITY(FEET/SEC) = 19.11 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.13   Tc(MIN.) =   16.27
  LONGEST FLOWPATH FROM NODE    850.00 TO NODE    857.00 =   6623.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    856.00 TO NODE    857.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.816
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   42.96   SUBAREA RUNOFF(CFS) =   57.37
  TOTAL AREA(ACRES) =      200.5   TOTAL RUNOFF(CFS) =     267.75
  TC(MIN.) =   16.27

******************************************************************************
  FLOW PROCESS FROM NODE    858.00 TO NODE    857.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.816
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    5.02   SUBAREA RUNOFF(CFS) =    6.70
  TOTAL AREA(ACRES) =      205.5   TOTAL RUNOFF(CFS) =     274.45
  TC(MIN.) =   16.27

******************************************************************************
  FLOW PROCESS FROM NODE    857.00 TO NODE    859.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    750.00  DOWNSTREAM(FEET) =    740.00
  FLOW LENGTH(FEET) =    400.00   MANNING'S N = 0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) = 21.58
  ESTIMATED PIPE DIAMETER(INCH) = 54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    274.45
  PIPE TRAVEL TIME(MIN.) =   0.31   Tc(MIN.) =   16.58
  LONGEST FLOWPATH FROM NODE    850.00 TO NODE    859.00 =   7023.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    859.00 TO NODE    859.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS = 2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.58
  RAINFALL INTENSITY(INCH/HR) =    3.77
  TOTAL STREAM AREA(ACRES) =   205.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    274.45


*******************************************************************************
  FLOW PROCESS FROM NODE    860.00 TO NODE    861.00 IS CODE = 21
-------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
===============================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =    0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    915.00
  DOWNSTREAM ELEVATION(FEET) =    905.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
  SUBAREA RUNOFF(CFS) =      0.82
  TOTAL AREA(ACRES) =       0.33   TOTAL RUNOFF(CFS) =       0.82


*******************************************************************************
  FLOW PROCESS FROM NODE    861.00 TO NODE    862.00 IS CODE = 31
-------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
===============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    905.00  DOWNSTREAM(FEET) =    800.00
  FLOW LENGTH(FEET) =  1115.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.62
  ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.82
  PIPE TRAVEL TIME(MIN.) =   2.44    Tc(MIN.) =    8.70
  LONGEST FLOWPATH FROM NODE    860.00 TO NODE    862.00 =   1215.00 FEET.


*******************************************************************************
  FLOW PROCESS FROM NODE    861.00 TO NODE    862.00 IS CODE = 81
-------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
===============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.712
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =    0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    9.02   SUBAREA RUNOFF(CFS) =   18.03
  TOTAL AREA(ACRES) =        9.4   TOTAL RUNOFF(CFS) =      18.69
  TC(MIN.) =    8.70


*******************************************************************************
  FLOW PROCESS FROM NODE    862.00 TO NODE    859.00 IS CODE = 31
-------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
===============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    800.00  DOWNSTREAM(FEET) =    740.00
  FLOW LENGTH(FEET) =   986.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.64
  ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.69
  PIPE TRAVEL TIME(MIN.) =   1.05    Tc(MIN.) =    9.75
  LONGEST FLOWPATH FROM NODE    860.00 TO NODE    859.00 =   2201.00 FEET.


*******************************************************************************
  FLOW PROCESS FROM NODE    859.00 TO NODE    859.00 IS CODE =   1
-------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
===============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.75
  RAINFALL INTENSITY(INCH/HR) =    5.31
  TOTAL STREAM AREA(ACRES) =      9.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.69

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER     (CFS)      (MIN.)   (INCH/HOUR)    (ACRE)
     1      274.45    16.58       3.770        205.50
     2       18.69     9.75       5.307          9.35

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc       INTENSITY
   NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
      1       180.18     9.75       5.307
      2       287.73    16.58       3.770

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     287.73   Tc(MIN.) =   16.58
  TOTAL AREA(ACRES) =       214.8
  LONGEST FLOWPATH FROM NODE    850.00 TO NODE    859.00 =    7023.00 FEET.

*******************************************************************************
   FLOW PROCESS FROM NODE    859.00 TO NODE    863.00 IS CODE =  31
-------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
===============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   740.00  DOWNSTREAM(FEET) =   705.00
  FLOW LENGTH(FEET) = 1318.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) = 22.28
  ESTIMATED PIPE DIAMETER(INCH) = 54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      287.73
  PIPE TRAVEL TIME(MIN.) =    0.99   Tc(MIN.) =   17.56
  LONGEST FLOWPATH FROM NODE    850.00 TO NODE    863.00 =    8341.00 FEET.

*******************************************************************************
   FLOW PROCESS FROM NODE    863.00 TO NODE    863.00 IS CODE =  10
-------------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
===============================================================================

*******************************************************************************
   FLOW PROCESS FROM NODE    865.00 TO NODE    866.00 IS CODE =  21
-------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
===============================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1540.00
  DOWNSTREAM ELEVATION(FEET) =   1530.00
  ELEVATION DIFFERENCE(FEET) =      10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
  SUBAREA RUNOFF(CFS) =       0.49
  TOTAL AREA(ACRES) =       0.20   TOTAL RUNOFF(CFS) =       0.49

*******************************************************************************
   FLOW PROCESS FROM NODE    866.00 TO NODE    867.00 IS CODE =  53
-------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
===============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1530.00  DOWNSTREAM(FEET) =   1175.00
  CHANNEL LENGTH THRU SUBAREA(FEET) = 1014.00   CHANNEL SLOPE = 0.3501
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.49
  FLOW VELOCITY(FEET/SEC) =   3.31 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.10   Tc(MIN.) =   11.37
  LONGEST FLOWPATH FROM NODE    865.00 TO NODE    867.00 =    1114.00 FEET.

*******************************************************************************
   FLOW PROCESS FROM NODE    866.00 TO NODE    867.00 IS CODE =  81
-------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
===============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.809
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   12.73   SUBAREA RUNOFF(CFS) =   21.43
  TOTAL AREA(ACRES) =       12.9   TOTAL RUNOFF(CFS) =       21.76
  TC(MIN.) =   11.37

*******************************************************************************
   FLOW PROCESS FROM NODE    867.00 TO NODE    868.00 IS CODE =  52
-------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
===============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1175.00  DOWNSTREAM(FEET) =    930.00
  CHANNEL LENGTH THRU SUBAREA(FEET) = 1050.00   CHANNEL SLOPE = 0.2333
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       21.76
  FLOW VELOCITY(FEET/SEC) =   9.69 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
```

```
      TRAVEL TIME(MIN.) =    1.81   Tc(MIN.) =    13.17
      LONGEST FLOWPATH FROM NODE    865.00 TO NODE    868.00 =   2164.00 FEET.


  *******************************************************************************
     FLOW PROCESS FROM NODE    867.00 TO NODE    868.00 IS CODE =  81
  -------------------------------------------------------------------------
     >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
  ===============================================================================
     100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.373
     *USER SPECIFIED(SUBAREA):
     NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
     S.C.S. CURVE NUMBER (AMC II) =   0
     AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
     SUBAREA AREA(ACRES) =   22.59   SUBAREA RUNOFF(CFS) =   34.57
     TOTAL AREA(ACRES) =        35.5   TOTAL RUNOFF(CFS) =       54.36
     TC(MIN.) =   13.17


  *******************************************************************************
     FLOW PROCESS FROM NODE    868.00 TO NODE    869.00 IS CODE =  52
  -------------------------------------------------------------------------
     >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
     >>>>>TRAVELTIME THRU SUBAREA<<<<<
  ===============================================================================
     ELEVATION DATA: UPSTREAM(FEET) =    930.00  DOWNSTREAM(FEET) =    780.00
     CHANNEL LENGTH THRU SUBAREA(FEET) = 1086.00   CHANNEL SLOPE =  0.1381
     NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
     CHANNEL FLOW THRU SUBAREA(CFS) =     54.36
     FLOW VELOCITY(FEET/SEC) = 12.54 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
     TRAVEL TIME(MIN.) =   1.44   Tc(MIN.) =   14.62
     LONGEST FLOWPATH FROM NODE    865.00 TO NODE    869.00 =   3250.00 FEET.


  *******************************************************************************
     FLOW PROCESS FROM NODE    868.00 TO NODE    869.00 IS CODE =  81
  -------------------------------------------------------------------------
     >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
  ===============================================================================
     100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.089
     *USER SPECIFIED(SUBAREA):
     NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
     S.C.S. CURVE NUMBER (AMC II) =   0
     AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
     SUBAREA AREA(ACRES) =   44.20   SUBAREA RUNOFF(CFS) =   63.26
     TOTAL AREA(ACRES) =        79.7   TOTAL RUNOFF(CFS) =      114.09
     TC(MIN.) =   14.62


  *******************************************************************************
     FLOW PROCESS FROM NODE    869.00 TO NODE    872.00 IS CODE =  31
  -------------------------------------------------------------------------
     >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
     >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
  ===============================================================================
     ELEVATION DATA: UPSTREAM(FEET) =    780.00  DOWNSTREAM(FEET) =    755.00
     FLOW LENGTH(FEET) =    730.00   MANNING'S N =  0.013
     DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.0 INCHES
     PIPE-FLOW VELOCITY(FEET/SEC.) = 19.36
     ESTIMATED PIPE DIAMETER(INCH) = 36.00    NUMBER OF PIPES =   1
     PIPE-FLOW(CFS) =      114.09
     PIPE TRAVEL TIME(MIN.) =   0.63   Tc(MIN.) =   15.24
     LONGEST FLOWPATH FROM NODE    865.00 TO NODE    872.00 =   3980.00 FEET.


  *******************************************************************************
     FLOW PROCESS FROM NODE    872.00 TO NODE    872.00 IS CODE =   1
  -------------------------------------------------------------------------
     >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  ===============================================================================
     TOTAL NUMBER OF STREAMS =  2
     CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
     TIME OF CONCENTRATION(MIN.) =   15.24
     RAINFALL INTENSITY(INCH/HR) =   3.98
     TOTAL STREAM AREA(ACRES) =    79.72
     PEAK FLOW RATE(CFS) AT CONFLUENCE =    114.09


  *******************************************************************************
     FLOW PROCESS FROM NODE    870.00 TO NODE    871.00 IS CODE =  21
  -------------------------------------------------------------------------
     >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  ===============================================================================
     *USER SPECIFIED(SUBAREA):
     NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
     S.C.S. CURVE NUMBER (AMC II) =   0
     INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
     UPSTREAM ELEVATION(FEET) =   950.00
     DOWNSTREAM ELEVATION(FEET) =    940.00
     ELEVATION DIFFERENCE(FEET) =    10.00
     SUBAREA OVERLAND TIME OF FLOW(MIN.) =   6.267
     WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
      100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
     SUBAREA RUNOFF(CFS) =      0.79
     TOTAL AREA(ACRES) =       0.32   TOTAL RUNOFF(CFS) =      0.79
```

```
******************************************************************************
  FLOW PROCESS FROM NODE   871.00 TO NODE   872.00 IS CODE =  52
------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    930.00  DOWNSTREAM(FEET) =    755.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   864.00   CHANNEL SLOPE =  0.2025
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =      0.79
  FLOW VELOCITY(FEET/SEC) =   4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.04   Tc(MIN.) =    9.30
  LONGEST FLOWPATH FROM NODE    870.00 TO NODE    872.00 =    964.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE   871.00 TO NODE   872.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.473
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    9.68   SUBAREA RUNOFF(CFS) =   18.54
  TOTAL AREA(ACRES) =       10.0   TOTAL RUNOFF(CFS) =      19.15
  TC(MIN.) =    9.30

******************************************************************************
  FLOW PROCESS FROM NODE   872.00 TO NODE   872.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.30
  RAINFALL INTENSITY(INCH/HR) =   5.47
  TOTAL STREAM AREA(ACRES) =     10.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.15

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc        INTENSITY      AREA
  NUMBER     (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1      114.09     15.24        3.980        79.72
     2       19.15      9.30        5.473        10.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
     1       88.78      9.30        5.473
     2      128.02     15.24        3.980

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      128.02   Tc(MIN.) =   15.24
  TOTAL AREA(ACRES) =        89.7
  LONGEST FLOWPATH FROM NODE    865.00 TO NODE    872.00 =   3980.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE   872.00 TO NODE   877.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    755.00  DOWNSTREAM(FEET) =    730.00
  FLOW LENGTH(FEET) =   460.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.04
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     128.02
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   15.56
  LONGEST FLOWPATH FROM NODE    865.00 TO NODE    877.00 =   4440.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE   877.00 TO NODE   877.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.56
  RAINFALL INTENSITY(INCH/HR) =   3.93
  TOTAL STREAM AREA(ACRES) =    89.72
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    128.02

******************************************************************************
```

```
   FLOW PROCESS FROM NODE    875.00 TO NODE    876.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    895.00
  DOWNSTREAM ELEVATION(FEET) =    885.00
  ELEVATION DIFFERENCE(FEET) =    10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
  SUBAREA RUNOFF(CFS) =      0.72
  TOTAL AREA(ACRES) =      0.29   TOTAL RUNOFF(CFS) =      0.72

****************************************************************************
   FLOW PROCESS FROM NODE    876.00 TO NODE    877.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    885.00  DOWNSTREAM(FEET) =    735.00
  FLOW LENGTH(FEET) =    587.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) = 10.40
  ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.72
  PIPE TRAVEL TIME(MIN.) =   0.94   Tc(MIN.) =    7.21
  LONGEST FLOWPATH FROM NODE    875.00 TO NODE    877.00 =    687.00 FEET.

****************************************************************************
   FLOW PROCESS FROM NODE    876.00 TO NODE    877.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.451
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.92   SUBAREA RUNOFF(CFS) =    6.59
  TOTAL AREA(ACRES) =        3.2   TOTAL RUNOFF(CFS) =       7.25
  TC(MIN.) =    7.21

****************************************************************************
   FLOW PROCESS FROM NODE    877.00 TO NODE    877.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.21
  RAINFALL INTENSITY(INCH/HR) =   6.45
  TOTAL STREAM AREA(ACRES) =     3.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.25

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY      AREA
  NUMBER     (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
    1      128.02    15.56       3.927        89.72
    2        7.25     7.21       6.451         3.21

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
    1       85.17     7.21        6.451
    2      132.43    15.56        3.927

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      132.43   Tc(MIN.) =   15.56
  TOTAL AREA(ACRES) =        92.9
  LONGEST FLOWPATH FROM NODE    865.00 TO NODE    877.00 =   4440.00 FEET.

****************************************************************************
   FLOW PROCESS FROM NODE    877.00 TO NODE    878.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    730.00  DOWNSTREAM(FEET) =    720.00
  FLOW LENGTH(FEET) =    288.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) = 20.41
```

```
   ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =     132.43
   PIPE TRAVEL TIME(MIN.) =   0.24   Tc(MIN.) =   15.80
   LONGEST FLOWPATH FROM NODE   865.00 TO NODE   878.00 =   4728.00 FEET.

*******************************************************************************
   FLOW PROCESS FROM NODE   878.00 TO NODE   878.00 IS CODE =   1
-------------------------------------------------------------------------------
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
===============================================================================
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   15.80
   RAINFALL INTENSITY(INCH/HR) =   3.89
   TOTAL STREAM AREA(ACRES) =   92.93
   PEAK FLOW RATE(CFS) AT CONFLUENCE =   132.43

*******************************************************************************
   FLOW PROCESS FROM NODE   880.00 TO NODE   881.00 IS CODE =  21
-------------------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
===============================================================================
   *USER SPECIFIED(SUBAREA):
   NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =   880.00
   DOWNSTREAM ELEVATION(FEET) =   870.00
   ELEVATION DIFFERENCE(FEET) =   10.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =   6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =   7.061
   SUBAREA RUNOFF(CFS) =     0.35
   TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.35

*******************************************************************************
   FLOW PROCESS FROM NODE   881.00 TO NODE   882.00 IS CODE =  53
-------------------------------------------------------------------------------
   >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA<<<<<
===============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   870.00  DOWNSTREAM(FEET) =   725.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   650.00   CHANNEL SLOPE = 0.2231
   NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
   CHANNEL FLOW THRU SUBAREA(CFS) =     0.35
   FLOW VELOCITY(FEET/SEC) =   2.64 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
   TRAVEL TIME(MIN.) =   4.10   Tc(MIN.) =   10.36
   LONGEST FLOWPATH FROM NODE   880.00 TO NODE   882.00 =    750.00 FEET.

*******************************************************************************
   FLOW PROCESS FROM NODE   881.00 TO NODE   882.00 IS CODE =  81
-------------------------------------------------------------------------------
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
===============================================================================
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.105
   *USER SPECIFIED(SUBAREA):
   NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
   SUBAREA AREA(ACRES) =     5.76   SUBAREA RUNOFF(CFS) =   10.29
   TOTAL AREA(ACRES) =        5.9   TOTAL RUNOFF(CFS) =      10.54
   TC(MIN.) =   10.36

*******************************************************************************
   FLOW PROCESS FROM NODE   882.00 TO NODE   878.00 IS CODE =  31
-------------------------------------------------------------------------------
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
===============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   725.00  DOWNSTREAM(FEET) =   720.00
   FLOW LENGTH(FEET) =   300.00   MANNING'S N = 0.013
   DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   8.31
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      10.54
   PIPE TRAVEL TIME(MIN.) =   0.60   Tc(MIN.) =   10.96
   LONGEST FLOWPATH FROM NODE   880.00 TO NODE   878.00 =   1050.00 FEET.

*******************************************************************************
   FLOW PROCESS FROM NODE   878.00 TO NODE   878.00 IS CODE =   1
-------------------------------------------------------------------------------
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
===============================================================================
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =   10.96
   RAINFALL INTENSITY(INCH/HR) =   4.92
   TOTAL STREAM AREA(ACRES) =     5.90
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.54
```

```
   ** CONFLUENCE DATA **
   STREAM    RUNOFF     Tc      INTENSITY     AREA
   NUMBER    (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      132.43   15.80       3.889        92.93
      2       10.54   10.96       4.922         5.90

   RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
   CONFLUENCE FORMULA USED FOR  2 STREAMS.

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF     Tc      INTENSITY
   NUMBER    (CFS)    (MIN.)   (INCH/HOUR)
      1      115.18   10.96       4.922
      2      140.76   15.80       3.889

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     140.76   Tc(MIN.) =   15.80
   TOTAL AREA(ACRES) =        98.8
   LONGEST FLOWPATH FROM NODE   865.00 TO NODE    878.00 =   4728.00 FEET.

*******************************************************************************
   FLOW PROCESS FROM NODE   878.00 TO NODE    863.00 IS CODE =  31
-------------------------------------------------------------------------------
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
===============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   720.00  DOWNSTREAM(FEET) =   705.00
   FLOW LENGTH(FEET) =   478.00   MANNING'S N =  0.013
   DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.5 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  19.59
   ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =     140.76
   PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   16.20
   LONGEST FLOWPATH FROM NODE   865.00 TO NODE    863.00 =   5206.00 FEET.

*******************************************************************************
   FLOW PROCESS FROM NODE   863.00 TO NODE    863.00 IS CODE =  11
-------------------------------------------------------------------------------
   >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
===============================================================================

   ** MAIN STREAM CONFLUENCE DATA **
   STREAM    RUNOFF     Tc      INTENSITY     AREA
   NUMBER    (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      140.76   16.20       3.826        98.83
   LONGEST FLOWPATH FROM NODE   865.00 TO NODE    863.00 =   5206.00 FEET.

   ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM    RUNOFF     Tc      INTENSITY     AREA
   NUMBER    (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      287.73   17.56       3.632       214.85
   LONGEST FLOWPATH FROM NODE   850.00 TO NODE    863.00 =   8341.00 FEET.

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF     Tc      INTENSITY
   NUMBER    (CFS)    (MIN.)   (INCH/HOUR)
      1      406.21   16.20       3.826
      2      421.36   17.56       3.632

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     421.36   Tc(MIN.) =   17.56
   TOTAL AREA(ACRES) =       313.7

*******************************************************************************
   FLOW PROCESS FROM NODE   863.00 TO NODE    863.00 IS CODE =  12
-------------------------------------------------------------------------------
   >>>>>CLEAR MEMORY BANK # 1 <<<<<
===============================================================================

*******************************************************************************
   FLOW PROCESS FROM NODE   863.00 TO NODE    883.00 IS CODE =  31
-------------------------------------------------------------------------------
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
===============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   705.00  DOWNSTREAM(FEET) =   618.00
   FLOW LENGTH(FEET) =  3114.00   MANNING'S N =  0.013
   DEPTH OF FLOW IN  60.0 INCH PIPE IS  48.8 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  24.63
   ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =     421.36
   PIPE TRAVEL TIME(MIN.) =   2.11    Tc(MIN.) =   19.67
   LONGEST FLOWPATH FROM NODE   850.00 TO NODE    883.00 =  11455.00 FEET.

   +-----------------------------------------------------------------------+
   |                                                                       |
   |                                                                       |
   |                                                                       |
   +-----------------------------------------------------------------------+
```

```
 ******************************************************************************
   FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
 ------------------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 ==============================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1870.00
  DOWNSTREAM ELEVATION(FEET) =   1860.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.061
  SUBAREA RUNOFF(CFS) =       0.67
  TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =       0.67

 ******************************************************************************
   FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  53
 ------------------------------------------------------------------------------
   >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA<<<<<
 ==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1860.00  DOWNSTREAM(FEET) =   1350.00
  CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00   CHANNEL SLOPE = 0.4880
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.67
  FLOW VELOCITY(FEET/SEC) =   3.91 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =    4.45   Tc(MIN.) =   10.72
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =    1145.00 FEET.

 ******************************************************************************
   FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  81
 ------------------------------------------------------------------------------
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 ==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.995
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   21.52   SUBAREA RUNOFF(CFS) =   37.62
  TOTAL AREA(ACRES) =       21.8   TOTAL RUNOFF(CFS) =       38.09
  TC(MIN.) =   10.72

 ******************************************************************************
   FLOW PROCESS FROM NODE    902.00 TO NODE    903.00 IS CODE =  52
 ------------------------------------------------------------------------------
   >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA<<<<<
 ==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1350.00  DOWNSTREAM(FEET) =    960.00
  CHANNEL LENGTH THRU SUBAREA(FEET) = 1672.00   CHANNEL SLOPE = 0.2333
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       38.09
  FLOW VELOCITY(FEET/SEC) =  11.32 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =    2.46   Tc(MIN.) =   13.18
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    903.00 =    2817.00 FEET.

 ******************************************************************************
   FLOW PROCESS FROM NODE    902.00 TO NODE    903.00 IS CODE =  81
 ------------------------------------------------------------------------------
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 ==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.371
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   43.96   SUBAREA RUNOFF(CFS) =   67.26
  TOTAL AREA(ACRES) =        65.8   TOTAL RUNOFF(CFS) =      100.59
  TC(MIN.) =   13.18

 ******************************************************************************
   FLOW PROCESS FROM NODE    903.00 TO NODE    904.00 IS CODE =  52
 ------------------------------------------------------------------------------
   >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA<<<<<
 ==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    960.00  DOWNSTREAM(FEET) =    730.00
  CHANNEL LENGTH THRU SUBAREA(FEET) = 2069.00   CHANNEL SLOPE = 0.1112
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =      100.59
  FLOW VELOCITY(FEET/SEC) =  15.04 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =    2.29   Tc(MIN.) =   15.47
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    904.00 =    4886.00 FEET.

 ******************************************************************************
```

```
   FLOW PROCESS FROM NODE    903.00 TO NODE    904.00 IS CODE =   81
-----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.942
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   44.48   SUBAREA RUNOFF(CFS) =   61.36
  TOTAL AREA(ACRES) =       110.2   TOTAL RUNOFF(CFS) =      152.07
  TC(MIN.) =   15.47

*****************************************************************************
   FLOW PROCESS FROM NODE    904.00 TO NODE    905.00 IS CODE =   31
-----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   730.00  DOWNSTREAM(FEET) =   715.00
  FLOW LENGTH(FEET) =   546.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) = 19.20
  ESTIMATED PIPE DIAMETER(INCH) = 42.00     NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      152.07
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   15.95
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    905.00 =    5432.00 FEET.

*****************************************************************************
   FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   10
-----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
=============================================================================

*****************************************************************************
   FLOW PROCESS FROM NODE    910.00 TO NODE    911.00 IS CODE =   21
-----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=============================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =    0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1780.00
  DOWNSTREAM ELEVATION(FEET) =   1770.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.061
  SUBAREA RUNOFF(CFS) =      0.67
  TOTAL AREA(ACRES) =      0.27   TOTAL RUNOFF(CFS) =      0.67

*****************************************************************************
   FLOW PROCESS FROM NODE    911.00 TO NODE    912.00 IS CODE =   53
-----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
=============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1770.00  DOWNSTREAM(FEET) =   1240.00
  CHANNEL LENGTH THRU SUBAREA(FEET) = 1025.00   CHANNEL SLOPE =  0.5171
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  NOTE: CHANNEL SLOPE OF .5 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.67
  FLOW VELOCITY(FEET/SEC) =    3.96 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =    4.31   Tc(MIN.) =   10.58
  LONGEST FLOWPATH FROM NODE     910.00 TO NODE    912.00 =    1125.00 FEET.

*****************************************************************************
   FLOW PROCESS FROM NODE    911.00 TO NODE    912.00 IS CODE =   81
-----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.036
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =    0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   11.69   SUBAREA RUNOFF(CFS) =   20.61
  TOTAL AREA(ACRES) =       12.0   TOTAL RUNOFF(CFS) =      21.08
  TC(MIN.) =   10.58

*****************************************************************************
   FLOW PROCESS FROM NODE    912.00 TO NODE    913.00 IS CODE =   52
-----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
=============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1240.00  DOWNSTREAM(FEET) =    990.00
  CHANNEL LENGTH THRU SUBAREA(FEET) = 1000.00   CHANNEL SLOPE =  0.2500
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
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```
   CHANNEL FLOW THRU SUBAREA(CFS) =     21.08
   FLOW VELOCITY(FEET/SEC) =   9.61 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
   TRAVEL TIME(MIN.) =  1.73   Tc(MIN.) =   12.31
   LONGEST FLOWPATH FROM NODE   910.00 TO NODE   913.00 =   2125.00 FEET.

*******************************************************************************
   FLOW PROCESS FROM NODE   912.00 TO NODE   913.00 IS CODE = 81
-------------------------------------------------------------------------------
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
===============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.567
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   19.69   SUBAREA RUNOFF(CFS) =   31.47
  TOTAL AREA(ACRES) =       31.7   TOTAL RUNOFF(CFS) =      50.59
  TC(MIN.) =   12.31

*******************************************************************************
   FLOW PROCESS FROM NODE   913.00 TO NODE   914.00 IS CODE = 52
-------------------------------------------------------------------------------
   >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA<<<<<
===============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =    990.00  DOWNSTREAM(FEET) =    740.00
   CHANNEL LENGTH THRU SUBAREA(FEET) = 1297.00   CHANNEL SLOPE = 0.1928
   NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
   CHANNEL FLOW THRU SUBAREA(CFS) =     50.59
   FLOW VELOCITY(FEET/SEC) =  12.28 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
   TRAVEL TIME(MIN.) =  1.76   Tc(MIN.) =   14.08
   LONGEST FLOWPATH FROM NODE   910.00 TO NODE   914.00 =   3422.00 FEET.

*******************************************************************************
   FLOW PROCESS FROM NODE   913.00 TO NODE   914.00 IS CODE = 81
-------------------------------------------------------------------------------
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
===============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.190
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   37.07   SUBAREA RUNOFF(CFS) =   54.36
  TOTAL AREA(ACRES) =       68.7   TOTAL RUNOFF(CFS) =     100.77
  TC(MIN.) =   14.08

*******************************************************************************
   FLOW PROCESS FROM NODE   914.00 TO NODE   915.00 IS CODE = 31
-------------------------------------------------------------------------------
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
===============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   740.00  DOWNSTREAM(FEET) =   739.00
   FLOW LENGTH(FEET) =   200.00   MANNING'S N = 0.013
   DEPTH OF FLOW IN  51.0 INCH PIPE IS  36.7 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  9.23
   ESTIMATED PIPE DIAMETER(INCH) = 51.00    NUMBER OF PIPES =  1
   PIPE-FLOW(CFS) =    100.77
   PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   14.44
   LONGEST FLOWPATH FROM NODE   910.00 TO NODE   915.00 =   3622.00 FEET.

*******************************************************************************
   FLOW PROCESS FROM NODE   915.00 TO NODE   915.00 IS CODE =  1
-------------------------------------------------------------------------------
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
===============================================================================
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   14.44
   RAINFALL INTENSITY(INCH/HR) =   4.12
   TOTAL STREAM AREA(ACRES) =   68.72
   PEAK FLOW RATE(CFS) AT CONFLUENCE =    100.77

*******************************************************************************
   FLOW PROCESS FROM NODE   920.00 TO NODE   921.00 IS CODE = 21
-------------------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
===============================================================================
   *USER SPECIFIED(SUBAREA):
   NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =  1770.00
   DOWNSTREAM ELEVATION(FEET) =   1760.00
   ELEVATION DIFFERENCE(FEET) =    10.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =  .    0.59
```

```
          TOTAL AREA(ACRES) =      0.24    TOTAL RUNOFF(CFS) =      0.59


*****************************************************************************
   FLOW PROCESS FROM NODE    921.00 TO NODE    922.00 IS CODE = 53
-----------------------------------------------------------------------------
   >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA<<<<<
=============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   1760.00  DOWNSTREAM(FEET) =   1330.00
   CHANNEL LENGTH THRU SUBAREA(FEET) = 1171.00   CHANNEL SLOPE = 0.3672
   NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
   CHANNEL FLOW THRU SUBAREA(CFS) =      0.59
   FLOW VELOCITY(FEET/SEC) =  3.39 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
   TRAVEL TIME(MIN.) =  5.75   Tc(MIN.) =  12.02
   LONGEST FLOWPATH FROM NODE    920.00 TO NODE    922.00 =   1271.00 FEET.

*****************************************************************************
   FLOW PROCESS FROM NODE    921.00 TO NODE    922.00 IS CODE = 81
-----------------------------------------------------------------------------
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=============================================================================
     100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.639
   *USER SPECIFIED(SUBAREA):
   NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =    0
   AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
   SUBAREA AREA(ACRES) =   12.01   SUBAREA RUNOFF(CFS) =   19.50
   TOTAL AREA(ACRES) =       12.2   TOTAL RUNOFF(CFS) =      19.89
   TC(MIN.) =   12.02

*****************************************************************************
   FLOW PROCESS FROM NODE    922.00 TO NODE    923.00 IS CODE = 52
-----------------------------------------------------------------------------
   >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA<<<<<
=============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   1330.00  DOWNSTREAM(FEET) =   1080.00
   CHANNEL LENGTH THRU SUBAREA(FEET) = 1050.00   CHANNEL SLOPE = 0.2381
   NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
   CHANNEL FLOW THRU SUBAREA(CFS) =     19.89
   FLOW VELOCITY(FEET/SEC) =  9.46 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
   TRAVEL TIME(MIN.) =  1.85   Tc(MIN.) =  13.87
   LONGEST FLOWPATH FROM NODE    920.00 TO NODE    923.00 =   2321.00 FEET.

*****************************************************************************
   FLOW PROCESS FROM NODE    922.00 TO NODE    923.00 IS CODE = 81
-----------------------------------------------------------------------------
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=============================================================================
     100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.230
   *USER SPECIFIED(SUBAREA):
   NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =    0
   AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
   SUBAREA AREA(ACRES) =   26.58   SUBAREA RUNOFF(CFS) =   39.35
   TOTAL AREA(ACRES) =       38.8   TOTAL RUNOFF(CFS) =      57.49
   TC(MIN.) =   13.87

*****************************************************************************
   FLOW PROCESS FROM NODE    923.00 TO NODE    924.00 IS CODE = 52
-----------------------------------------------------------------------------
   >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA<<<<<
=============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   1080.00  DOWNSTREAM(FEET) =    740.00
   CHANNEL LENGTH THRU SUBAREA(FEET) = 1722.00   CHANNEL SLOPE = 0.1974
   NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
   CHANNEL FLOW THRU SUBAREA(CFS) =     57.49
   FLOW VELOCITY(FEET/SEC) = 12.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
   TRAVEL TIME(MIN.) =  2.25   Tc(MIN.) =  16.12
   LONGEST FLOWPATH FROM NODE    920.00 TO NODE    924.00 =   4043.00 FEET.

*****************************************************************************
   FLOW PROCESS FROM NODE    923.00 TO NODE    924.00 IS CODE = 81
-----------------------------------------------------------------------------
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=============================================================================
     100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.839
   *USER SPECIFIED(SUBAREA):
   NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =    0
   AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
   SUBAREA AREA(ACRES) =   33.93   SUBAREA RUNOFF(CFS) =   45.59
   TOTAL AREA(ACRES) =       72.8   TOTAL RUNOFF(CFS) =      97.76
   TC(MIN.) =   16.12

*****************************************************************************
   FLOW PROCESS FROM NODE    924.00 TO NODE    915.00 IS CODE = 31
-----------------------------------------------------------------------------
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
          >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   740.00  DOWNSTREAM(FEET) =   739.00
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.94
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      97.76
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   16.39
  LONGEST FLOWPATH FROM NODE   920.00 TO NODE   915.00 =   4203.00 FEET.


******************************************************************************
  FLOW PROCESS FROM NODE   915.00 TO NODE   915.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.39
  RAINFALL INTENSITY(INCH/HR) =   3.80
  TOTAL STREAM AREA(ACRES) =    72.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      97.76

  ** CONFLUENCE DATA **
  STREAM    RUNOFF       Tc       INTENSITY      AREA
  NUMBER    (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
     1      100.77     14.44        4.122        68.72
     2       97.76     16.39        3.798        72.76

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER    (CFS)      (MIN.)   (INCH/HOUR)
     1      186.89     14.44       4.122
     2      190.62     16.39       3.798

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      190.62   Tc(MIN.) =   16.39
  TOTAL AREA(ACRES) =       141.5
  LONGEST FLOWPATH FROM NODE   920.00 TO NODE   915.00 =   4203.00 FEET.


******************************************************************************
  FLOW PROCESS FROM NODE   915.00 TO NODE   925.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   739.00  DOWNSTREAM(FEET) =   735.00
  FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  39.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.43
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      190.62
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   16.72
  LONGEST FLOWPATH FROM NODE   920.00 TO NODE   925.00 =   4513.00 FEET.


******************************************************************************
  FLOW PROCESS FROM NODE   925.00 TO NODE   925.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.72
  RAINFALL INTENSITY(INCH/HR) =   3.75
  TOTAL STREAM AREA(ACRES) =   141.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    190.62


******************************************************************************
  FLOW PROCESS FROM NODE   930.00 TO NODE   931.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    850.00
  DOWNSTREAM ELEVATION(FEET) =    840.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =   7.061
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =       0.11   TOTAL RUNOFF(CFS) =      0.27


******************************************************************************
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```
  FLOW PROCESS FROM NODE    931.00 TO NODE    932.00 IS CODE =   31
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   840.00  DOWNSTREAM(FEET) =   740.00
 FLOW LENGTH(FEET) =   463.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.35
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.27
 PIPE TRAVEL TIME(MIN.) =   1.05    Tc(MIN.) =    7.32
 LONGEST FLOWPATH FROM NODE    930.00 TO NODE    932.00 =    563.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    931.00 TO NODE    932.00 IS CODE =   81
--------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.390
 *USER SPECIFIED(SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    2.76   SUBAREA RUNOFF(CFS) =    6.17
 TOTAL AREA(ACRES) =       2.9   TOTAL RUNOFF(CFS) =       6.42
 TC(MIN.) =    7.32

**************************************************************************
  FLOW PROCESS FROM NODE    932.00 TO NODE    925.00 IS CODE =   31
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   735.00  DOWNSTREAM(FEET) =   730.00
 FLOW LENGTH(FEET) =   348.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.02
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.42
 PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =    8.14
 LONGEST FLOWPATH FROM NODE    930.00 TO NODE    925.00 =    911.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    925.00 TO NODE    925.00 IS CODE =    1
--------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==========================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.14
 RAINFALL INTENSITY(INCH/HR) =   5.96
 TOTAL STREAM AREA(ACRES) =     2.87
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.42

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc        INTENSITY       AREA
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)      (ACRE)
    1       190.62    16.72        3.749          141.48
    2         6.42     8.14        5.964            2.87

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
    1       126.24     8.14        5.964
    2       194.65    16.72        3.749

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      194.65   Tc(MIN.) =    16.72
 TOTAL AREA(ACRES) =       144.4
 LONGEST FLOWPATH FROM NODE    920.00 TO NODE    925.00 =   4513.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    925.00 TO NODE    905.00 IS CODE =   31
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   730.00  DOWNSTREAM(FEET) =   720.00
 FLOW LENGTH(FEET) =   286.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.53
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      194.65
```

```
     PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   16.93
     LONGEST FLOWPATH FROM NODE   920.00 TO NODE   905.00 =   4799.00 FEET.


******************************************************************************
   FLOW PROCESS FROM NODE   905.00 TO NODE   905.00 IS CODE =  11
------------------------------------------------------------------------------
   >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================

   ** MAIN STREAM CONFLUENCE DATA **
   STREAM    RUNOFF      Tc      INTENSITY     AREA
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1       194.65    16.93       3.719      144.35
   LONGEST FLOWPATH FROM NODE   920.00 TO NODE   905.00 =   4799.00 FEET.

   ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM    RUNOFF      Tc      INTENSITY     AREA
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1       152.07    15.95       3.866      110.23
   LONGEST FLOWPATH FROM NODE   900.00 TO NODE   905.00 =   5432.00 FEET.

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF      Tc      INTENSITY
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       335.37    15.95       3.866
      2       340.94    16.93       3.719

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     340.94   Tc(MIN.) =   16.93
   TOTAL AREA(ACRES) =       254.6

******************************************************************************
   FLOW PROCESS FROM NODE   905.00 TO NODE   905.00 IS CODE =  12
------------------------------------------------------------------------------
   >>>>>CLEAR MEMORY BANK # 1 <<<<<
==============================================================================

******************************************************************************
   FLOW PROCESS FROM NODE   905.00 TO NODE   933.00 IS CODE =  31
------------------------------------------------------------------------------
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   720.00  DOWNSTREAM(FEET) =   650.00
   FLOW LENGTH(FEET) = 1281.00   MANNING'S N =  0.013
   DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.3 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  30.63
   ESTIMATED PIPE DIAMETER(INCH) =  51.00     NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      340.94
   PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =   17.63
   LONGEST FLOWPATH FROM NODE   900.00 TO NODE   933.00 =   6713.00 FEET.

******************************************************************************
   FLOW PROCESS FROM NODE   933.00 TO NODE   934.00 IS CODE =  52
------------------------------------------------------------------------------
   >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =    650.00  DOWNSTREAM(FEET) =    615.00
   CHANNEL LENGTH THRU SUBAREA(FEET) = 1105.00   CHANNEL SLOPE = 0.0317
   CHANNEL FLOW THRU SUBAREA(CFS) =     340.94
   FLOW VELOCITY(FEET/SEC) =  12.34 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
   TRAVEL TIME(MIN.) =   1.49   Tc(MIN.) =   19.12
   LONGEST FLOWPATH FROM NODE   900.00 TO NODE   934.00 =   7818.00 FEET.

******************************************************************************
   FLOW PROCESS FROM NODE   933.00 TO NODE   934.00 IS CODE =  81
------------------------------------------------------------------------------
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.438
   *USER SPECIFIED(SUBAREA):
   NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
   SUBAREA AREA(ACRES) =   24.30    SUBAREA RUNOFF(CFS) =   29.24
   TOTAL AREA(ACRES) =        278.9   TOTAL RUNOFF(CFS) =      340.94
   TC(MIN.) =   19.12
   NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE


******************************************************************************
   FLOW PROCESS FROM NODE   934.00 TO NODE   935.00 IS CODE =  52
------------------------------------------------------------------------------
   >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =    615.00  DOWNSTREAM(FEET) =    575.00
   CHANNEL LENGTH THRU SUBAREA(FEET) = 1385.00   CHANNEL SLOPE = 0.0289
   CHANNEL FLOW THRU SUBAREA(CFS) =     340.94
   FLOW VELOCITY(FEET/SEC) =  11.78 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
```

```
      TRAVEL TIME(MIN.) =   1.96   Tc(MIN.) =   21.08
      LONGEST FLOWPATH FROM NODE   900.00 TO NODE    935.00 =   9203.00 FEET.


*******************************************************************************
   FLOW PROCESS FROM NODE    934.00 TO NODE    935.00 IS CODE =  81
-------------------------------------------------------------------------------
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
===============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.228
   *USER SPECIFIED(SUBAREA):
   NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
   SUBAREA AREA(ACRES) =   33.04   SUBAREA RUNOFF(CFS) =   37.33
   TOTAL AREA(ACRES) =       311.9   TOTAL RUNOFF(CFS) =      352.45
   TC(MIN.) =   21.08


*******************************************************************************
   FLOW PROCESS FROM NODE    935.00 TO NODE    936.00 IS CODE =  31
-------------------------------------------------------------------------------
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
===============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   575.00   DOWNSTREAM(FEET) =   574.00
   FLOW LENGTH(FEET) =    60.00    MANNING'S N =  0.013
   DEPTH OF FLOW IN  63.0 INCH PIPE IS  48.7 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  19.61
   ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =     352.45
   PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   21.13
   LONGEST FLOWPATH FROM NODE   900.00 TO NODE    936.00 =   9263.00 FEET.


*******************************************************************************
   FLOW PROCESS FROM NODE    936.00 TO NODE    936.00 IS CODE =  10
-------------------------------------------------------------------------------
   >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
===============================================================================


*******************************************************************************
   FLOW PROCESS FROM NODE    940.00 TO NODE    941.00 IS CODE =  21
-------------------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
===============================================================================
   *USER SPECIFIED(SUBAREA):
   NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =    0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
   UPSTREAM ELEVATION(FEET) =    622.00
   DOWNSTREAM ELEVATION(FEET) =    618.00
   ELEVATION DIFFERENCE(FEET) =     4.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.428
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.328
   SUBAREA RUNOFF(CFS) =      0.33
   TOTAL AREA(ACRES) =      0.15    TOTAL RUNOFF(CFS) =      0.33


*******************************************************************************
   FLOW PROCESS FROM NODE    941.00 TO NODE    942.00 IS CODE =  52
-------------------------------------------------------------------------------
   >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
   >>>>>TRAVELTIME THRU SUBAREA<<<<<
===============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =    618.00  DOWNSTREAM(FEET) =    600.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =    406.00   CHANNEL SLOPE =  0.0443
   NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
   CHANNEL FLOW THRU SUBAREA(CFS) =        0.33
   FLOW VELOCITY(FEET/SEC) =   3.16 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
   TRAVEL TIME(MIN.) =   2.14   Tc(MIN.) =    9.57
   LONGEST FLOWPATH FROM NODE    940.00 TO NODE    942.00 =    491.00 FEET.


*******************************************************************************
   FLOW PROCESS FROM NODE    941.00 TO NODE    942.00 IS CODE =  81
-------------------------------------------------------------------------------
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
===============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.373
   *USER SPECIFIED(SUBAREA):
   NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
   SUBAREA AREA(ACRES) =    2.03   SUBAREA RUNOFF(CFS) =    3.82
   TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =        4.10
   TC(MIN.) =    9.57


*******************************************************************************
   FLOW PROCESS FROM NODE    942.00 TO NODE    943.00 IS CODE =   1
-------------------------------------------------------------------------------
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
===============================================================================
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
      TIME OF CONCENTRATION(MIN.) =     9.57
      RAINFALL INTENSITY(INCH/HR) =    5.37
      TOTAL STREAM AREA(ACRES) =        2.18
      PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.10


     +------------------------------------------------------------------------+
     | The following input data taken from South hydrology model and is       |
     | the discharge from the South WQ basin.                                 |
     |                                                                        |
     +------------------------------------------------------------------------+


     *******************************************************************************
       FLOW PROCESS FROM NODE   208.00 TO NODE    208.00 IS CODE =    7
     -------------------------------------------------------------------------------
       >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
     ===============================================================================
       USER-SPECIFIED VALUES ARE AS FOLLOWS:
       TC(MIN) = 14.42   RAIN INTENSITY(INCH/HOUR) =  4.12
       TOTAL AREA(ACRES) =   140.97   TOTAL RUNOFF(CFS) =     306.69


     *******************************************************************************
       FLOW PROCESS FROM NODE   208.00 TO NODE    943.00 IS CODE =   31
     -------------------------------------------------------------------------------
       >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
       >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
     ===============================================================================
       ELEVATION DATA: UPSTREAM(FEET) =   585.00  DOWNSTREAM(FEET) =    580.00
       FLOW LENGTH(FEET) =   294.00   MANNING'S N =  0.013
       DEPTH OF FLOW IN  60.0 INCH PIPE IS  45.6 INCHES
       PIPE-FLOW VELOCITY(FEET/SEC.) =  19.14
       ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
       PIPE-FLOW(CFS) =      306.69
       PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   14.68
       LONGEST FLOWPATH FROM NODE   930.00 TO NODE    943.00 =   1205.00 FEET.


     *******************************************************************************
       FLOW PROCESS FROM NODE   943.00 TO NODE    943.00 IS CODE =    1
     -------------------------------------------------------------------------------
       >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
       >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
     ===============================================================================
       TOTAL NUMBER OF STREAMS =  2
       CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
       TIME OF CONCENTRATION(MIN.) =   14.68
       RAINFALL INTENSITY(INCH/HR) =   4.08
       TOTAL STREAM AREA(ACRES) =   140.97
       PEAK FLOW RATE(CFS) AT CONFLUENCE =    306.69

       ** CONFLUENCE DATA **
       STREAM     RUNOFF      Tc       INTENSITY      AREA
       NUMBER     (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
          1       4.10       9.57       5.373         2.18
          2     306.69      14.68       4.078       140.97

       RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
       CONFLUENCE FORMULA USED FOR  2 STREAMS.

       ** PEAK FLOW RATE TABLE **
       STREAM     RUNOFF      Tc       INTENSITY
       NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
          1     204.09       9.57       5.373
          2     309.80      14.68       4.078

       COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
       PEAK FLOW RATE(CFS) =       309.80   Tc(MIN.) =   14.68
       TOTAL AREA(ACRES) =        143.1
       LONGEST FLOWPATH FROM NODE   930.00 TO NODE    943.00 =   1205.00 FEET.


     *******************************************************************************
       FLOW PROCESS FROM NODE   943.00 TO NODE    936.00 IS CODE =   31
     -------------------------------------------------------------------------------
       >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
       >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
     ===============================================================================
       ELEVATION DATA: UPSTREAM(FEET) =   575.00  DOWNSTREAM(FEET) =    570.00
       FLOW LENGTH(FEET) =   294.00   MANNING'S N =  0.013
       DEPTH OF FLOW IN  60.0 INCH PIPE IS  46.0 INCHES
       PIPE-FLOW VELOCITY(FEET/SEC.) =  19.16
       ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
       PIPE-FLOW(CFS) =      309.80
       PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   14.93
       LONGEST FLOWPATH FROM NODE   930.00 TO NODE    936.00 =   1499.00 FEET.


     *******************************************************************************
       FLOW PROCESS FROM NODE   936.00 TO NODE    936.00 IS CODE =   11
     -------------------------------------------------------------------------------
       >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
     ===============================================================================

       ** MAIN STREAM CONFLUENCE DATA **
```

```
STREAM     RUNOFF    Tc      INTENSITY    AREA
NUMBER     (CFS)    (MIN.)  (INCH/HOUR)  (ACRE)
   1       309.80   14.93     4.033      143.15
LONGEST FLOWPATH FROM NODE    930.00 TO NODE    936.00 =   1499.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
STREAM     RUNOFF    Tc      INTENSITY    AREA
NUMBER     (CFS)    (MIN.)  (INCH/HOUR)  (ACRE)
   1       352.45   21.13     3.223      311.92
LONGEST FLOWPATH FROM NODE    900.00 TO NODE    936.00 =   9263.00 FEET.

 ** PEAK FLOW RATE TABLE **
STREAM     RUNOFF    Tc      INTENSITY
NUMBER     (CFS)    (MIN.)  (INCH/HOUR)
   1       558.81   14.93     4.033
   2       600.06   21.13     3.223

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     600.06   Tc(MIN.) =   21.13
 TOTAL AREA(ACRES) =      455.1

*****************************************************************************
  FLOW PROCESS FROM NODE    936.00 TO NODE    936.00 IS CODE =  12
 ---------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
=============================================================================

*****************************************************************************
  FLOW PROCESS FROM NODE    936.00 TO NODE    944.00 IS CODE =  31
 ---------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   570.00  DOWNSTREAM(FEET) =   569.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  75.0 INCH PIPE IS  56.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.08
  ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     600.06
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   21.17
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    944.00 =   9313.00 FEET.
=============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      455.1  TC(MIN.) =     21.17
  PEAK FLOW RATE(CFS)   =     600.06
=============================================================================
=============================================================================
  END OF RATIONAL METHOD ANALYSIS
```
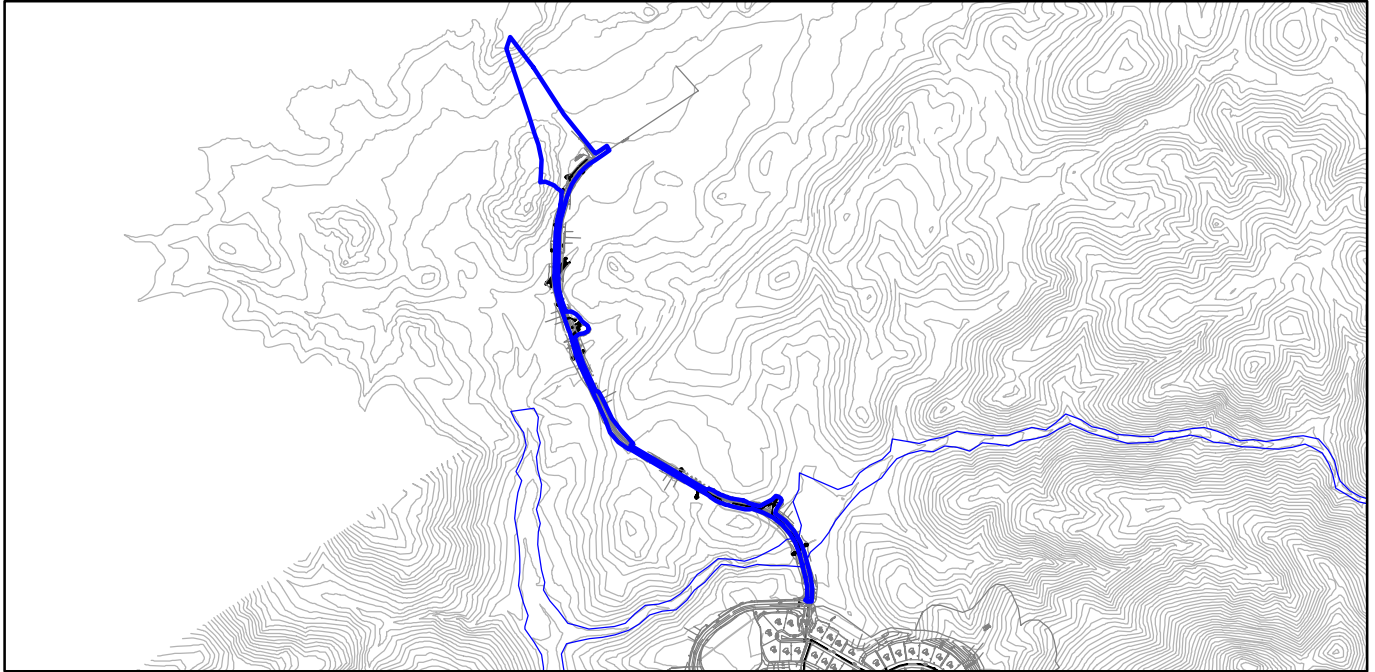
CHAPTER 4

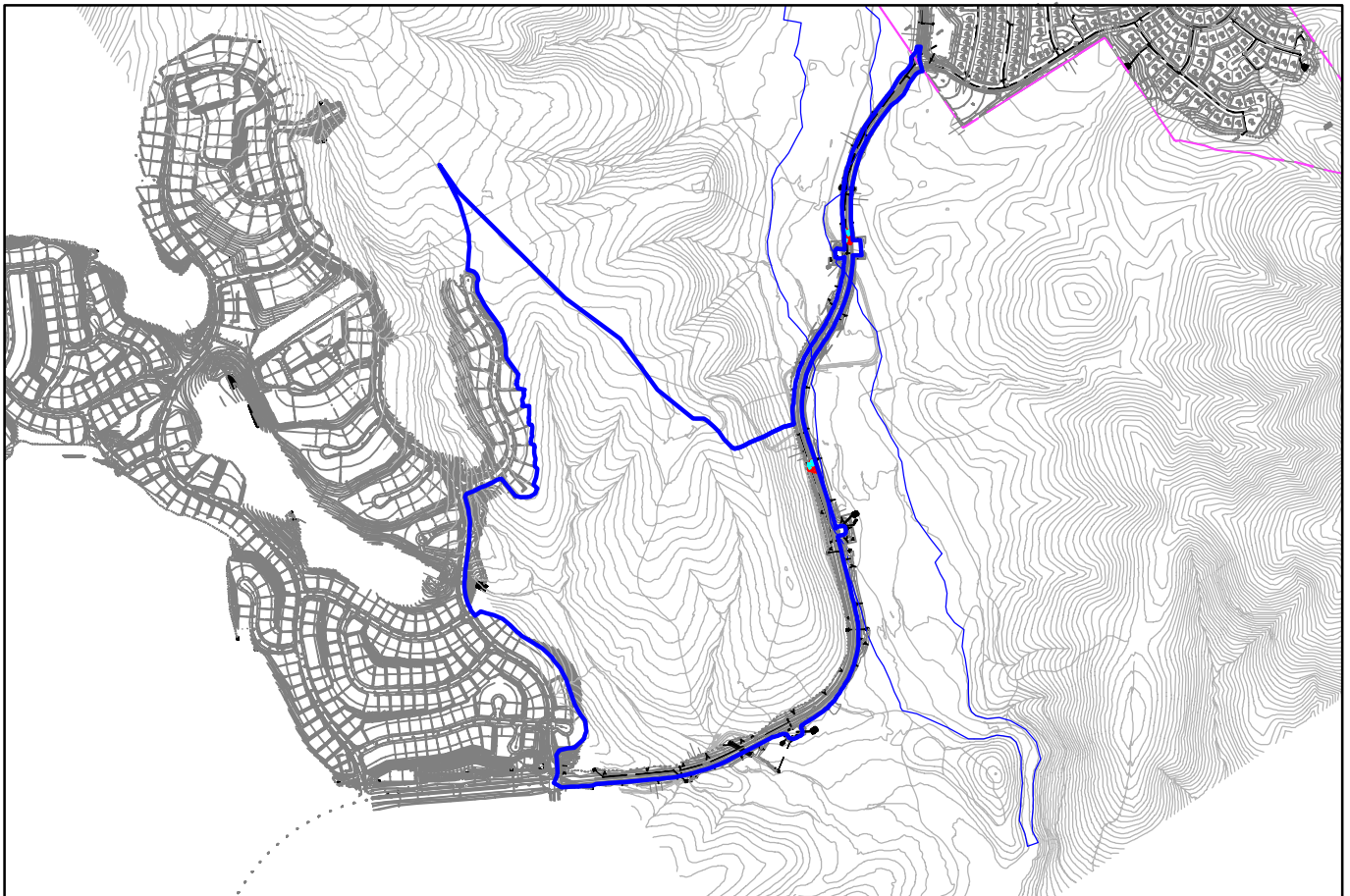# 4.1.4 – Rational Method Hydrologic Analysis (AES 2015)

Drainage Areas Along Proctor Valley Road (North and South)

LAND EXCHANGE ALTERNATIVE
DRAINAGE AREAS ALONG PROCTOR VALLEY ROAD

NORTHERN PORTION

SOUTHERN PORTION

R:\1235\Hyd\ACAD\HYDRO\TM- Land Exchange EIR\1235- HYDRO V14- PROP.dwg Oct-25-2017:13:06

W.O.# 3087-0002

```
    _____
    **************************************************************************

              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
              Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
              (c) Copyright 1982-2015 Advanced Engineering Software (aes)
                  Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                      Analysis prepared by:




     ************************** DESCRIPTION OF STUDY **************************
     * VILLAGE 14 TM HYDROLOGY ANALYSIS                                       *
     * PVR-SOUTH                                                              *
     * 100-YEAR RETURN INTERVAL.  W.O. 2421-31                                *
     **************************************************************************

       FILE NAME: R:\1235\HYD\CALCS\AES\TM\PVR-S.DAT
       TIME/DATE OF STUDY: 16:32 10/25/2017
     --------------------------------------------------------------------------
       USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
     --------------------------------------------------------------------------
       2003 SAN DIEGO MANUAL CRITERIA

       USER SPECIFIED STORM EVENT(YEAR) = 100.00
       6-HOUR DURATION PRECIPITATION (INCHES) =   3.100
       SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
       SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
       SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
       NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
       *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
          HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES: MANNING
          WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT WIDTH  LIP  HIKE  FACTOR
       NO.  (FT)    (FT)    SIDE / SIDE/ WAY    (FT)   (FT)  (FT)  (FT)   (n)
       === =====  ========  ================  ====== ===== ====== ===== =======
        1  16.0     8.0     0.020/0.020/0.020   0.50   2.00 0.0313 0.125 0.0150
        2  12.0     6.0     0.020/0.020/0.020   0.50   1.50 0.0313 0.125 0.0130

       GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
         1. Relative Flow-Depth =  0.00 FEET
            as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
         2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
        *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
         OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

     **************************************************************************
       FLOW PROCESS FROM NODE    10.00 TO NODE    11.00 IS CODE =  21
     --------------------------------------------------------------------------
       >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
     ==========================================================================
       *USER SPECIFIED(SUBAREA):
       RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4100
       S.C.S. CURVE NUMBER (AMC II) =    0
       INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
       UPSTREAM ELEVATION(FEET) =    970.00
       DOWNSTREAM ELEVATION(FEET) =    960.00
       ELEVATION DIFFERENCE(FEET) =     10.00
       SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.765
       WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
        100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.451
       SUBAREA RUNOFF(CFS) =      0.61
       TOTAL AREA(ACRES) =       0.20   TOTAL RUNOFF(CFS) =       0.61

     **************************************************************************
       FLOW PROCESS FROM NODE    11.00 TO NODE    12.00 IS CODE =  61
     --------------------------------------------------------------------------
       >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
       >>>>>(STANDARD CURB SECTION USED)<<<<<
     ==========================================================================
       UPSTREAM ELEVATION(FEET) =  960.00  DOWNSTREAM ELEVATION(FEET) =  890.00
       STREET LENGTH(FEET) =  1062.00   CURB HEIGHT(INCHES) =  6.0
       STREET HALFWIDTH(FEET) = 16.00

       DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
       INSIDE STREET CROSSFALL(DECIMAL) =  0.020
       OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

       SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
       STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
       Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

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```
     Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

        **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.01
        STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
        STREET FLOW DEPTH(FEET) =  0.29
        HALFSTREET FLOOD WIDTH(FEET) =    8.09
        AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.18
        PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =   1.49
     STREET FLOW TRAVEL TIME(MIN.) =   3.42  Tc(MIN.) =    9.18
      100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.518
     *USER SPECIFIED(SUBAREA):
     RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .4200
     S.C.S. CURVE NUMBER (AMC II) =   0
     AREA-AVERAGE RUNOFF COEFFICIENT = 0.420
     SUBAREA AREA(ACRES) =    6.30      SUBAREA RUNOFF(CFS) =   14.60
     TOTAL AREA(ACRES) =        6.5       PEAK FLOW RATE(CFS) =     15.05

     END OF SUBAREA STREET FLOW HYDRAULICS:
     DEPTH(FEET) = 0.34  HALFSTREET FLOOD WIDTH(FEET) = 10.66
     FLOW VELOCITY(FEET/SEC.) =  6.00  DEPTH*VELOCITY(FT*FT/SEC.) =   2.04
     LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =   1162.00 FEET.

*****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     12.00 IS CODE =  81
-----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.518
  *USER SPECIFIED(SUBAREA):
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4476
  SUBAREA AREA(ACRES) =    0.45   SUBAREA RUNOFF(CFS) =    2.11
  TOTAL AREA(ACRES) =        6.9   TOTAL RUNOFF(CFS) =       17.17
  TC(MIN.) =    9.18


+---------------------------------------------------------------------------+
| 0                                                                         |
|                                                                           |
|                                                                           |
|                                                                           |
+---------------------------------------------------------------------------+


*****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
-----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=============================================================================
  *USER SPECIFIED(SUBAREA):
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    901.00
  DOWNSTREAM ELEVATION(FEET) =    900.00
  ELEVATION DIFFERENCE(FEET) =    1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   2.789
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.74
  TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =      0.74

*****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  61
-----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
=============================================================================
  UPSTREAM ELEVATION(FEET) = 900.00  DOWNSTREAM ELEVATION(FEET) = 896.00
  STREET LENGTH(FEET) =   897.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 14.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

     **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.90
     STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
        STREET FLOW DEPTH(FEET) =  0.28
        HALFSTREET FLOOD WIDTH(FEET) =    7.74
        AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.33
        PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.37
     STREET FLOW TRAVEL TIME(MIN.) = 11.27   Tc(MIN.) =   14.06
      100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.193
     *USER SPECIFIED(SUBAREA):
     NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .9000
     S.C.S. CURVE NUMBER (AMC II) =   0
     AREA-AVERAGE RUNOFF COEFFICIENT = 0.900
     SUBAREA AREA(ACRES) =     0.59       SUBAREA RUNOFF(CFS) =    2.23
     TOTAL AREA(ACRES) =          0.7        PEAK FLOW RATE(CFS) =        2.60

     END OF SUBAREA STREET FLOW HYDRAULICS:
     DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.94
     FLOW VELOCITY(FEET/SEC.) = 1.42   DEPTH*VELOCITY(FT*FT/SEC.) =   0.43
     LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =    997.00 FEET.

****************************************************************************
   FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   890.00  DOWNSTREAM(FEET) =   884.00
   FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.6 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  10.40
   ESTIMATED PIPE DIAMETER(INCH) = 18.00     NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =        2.60
   PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   14.17
   LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =   1067.00 FEET.

****************************************************************************
   FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.172
   *USER SPECIFIED(SUBAREA):
   RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =   0
   AREA-AVERAGE RUNOFF COEFFICIENT = 0.6950
   SUBAREA AREA(ACRES) =     0.41    SUBAREA RUNOFF(CFS) =    0.60
   TOTAL AREA(ACRES) =          1.1    TOTAL RUNOFF(CFS) =        3.19
   TC(MIN.) =   14.17

****************************************************************************
   FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   884.00  DOWNSTREAM(FEET) =   882.00
   FLOW LENGTH(FEET) =   219.00   MANNING'S N =  0.013
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   4.95
   ESTIMATED PIPE DIAMETER(INCH) = 18.00     NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =        3.19
   PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   14.91
   LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =   1286.00 FEET.

****************************************************************************
   FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =  14.91
   RAINFALL INTENSITY(INCH/HR) =   4.04
   TOTAL STREAM AREA(ACRES) =     1.10
   PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.19

****************************************************************************
   FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  21
----------------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
   *USER SPECIFIED(SUBAREA):
   NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .8500
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
```

```
        UPSTREAM ELEVATION(FEET) =     920.00
        DOWNSTREAM ELEVATION(FEET) =    914.00
        ELEVATION DIFFERENCE(FEET) =      6.00
        SUBAREA OVERLAND TIME OF FLOW(MIN.) =     1.618
        WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
         100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
        NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
        SUBAREA RUNOFF(CFS) =       1.53
        TOTAL AREA(ACRES) =       0.22    TOTAL RUNOFF(CFS) =       1.53

******************************************************************************
    FLOW PROCESS FROM NODE     26.00 TO NODE     24.00 IS CODE =  61
------------------------------------------------------------------------------
     >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
     >>>>>(STANDARD CURB SECTION USED)<<<<<
==============================================================================
     UPSTREAM ELEVATION(FEET) = 914.00  DOWNSTREAM ELEVATION(FEET) = 898.00
     STREET LENGTH(FEET) =    681.00   CURB HEIGHT(INCHES) = 6.0
     STREET HALFWIDTH(FEET) = 14.00

     DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.00
     INSIDE STREET CROSSFALL(DECIMAL) = 0.020
     OUTSIDE STREET CROSSFALL(DECIMAL)  = 0.020

     SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
     STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
     Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
     Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

        **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.46
        STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
        STREET FLOW DEPTH(FEET) = 0.28
        HALFSTREET FLOOD WIDTH(FEET) =    7.85
        AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.03
        PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
     STREET FLOW TRAVEL TIME(MIN.) =   3.74   Tc(MIN.) =    5.36
      100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.812
     *USER SPECIFIED(SUBAREA):
     NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .8500
     S.C.S. CURVE NUMBER (AMC II) =    0
     AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
     SUBAREA AREA(ACRES) =     0.88       SUBAREA RUNOFF(CFS) =     5.84
     TOTAL AREA(ACRES) =         1.1        PEAK FLOW RATE(CFS) =       7.30

     END OF SUBAREA STREET FLOW HYDRAULICS:
     DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.76
     FLOW VELOCITY(FEET/SEC.) = 3.41   DEPTH*VELOCITY(FT*FT/SEC.) =   1.10
     LONGEST FLOWPATH FROM NODE     25.00 TO NODE     24.00 =    741.00 FEET.

******************************************************************************
    FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
------------------------------------------------------------------------------
     >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
     >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
     TOTAL NUMBER OF STREAMS =  2
     CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
     TIME OF CONCENTRATION(MIN.) =    5.36
     RAINFALL INTENSITY(INCH/HR) =   7.81
     TOTAL STREAM AREA(ACRES) =     1.10
     PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.30

     ** CONFLUENCE DATA **
     STREAM      RUNOFF       Tc      INTENSITY       AREA
     NUMBER      (CFS)      (MIN.)   (INCH/HOUR)     (ACRE)
        1        3.19      14.91       4.037          1.10
        2        7.30       5.36       7.812          1.10

     RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
     CONFLUENCE FORMULA USED FOR  2 STREAMS.

     ** PEAK FLOW RATE TABLE **
     STREAM      RUNOFF       Tc      INTENSITY
     NUMBER      (CFS)      (MIN.)   (INCH/HOUR)
        1        8.45       5.36       7.812
        2        6.96      14.91       4.037

     COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
     PEAK FLOW RATE(CFS) =       8.45   Tc(MIN.) =    5.36
     TOTAL AREA(ACRES) =        2.2
     LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =   1286.00 FEET.

******************************************************************************
    FLOW PROCESS FROM NODE     24.00 TO NODE     27.00 IS CODE =  31
------------------------------------------------------------------------------
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```
     >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
     >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
    ===========================================================================
     ELEVATION DATA: UPSTREAM(FEET) =    882.00  DOWNSTREAM(FEET) =    880.00
     FLOW LENGTH(FEET) =     55.00   MANNING'S N =  0.013
     ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
     DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.3 INCHES
     PIPE-FLOW VELOCITY(FEET/SEC.) = 10.65
     ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES =   1
     PIPE-FLOW(CFS) =        8.45
     PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    5.44
     LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =   1341.00 FEET.


    +------------------------------------------------------------------------+
    | 0                                                                      |
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    |                                                                        |
    |                                                                        |
    +------------------------------------------------------------------------+


    *****************************************************************************
      FLOW PROCESS FROM NODE    30.00 TO NODE    31.00 IS CODE =  21
    ----------------------------------------------------------------------------
     >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
    ===========================================================================
     *USER SPECIFIED(SUBAREA):
     NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .9000
     S.C.S. CURVE NUMBER (AMC II) =    0
     INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
     UPSTREAM ELEVATION(FEET) =    920.00
     DOWNSTREAM ELEVATION(FEET) =    911.00
     ELEVATION DIFFERENCE(FEET) =      9.00
     SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.585
     WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
      100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
     NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
     SUBAREA RUNOFF(CFS) =        0.51
     TOTAL AREA(ACRES) =       0.07   TOTAL RUNOFF(CFS) =       0.51

    *****************************************************************************
      FLOW PROCESS FROM NODE    31.00 TO NODE    32.00 IS CODE =  61
    ----------------------------------------------------------------------------
     >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
     >>>>>(STANDARD CURB SECTION USED)<<<<<
    ===========================================================================
     UPSTREAM ELEVATION(FEET) =  911.00  DOWNSTREAM ELEVATION(FEET) =  908.00
     STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  6.0
     STREET HALFWIDTH(FEET) = 14.00

     DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.00
     INSIDE STREET CROSSFALL(DECIMAL) =  0.020
     OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

     SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
     STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
     Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
     Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

       **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =        2.61
        STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
        STREET FLOW DEPTH(FEET) =  0.30
        HALFSTREET FLOOD WIDTH(FEET) =     8.72
        AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.48
        PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
      STREET FLOW TRAVEL TIME(MIN.) =   6.75   Tc(MIN.) =    8.33
       100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.876
      *USER SPECIFIED(SUBAREA):
      NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .9000
      S.C.S. CURVE NUMBER (AMC II) =    0
      AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
      SUBAREA AREA(ACRES) =     0.77       SUBAREA RUNOFF(CFS) =    4.07
      TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.44

      END OF SUBAREA STREET FLOW HYDRAULICS:
      DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.02
      FLOW VELOCITY(FEET/SEC.) =  1.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.58
      LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =   690.00 FEET.

    *****************************************************************************
      FLOW PROCESS FROM NODE    32.00 TO NODE    33.00 IS CODE =  31
    ----------------------------------------------------------------------------
     >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
     >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
    ===========================================================================
     ELEVATION DATA: UPSTREAM(FEET) =    903.00  DOWNSTREAM(FEET) =    890.00
     FLOW LENGTH(FEET) =    530.00   MANNING'S N =  0.013
```

```
    ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
    DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.5 INCHES
    PIPE-FLOW VELOCITY(FEET/SEC.) =   7.76
    ESTIMATED PIPE DIAMETER(INCH) = 18.00     NUMBER OF PIPES =   1
    PIPE-FLOW(CFS) =       4.44
    PIPE TRAVEL TIME(MIN.) =  1.14    Tc(MIN.) =   9.47
    LONGEST FLOWPATH FROM NODE     30.00 TO NODE     33.00 =   1220.00 FEET.

    *****************************************************************************
      FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  81
    -----------------------------------------------------------------------------
     >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
    =============================================================================
      100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.410
     *USER SPECIFIED(SUBAREA):
     RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3500
     S.C.S. CURVE NUMBER (AMC II) =   0
     AREA-AVERAGE RUNOFF COEFFICIENT = 0.7778
     SUBAREA AREA(ACRES) =    0.24    SUBAREA RUNOFF(CFS) =    0.45
     TOTAL AREA(ACRES) =        1.1    TOTAL RUNOFF(CFS) =       4.54
     TC(MIN.) =    9.47

    *****************************************************************************
      FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  31
    -----------------------------------------------------------------------------
     >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
     >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
    =============================================================================
     ELEVATION DATA: UPSTREAM(FEET) =   890.00  DOWNSTREAM(FEET) =   885.00
     FLOW LENGTH(FEET) =   430.00   MANNING'S N =  0.013
     ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
     DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
     PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
     ESTIMATED PIPE DIAMETER(INCH) = 18.00     NUMBER OF PIPES =   1
     PIPE-FLOW(CFS) =       4.54
     PIPE TRAVEL TIME(MIN.) =  1.21    Tc(MIN.) =   10.68
     LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =   1650.00 FEET.

    *****************************************************************************
      FLOW PROCESS FROM NODE     34.00 TO NODE     34.00 IS CODE =   1
    -----------------------------------------------------------------------------
     >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
    =============================================================================
     TOTAL NUMBER OF STREAMS =  2
     CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
     TIME OF CONCENTRATION(MIN.) =   10.68
     RAINFALL INTENSITY(INCH/HR) =   5.01
     TOTAL STREAM AREA(ACRES) =     1.08
     PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.54

    *****************************************************************************
      FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  21
    -----------------------------------------------------------------------------
     >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
    =============================================================================
     *USER SPECIFIED(SUBAREA):
     NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .9000
     S.C.S. CURVE NUMBER (AMC II) =    0
     INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
     UPSTREAM ELEVATION(FEET) =    911.00
     DOWNSTREAM ELEVATION(FEET) =    908.00
     ELEVATION DIFFERENCE(FEET) =     3.00
     SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.301
     WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
             THE MAXIMUM OVERLAND FLOW LENGTH =     85.00
             (Reference: Table 3-1B of Hydrology Manual)
             THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
      100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
     NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
     SUBAREA RUNOFF(CFS) =      0.96
     TOTAL AREA(ACRES) =       0.13    TOTAL RUNOFF(CFS) =      0.96

    *****************************************************************************
      FLOW PROCESS FROM NODE     36.00 TO NODE     34.00 IS CODE =  61
    -----------------------------------------------------------------------------
     >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
     >>>>>(STANDARD CURB SECTION USED)<<<<<
    =============================================================================
     UPSTREAM ELEVATION(FEET) = 908.00  DOWNSTREAM ELEVATION(FEET) =  905.00
     STREET LENGTH(FEET) =   474.00   CURB HEIGHT(INCHES) =  6.0
     STREET HALFWIDTH(FEET) = 14.00

     DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.00
     INSIDE STREET CROSSFALL(DECIMAL) =  0.020
     OUTSIDE STREET CROSSFALL(DECIMAL) =  0.020
```

```
      SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
      STREET PARKWAY CROSSFALL(DECIMAL)  = 0.020
      Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
      Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

        **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =        3.41
        STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
        STREET FLOW DEPTH(FEET) = 0.31
        HALFSTREET FLOOD WIDTH(FEET) =    9.32
        AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.73
        PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
      STREET FLOW TRAVEL TIME(MIN.) =    4.57   Tc(MIN.) =    6.87
       100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.652
      *USER SPECIFIED(SUBAREA):
      NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .9000
      S.C.S. CURVE NUMBER (AMC II) =   0
      AREA-AVERAGE RUNOFF COEFFICIENT = 0.900
      SUBAREA AREA(ACRES) =     0.81      SUBAREA RUNOFF(CFS) =    4.85
      TOTAL AREA(ACRES) =       0.9        PEAK FLOW RATE(CFS) =        5.63

      END OF SUBAREA STREET FLOW HYDRAULICS:
      DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) = 11.57
      FLOW VELOCITY(FEET/SEC.) =  1.93   DEPTH*VELOCITY(FT*FT/SEC.) =   0.69
      LONGEST FLOWPATH FROM NODE     35.00 TO NODE     34.00 =    574.00 FEET.

   *****************************************************************************
      FLOW PROCESS FROM NODE     34.00 TO NODE     34.00 IS CODE =   1
   -----------------------------------------------------------------------------
      >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
      >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
   =============================================================================
      TOTAL NUMBER OF STREAMS =  2
      CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
      TIME OF CONCENTRATION(MIN.) =    6.87
      RAINFALL INTENSITY(INCH/HR) =   6.65
      TOTAL STREAM AREA(ACRES) =     0.94
      PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.63

      ** CONFLUENCE DATA **
      STREAM     RUNOFF       Tc      INTENSITY      AREA
      NUMBER     (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
         1       4.54     10.68        5.007         1.08
         2       5.63      6.87        6.652         0.94

      RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
      CONFLUENCE FORMULA USED FOR  2 STREAMS.

      ** PEAK FLOW RATE TABLE **
      STREAM     RUNOFF       Tc      INTENSITY
      NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
         1       8.55      6.87        6.652
         2       8.78     10.68        5.007

      COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
      PEAK FLOW RATE(CFS) =        8.78   Tc(MIN.) =    10.68
      TOTAL AREA(ACRES) =          2.0
      LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =   1650.00 FEET.

   +---------------------------------------------------------------------------+
   | 0                                                                         |
   |                                                                           |
   |                                                                           |
   +---------------------------------------------------------------------------+

   *****************************************************************************
      FLOW PROCESS FROM NODE    950.00 TO NODE    951.00 IS CODE =  21
   -----------------------------------------------------------------------------
      >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
   =============================================================================
      *USER SPECIFIED(SUBAREA):
      NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .8200
      S.C.S. CURVE NUMBER (AMC II) =   0
      INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
      UPSTREAM ELEVATION(FEET) =    595.00
      DOWNSTREAM ELEVATION(FEET) =    593.50
      ELEVATION DIFFERENCE(FEET) =      1.50
      SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.617
      WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
               THE MAXIMUM OVERLAND FLOW LENGTH =     67.50
               (Reference: Table 3-1B of Hydrology Manual)
               THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
       100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
      NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
      SUBAREA RUNOFF(CFS) =       1.00
```

```
             TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      1.00


*****************************************************************************
   FLOW PROCESS FROM NODE    951.00 TO NODE    952.00 IS CODE =  61
-----------------------------------------------------------------------------
   >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>(STANDARD CURB SECTION USED)<<<<<
=============================================================================
   UPSTREAM ELEVATION(FEET) = 593.50  DOWNSTREAM ELEVATION(FEET) =  587.00
   STREET LENGTH(FEET) =   701.00   CURB HEIGHT(INCHES) =  6.0
   STREET HALFWIDTH(FEET) = 22.00

   DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
   INSIDE STREET CROSSFALL(DECIMAL) = 0.020
   OUTSIDE STREET CROSSFALL(DECIMAL)  = 0.020

   SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
   STREET PARKWAY CROSSFALL(DECIMAL)  = 0.020
   Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =  0.0150
   Manning's FRICTION FACTOR for Back-of-Walk Flow Section =  0.0200

      **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.90
      STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
      STREET FLOW DEPTH(FEET) =  0.31
      HALFSTREET FLOOD WIDTH(FEET) =    9.11
      AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.06
      PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
   STREET FLOW TRAVEL TIME(MIN.) =   5.68   Tc(MIN.) =    9.30
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.475
   *USER SPECIFIED(SUBAREA):
   NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7900
   S.C.S. CURVE NUMBER (AMC II) =   0
   AREA-AVERAGE RUNOFF COEFFICIENT = 0.793
   SUBAREA AREA(ACRES) =   1.30       SUBAREA RUNOFF(CFS) =   5.62
   TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       6.30

   END OF SUBAREA STREET FLOW HYDRAULICS:
   DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.21
   FLOW VELOCITY(FEET/SEC.) =  2.29   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
   LONGEST FLOWPATH FROM NODE    950.00 TO NODE    952.00 =    801.00 FEET.


*****************************************************************************
   FLOW PROCESS FROM NODE    953.00 TO NODE    957.00 IS CODE =  31
-----------------------------------------------------------------------------
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =    582.00  DOWNSTREAM(FEET) =   577.00
   FLOW LENGTH(FEET) =   504.00   MANNING'S N = 0.013
   DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.2 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  6.07
   ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       6.30
   PIPE TRAVEL TIME(MIN.) =   1.38   Tc(MIN.) =  10.68
   LONGEST FLOWPATH FROM NODE    950.00 TO NODE    957.00 =   1305.00 FEET.


*****************************************************************************
   FLOW PROCESS FROM NODE    957.00 TO NODE    957.00 IS CODE =   1
-----------------------------------------------------------------------------
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=============================================================================
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =  10.68
   RAINFALL INTENSITY(INCH/HR) =   5.01
   TOTAL STREAM AREA(ACRES) =    1.45
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.30


*****************************************************************************
   FLOW PROCESS FROM NODE    955.00 TO NODE    956.00 IS CODE =  21
-----------------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=============================================================================
   *USER SPECIFIED(SUBAREA):
   NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7900
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    586.75
   DOWNSTREAM ELEVATION(FEET) =    585.75
   ELEVATION DIFFERENCE(FEET) =    1.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =   4.322
   WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
            THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
            (Reference: Table 3-1B of Hydrology Manual)
            THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
```

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      100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.168
     NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
     SUBAREA RUNOFF(CFS) =      1.03
     TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      1.03


  ******************************************************************************
   FLOW PROCESS FROM NODE   956.00 TO NODE   957.00 IS CODE =  61
  ------------------------------------------------------------------------------
   >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>(STANDARD CURB SECTION USED)<<<<<
  ==============================================================================
   UPSTREAM ELEVATION(FEET) = 585.75  DOWNSTREAM ELEVATION(FEET) = 581.75
   STREET LENGTH(FEET) =  394.00   CURB HEIGHT(INCHES) = 6.0
   STREET HALFWIDTH(FEET) = 22.00

   DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 11.00
   INSIDE STREET CROSSFALL(DECIMAL) = 0.020
   OUTSIDE STREET CROSSFALL(DECIMAL)  = 0.020

   SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
   STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
   Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =  0.0150
   Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

     **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.59
      STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
      STREET FLOW DEPTH(FEET) = 0.27
      HALFSTREET FLOOD WIDTH(FEET) =   7.40
      AVERAGE FLOW VELOCITY(FEET/SEC.) =   1.94
      PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.53
   STREET FLOW TRAVEL TIME(MIN.) =   3.38   Tc(MIN.) =   7.70
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.182
   *USER SPECIFIED(SUBAREA):
   NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7900
   S.C.S. CURVE NUMBER (AMC II) =   0
   AREA-AVERAGE RUNOFF COEFFICIENT = 0.790
   SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    3.08
   TOTAL AREA(ACRES) =        0.8      PEAK FLOW RATE(CFS) =      3.86

   END OF SUBAREA STREET FLOW HYDRAULICS:
   DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  8.88
   FLOW VELOCITY(FEET/SEC.) = 2.13   DEPTH*VELOCITY(FT*FT/SEC.) =  0.65
   LONGEST FLOWPATH FROM NODE   955.00 TO NODE   957.00 =    494.00 FEET.


  ******************************************************************************
   FLOW PROCESS FROM NODE   957.00 TO NODE   957.00 IS CODE =   1
  ------------------------------------------------------------------------------
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
  ==============================================================================
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =    7.70
   RAINFALL INTENSITY(INCH/HR) =   6.18
   TOTAL STREAM AREA(ACRES) =     0.79
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.86

   ** CONFLUENCE DATA **
   STREAM     RUNOFF      Tc       INTENSITY      AREA
   NUMBER     (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        6.30     10.68      5.006          1.45
      2        3.86      7.70      6.182          0.79

   RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
   CONFLUENCE FORMULA USED FOR  2 STREAMS.

   ** PEAK FLOW RATE TABLE **
   STREAM     RUNOFF      Tc       INTENSITY
   NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
      1        8.40      7.70      6.182
      2        9.42     10.68      5.006

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =       9.42   Tc(MIN.) =   10.68
   TOTAL AREA(ACRES) =        2.2
   LONGEST FLOWPATH FROM NODE   950.00 TO NODE   957.00 =   1305.00 FEET.


  ******************************************************************************
   FLOW PROCESS FROM NODE   957.00 TO NODE   962.00 IS CODE =  31
  ------------------------------------------------------------------------------
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
  ==============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =   577.00  DOWNSTREAM(FEET) =   572.00
   FLOW LENGTH(FEET) =   470.00   MANNING'S N = 0.013
```

```
   DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   6.75
   ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =      9.42
   PIPE TRAVEL TIME(MIN.) =   1.16    Tc(MIN.) =   11.84
   LONGEST FLOWPATH FROM NODE   950.00 TO NODE    962.00 =   1775.00 FEET.

****************************************************************************
   FLOW PROCESS FROM NODE   962.00 TO NODE   962.00 IS CODE =   1
   ------------------------------------------------------------------------------
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   ==========================================================================
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
   TIME OF CONCENTRATION(MIN.) =   11.84
   RAINFALL INTENSITY(INCH/HR) =   4.68
   TOTAL STREAM AREA(ACRES) =     2.24
   PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.42

****************************************************************************
   FLOW PROCESS FROM NODE   960.00 TO NODE   961.00 IS CODE =  21
   ------------------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
   ==========================================================================
   *USER SPECIFIED(SUBAREA):
   NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7900
   S.C.S. CURVE NUMBER (AMC II) =   0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   90.00
   UPSTREAM ELEVATION(FEET) =   585.40
   DOWNSTREAM ELEVATION(FEET) =   584.60
   ELEVATION DIFFERENCE(FEET) =     0.80
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =   4.411
   WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
            THE MAXIMUM OVERLAND FLOW LENGTH =    57.78
            (Reference: Table 3-1B of Hydrology Manual)
            THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
   NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
   SUBAREA RUNOFF(CFS) =      1.03
   TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      1.03

****************************************************************************
   FLOW PROCESS FROM NODE   961.00 TO NODE   962.00 IS CODE =  61
   ------------------------------------------------------------------------------
   >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>(STANDARD CURB SECTION USED)<<<<<
   ==========================================================================
   UPSTREAM ELEVATION(FEET) = 584.60  DOWNSTREAM ELEVATION(FEET) = 577.10
   STREET LENGTH(FEET) =   751.00   CURB HEIGHT(INCHES) = 6.0
   STREET HALFWIDTH(FEET) = 22.00

   DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 11.00
   INSIDE STREET CROSSFALL(DECIMAL) = 0.020
   OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

   SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
   STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
   Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
   Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

     **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.73
     STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
     STREET FLOW DEPTH(FEET) =  0.34
     HALFSTREET FLOOD WIDTH(FEET) =   10.59
     AVERAGE FLOW VELOCITY(FEET/SEC.) =     2.31
     PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =     0.78
   STREET FLOW TRAVEL TIME(MIN.) =   5.42   Tc(MIN.) =    9.83
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.282
   *USER SPECIFIED(SUBAREA):
   NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7900
   S.C.S. CURVE NUMBER (AMC II) =   0
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.790
   SUBAREA AREA(ACRES) =    2.19       SUBAREA RUNOFF(CFS) =    9.14
   TOTAL AREA(ACRES) =        2.4       PEAK FLOW RATE(CFS) =       9.81

   END OF SUBAREA STREET FLOW HYDRAULICS:
   DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) = 13.19
   FLOW VELOCITY(FEET/SEC.) = 2.64   DEPTH*VELOCITY(FT*FT/SEC.) =  1.03
   LONGEST FLOWPATH FROM NODE   960.00 TO NODE    962.00 =    841.00 FEET.

****************************************************************************
   FLOW PROCESS FROM NODE   962.00 TO NODE   962.00 IS CODE =   1
   ------------------------------------------------------------------------------
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
```

```
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   9.83
  RAINFALL INTENSITY(INCH/HR) =   5.28
  TOTAL STREAM AREA(ACRES) =     2.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.81

   ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY      AREA
  NUMBER     (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        9.42     11.84       4.684         2.24
     2        9.81      9.83       5.282         2.35

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

   ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       18.16      9.83      5.282
     2       18.12     11.84      4.684

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       18.16   Tc(MIN.) =    9.83
  TOTAL AREA(ACRES) =        4.6
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    962.00 =    1775.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    962.00 TO NODE    963.00 IS CODE = 31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    572.00  DOWNSTREAM(FEET) =    570.00
  FLOW LENGTH(FEET) =    120.00   MANNING'S N =   0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.39
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =        18.16
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   10.04
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    963.00 =    1895.00 FEET.


  +--------------------------------------------------------------------------+
  |                                                                          |
  |                                                                          |
  |                                                                          |
  +--------------------------------------------------------------------------+


********************************************************************************
  FLOW PROCESS FROM NODE    965.00 TO NODE    966.00 IS CODE = 21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =    0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    585.40
  DOWNSTREAM ELEVATION(FEET) =    584.36
  ELEVATION DIFFERENCE(FEET) =      1.04
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.106
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    64.50
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.168
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.03
  TOTAL AREA(ACRES) =       0.16   TOTAL RUNOFF(CFS) =      1.03

********************************************************************************
  FLOW PROCESS FROM NODE    966.00 TO NODE    967.00 IS CODE = 61
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  584.35  DOWNSTREAM ELEVATION(FEET) =  579.00
  STREET LENGTH(FEET) =    558.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 22.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL) =  0.020
```

```
   SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
   STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
   Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
   Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

      **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.19
       STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
       STREET FLOW DEPTH(FEET) =  0.29
       HALFSTREET FLOOD WIDTH(FEET) =    8.22
       AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.01
       PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
   STREET FLOW TRAVEL TIME(MIN.) =   4.63   Tc(MIN.) =    8.74
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.698
   *USER SPECIFIED(SUBAREA):
   NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7900
   S.C.S. CURVE NUMBER (AMC II) =    0
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.790
   SUBAREA AREA(ACRES) =    0.94      SUBAREA RUNOFF(CFS) =    4.23
   TOTAL AREA(ACRES) =         1.1      PEAK FLOW RATE(CFS) =        4.95

   END OF SUBAREA STREET FLOW HYDRAULICS:
   DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.00
   FLOW VELOCITY(FEET/SEC.) =  2.21   DEPTH*VELOCITY(FT*FT/SEC.) =   0.72
   LONGEST FLOWPATH FROM NODE   965.00 TO NODE   967.00 =   638.00 FEET.

   *******************************************************************************
    FLOW PROCESS FROM NODE   967.00 TO NODE   972.00 IS CODE =  31
   -------------------------------------------------------------------------------
    >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
    >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
   ===============================================================================
    ELEVATION DATA: UPSTREAM(FEET) =   575.00  DOWNSTREAM(FEET) =   565.00
    FLOW LENGTH(FEET) =   900.00   MANNING'S N =  0.013
    ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
    DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
    PIPE-FLOW VELOCITY(FEET/SEC.) =   5.98
    ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES =   1
    PIPE-FLOW(CFS) =        4.95
    PIPE TRAVEL TIME(MIN.) =   2.51    Tc(MIN.) =   11.25
    LONGEST FLOWPATH FROM NODE   965.00 TO NODE   972.00 =   1538.00 FEET.

   *******************************************************************************
    FLOW PROCESS FROM NODE   972.00 TO NODE   972.00 IS CODE =  1
   -------------------------------------------------------------------------------
    >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   ===============================================================================
    TOTAL NUMBER OF STREAMS =  2
    CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
    TIME OF CONCENTRATION(MIN.) =   11.25
    RAINFALL INTENSITY(INCH/HR) =   4.84
    TOTAL STREAM AREA(ACRES) =     1.10
    PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.95

   *******************************************************************************
    FLOW PROCESS FROM NODE   970.00 TO NODE   971.00 IS CODE =  21
   -------------------------------------------------------------------------------
    >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
   ===============================================================================
    *USER SPECIFIED(SUBAREA):
    NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7900
    S.C.S. CURVE NUMBER (AMC II) =    0
    INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
    UPSTREAM ELEVATION(FEET) =    578.90
    DOWNSTREAM ELEVATION(FEET) =    577.90
    ELEVATION DIFFERENCE(FEET) =      1.00
    SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.322
    WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
             THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
             (Reference: Table 3-1B of Hydrology Manual)
             THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.168
    NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
    SUBAREA RUNOFF(CFS) =      1.23
    TOTAL AREA(ACRES) =        0.19   TOTAL RUNOFF(CFS) =      1.23

   *******************************************************************************
    FLOW PROCESS FROM NODE   971.00 TO NODE   972.00 IS CODE =  61
   -------------------------------------------------------------------------------
    >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
    >>>>>(STANDARD CURB SECTION USED)<<<<<
   ===============================================================================
    UPSTREAM ELEVATION(FEET) = 577.90  DOWNSTREAM ELEVATION(FEET) = 570.00
    STREET LENGTH(FEET) =   782.00   CURB HEIGHT(INCHES) =  6.0
    STREET HALFWIDTH(FEET) = 22.00
```

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      DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
      INSIDE STREET CROSSFALL(DECIMAL) =  0.020
      OUTSIDE STREET CROSSFALL(DECIMAL) =  0.020

      SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
      STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
      Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
      Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

        **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.75
        STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
        STREET FLOW DEPTH(FEET) =  0.34
        HALFSTREET FLOOD WIDTH(FEET) =   10.59
        AVERAGE FLOW VELOCITY(FEET/SEC.) =     2.32
        PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =     0.78
      STREET FLOW TRAVEL TIME(MIN.) =   5.62   Tc(MIN.) =    9.94
       100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.243
      *USER SPECIFIED(SUBAREA):
      NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7900
      S.C.S. CURVE NUMBER (AMC II) =   0
      AREA-AVERAGE RUNOFF COEFFICIENT =  0.790
      SUBAREA AREA(ACRES) =    2.12      SUBAREA RUNOFF(CFS) =    8.78
      TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       9.57

      END OF SUBAREA STREET FLOW HYDRAULICS:
      DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) = 13.02
      FLOW VELOCITY(FEET/SEC.) = 2.64   DEPTH*VELOCITY(FT*FT/SEC.) =  1.02
      LONGEST FLOWPATH FROM NODE   970.00 TO NODE   972.00 =    882.00 FEET.

**********************************************************************************
      FLOW PROCESS FROM NODE   972.00 TO NODE   972.00 IS CODE =   1
--------------------------------------------------------------------------------
      >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
      >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
      TOTAL NUMBER OF STREAMS =  2
      CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
      TIME OF CONCENTRATION(MIN.) =   9.94
      RAINFALL INTENSITY(INCH/HR) =  5.24
      TOTAL STREAM AREA(ACRES) =    2.31
      PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.57

      ** CONFLUENCE DATA **
      STREAM     RUNOFF      Tc      INTENSITY     AREA
      NUMBER     (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
        1        4.95    11.25       4.842        1.10
        2        9.57     9.94       5.243        2.31

      RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
      CONFLUENCE FORMULA USED FOR  2 STREAMS.

      ** PEAK FLOW RATE TABLE **
      STREAM     RUNOFF      Tc      INTENSITY
      NUMBER     (CFS)    (MIN.)   (INCH/HOUR)
        1       13.94     9.94       5.243
        2       13.79    11.25       4.842

      COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
      PEAK FLOW RATE(CFS) =      13.94   Tc(MIN.) =    9.94
      TOTAL AREA(ACRES) =        3.4
      LONGEST FLOWPATH FROM NODE   965.00 TO NODE   972.00 =   1538.00 FEET.

**********************************************************************************
      FLOW PROCESS FROM NODE   972.00 TO NODE   973.00 IS CODE =  31
--------------------------------------------------------------------------------
      >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
      >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
      ELEVATION DATA: UPSTREAM(FEET) =   565.00  DOWNSTREAM(FEET) =   560.00
      FLOW LENGTH(FEET) =   195.00   MANNING'S N =  0.013
      DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.8 INCHES
      PIPE-FLOW VELOCITY(FEET/SEC.) = 10.41
      ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES =   1
      PIPE-FLOW(CFS) =       13.94
      PIPE TRAVEL TIME(MIN.) =   0.31   Tc(MIN.) =   10.25
      LONGEST FLOWPATH FROM NODE   965.00 TO NODE   973.00 =   1733.00 FEET.

      +----------------------------------------------------------------------+
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      +----------------------------------------------------------------------+

**********************************************************************************
      FLOW PROCESS FROM NODE   975.00 TO NODE   976.00 IS CODE =  21
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  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    574.80
  DOWNSTREAM ELEVATION(FEET) =    573.90
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.402
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =     58.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.168
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.03
  TOTAL AREA(ACRES) =       0.16   TOTAL RUNOFF(CFS) =      1.03

*******************************************************************************
  FLOW PROCESS FROM NODE   976.00 TO NODE   977.00 IS CODE =  61
-------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  573.90  DOWNSTREAM ELEVATION(FEET) =  563.40
  STREET LENGTH(FEET) =  1089.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 22.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.86
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   13.36
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   7.01   Tc(MIN.) =   11.41
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.797
  *USER SPECIFIED(SUBAREA):
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.790
  SUBAREA AREA(ACRES) =    4.46      SUBAREA RUNOFF(CFS) =   16.90
  TOTAL AREA(ACRES) =         4.6        PEAK FLOW RATE(CFS) =     17.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.80
  FLOW VELOCITY(FEET/SEC.) =  2.98   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L = 1089.0 FT WITH ELEVATION-DROP = 10.5 FT, IS   28.8 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    977.00
  LONGEST FLOWPATH FROM NODE    975.00 TO NODE    977.00 =    1189.00 FEET.

*******************************************************************************
  FLOW PROCESS FROM NODE   977.00 TO NODE   977.00 IS CODE =   1
-------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  11.41
  RAINFALL INTENSITY(INCH/HR) =  4.80
  TOTAL STREAM AREA(ACRES) =     4.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.51

*******************************************************************************
  FLOW PROCESS FROM NODE   980.00 TO NODE   981.00 IS CODE =  21
-------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7900
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    98.00
  UPSTREAM ELEVATION(FEET) =    626.00
  DOWNSTREAM ELEVATION(FEET) =    624.00
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     ELEVATION DIFFERENCE(FEET) =      2.00
     SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.820
     WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
              THE MAXIMUM OVERLAND FLOW LENGTH =    75.41
              (Reference: Table 3-1B of Hydrology Manual)
              THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
      100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.168
     NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
     SUBAREA RUNOFF(CFS) =      1.16
     TOTAL AREA(ACRES) =       0.18   TOTAL RUNOFF(CFS) =       1.16

*******************************************************************************
   FLOW PROCESS FROM NODE    981.00 TO NODE    982.00 IS CODE =  61
-------------------------------------------------------------------------------
   >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>(STANDARD CURB SECTION USED)<<<<<
===============================================================================
   UPSTREAM ELEVATION(FEET) =  624.00  DOWNSTREAM ELEVATION(FEET) = 592.00
   STREET LENGTH(FEET) =    910.00   CURB HEIGHT(INCHES) =  6.0
   STREET HALFWIDTH(FEET) = 22.00

   DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
   INSIDE STREET CROSSFALL(DECIMAL) =  0.020
   OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

   SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
   STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
   Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
   Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

     **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.58
     STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
     STREET FLOW DEPTH(FEET) =  0.28
     HALFSTREET FLOOD WIDTH(FEET) =   7.92
     AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.75
     PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
   STREET FLOW TRAVEL TIME(MIN.) =   4.05   Tc(MIN.) =    7.87
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.096
   *USER SPECIFIED(SUBAREA):
   NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7900
   S.C.S. CURVE NUMBER (AMC II) =    0
   AREA-AVERAGE RUNOFF COEFFICIENT =  0.790
   SUBAREA AREA(ACRES) =    1.81      SUBAREA RUNOFF(CFS) =    8.72
   TOTAL AREA(ACRES) =        2.0       PEAK FLOW RATE(CFS) =       9.58

   END OF SUBAREA STREET FLOW HYDRAULICS:
   DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.07
   FLOW VELOCITY(FEET/SEC.) =   4.23   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
   LONGEST FLOWPATH FROM NODE    980.00 TO NODE    982.00 =    1008.00 FEET.

*******************************************************************************
   FLOW PROCESS FROM NODE    982.00 TO NODE    977.00 IS CODE =  31
-------------------------------------------------------------------------------
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
===============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =    585.00  DOWNSTREAM(FEET) =    560.00
   FLOW LENGTH(FEET) =   948.00   MANNING'S N =  0.013
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.8 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  9.74
   ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =        9.58
   PIPE TRAVEL TIME(MIN.) =   1.62   Tc(MIN.) =    9.49
   LONGEST FLOWPATH FROM NODE    980.00 TO NODE    977.00 =    1956.00 FEET.

*******************************************************************************
   FLOW PROCESS FROM NODE    977.00 TO NODE    977.00 IS CODE =   1
-------------------------------------------------------------------------------
   >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
===============================================================================
   TOTAL NUMBER OF STREAMS =  2
   CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
   TIME OF CONCENTRATION(MIN.) =   9.49
   RAINFALL INTENSITY(INCH/HR) =   5.40
   TOTAL STREAM AREA(ACRES) =    1.99
   PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.58

   ** CONFLUENCE DATA **
   STREAM     RUNOFF      Tc     INTENSITY      AREA
   NUMBER     (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       17.51     11.41      4.797         4.62
      2        9.58      9.49      5.402         1.99
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   RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
   CONFLUENCE FORMULA USED FOR  2 STREAMS.

   ** PEAK FLOW RATE TABLE **
   STREAM    RUNOFF      Tc      INTENSITY
   NUMBER    (CFS)     (MIN.)   (INCH/HOUR)
      1      24.15     9.49       5.402
      2      26.02    11.41       4.797

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      26.02   Tc(MIN.) =   11.41
   TOTAL AREA(ACRES) =         6.6
   LONGEST FLOWPATH FROM NODE    980.00 TO NODE    977.00 =    1956.00 FEET.

*******************************************************************************
   FLOW PROCESS FROM NODE    977.00 TO NODE    984.00 IS CODE =  31
-------------------------------------------------------------------------------
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
===============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =    560.00  DOWNSTREAM(FEET) =    550.00
   FLOW LENGTH(FEET) =   295.00   MANNING'S N =  0.013
   DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.8 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  13.41
   ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =       26.02
   PIPE TRAVEL TIME(MIN.) =   0.37   Tc(MIN.) =   11.78
   LONGEST FLOWPATH FROM NODE    980.00 TO NODE    984.00 =    2251.00 FEET.


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+-----------------------------------------------------------------------+

*******************************************************************************
   FLOW PROCESS FROM NODE    985.00 TO NODE    986.00 IS CODE =  21
-------------------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
===============================================================================
   *USER SPECIFIED(SUBAREA):
   NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =    0
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
   UPSTREAM ELEVATION(FEET) =    715.00
   DOWNSTREAM ELEVATION(FEET) =    705.00
   ELEVATION DIFFERENCE(FEET) =     10.00
   SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
   WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.061
   SUBAREA RUNOFF(CFS) =       0.47
   TOTAL AREA(ACRES) =        0.19   TOTAL RUNOFF(CFS) =       0.47

*******************************************************************************
   FLOW PROCESS FROM NODE    986.00 TO NODE    987.00 IS CODE =  31
-------------------------------------------------------------------------------
   >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
===============================================================================
   ELEVATION DATA: UPSTREAM(FEET) =    700.00  DOWNSTREAM(FEET) =    560.00
   FLOW LENGTH(FEET) =  1154.00   MANNING'S N =  0.013
   ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
   DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.4 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =   7.04
   ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =        0.47
   PIPE TRAVEL TIME(MIN.) =   2.73   Tc(MIN.) =    9.00
   LONGEST FLOWPATH FROM NODE    985.00 TO NODE    987.00 =    1254.00 FEET.

*******************************************************************************
   FLOW PROCESS FROM NODE    986.00 TO NODE    987.00 IS CODE =  81
-------------------------------------------------------------------------------
   >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
===============================================================================
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.591
   *USER SPECIFIED(SUBAREA):
   NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .3500
   S.C.S. CURVE NUMBER (AMC II) =    0
   AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
   SUBAREA AREA(ACRES) =   14.04   SUBAREA RUNOFF(CFS) =    27.47
   TOTAL AREA(ACRES) =        14.2   TOTAL RUNOFF(CFS) =       27.85
   TC(MIN.) =    9.00

*******************************************************************************
   FLOW PROCESS FROM NODE    987.00 TO NODE    988.00 IS CODE =  31
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--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   560.00  DOWNSTREAM(FEET) =   550.00
  FLOW LENGTH(FEET) =   177.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.79
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       27.85
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   9.17
  LONGEST FLOWPATH FROM NODE   985.00 TO NODE   988.00 =   1431.00 FEET.


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********************************************************************************
  FLOW PROCESS FROM NODE   990.00 TO NODE   991.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   677.00
  DOWNSTREAM ELEVATION(FEET) =   670.00
  ELEVATION DIFFERENCE(FEET) =     7.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   7.058
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.540
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.16

********************************************************************************
  FLOW PROCESS FROM NODE   991.00 TO NODE   992.00 IS CODE =  53
--------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    670.00  DOWNSTREAM(FEET) =    570.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   513.00    CHANNEL SLOPE =  0.1949
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.16
  FLOW VELOCITY(FEET/SEC) =   2.47 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.46   Tc(MIN.) =   10.52
  LONGEST FLOWPATH FROM NODE   990.00 TO NODE   992.00 =   613.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE   991.00 TO NODE   992.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.056
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    7.79   SUBAREA RUNOFF(CFS) =   13.79
  TOTAL AREA(ACRES) =       7.9   TOTAL RUNOFF(CFS) =      13.91
  TC(MIN.) =   10.52

********************************************************************************
  FLOW PROCESS FROM NODE   992.00 TO NODE   993.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    570.00  DOWNSTREAM(FEET) =    545.00
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.78
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       13.91
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.64
  LONGEST FLOWPATH FROM NODE   990.00 TO NODE   993.00 =    773.00 FEET.


  +----------------------------------------------------------------------+
  |                                                                      |
  |                                                                      |
  |                                                                      |
  |                                                                      |
  |                                                                      |
  +----------------------------------------------------------------------+
```

```
+-----------------------------------------------------------------------------+
| The following input information is per the Hydrology Study for Rolling       |
| Hills Ranch Neighborhoods 9-12 (Oct 2003)                                    |
|                                                                              |
+-----------------------------------------------------------------------------+


*******************************************************************************
  FLOW PROCESS FROM NODE    994.00 TO NODE    994.00 IS CODE =    7
-------------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
===============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  22.29   RAIN INTENSITY(INCH/HOUR) =  3.11
  TOTAL AREA(ACRES) =   261.03   TOTAL RUNOFF(CFS) =    469.76


*******************************************************************************
  FLOW PROCESS FROM NODE    994.00 TO NODE    995.00 IS CODE =   31
-------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
===============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   605.00  DOWNSTREAM(FEET) =   600.00
  FLOW LENGTH(FEET) =  233.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  52.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.00
  ESTIMATED PIPE DIAMETER(INCH) = 66.00    NUMBER OF PIPES =    1
  PIPE-FLOW(CFS) =    469.76
  PIPE TRAVEL TIME(MIN.) =   0.17   Tc(MIN.) =   22.46
  LONGEST FLOWPATH FROM NODE    990.00 TO NODE    995.00 =    1006.00 FEET.


*******************************************************************************
  FLOW PROCESS FROM NODE    994.00 TO NODE    995.00 IS CODE =   81
-------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
===============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.099
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =    0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5754
  SUBAREA AREA(ACRES) =    2.78   SUBAREA RUNOFF(CFS) =    3.02
  TOTAL AREA(ACRES) =        263.8   TOTAL RUNOFF(CFS) =     470.50
  TC(MIN.) =   22.46


*******************************************************************************
  FLOW PROCESS FROM NODE    995.00 TO NODE    996.00 IS CODE =   31
-------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
===============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   600.00  DOWNSTREAM(FEET) =   575.00
  FLOW LENGTH(FEET) =   771.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  46.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.23
  ESTIMATED PIPE DIAMETER(INCH) = 63.00    NUMBER OF PIPES =    1
  PIPE-FLOW(CFS) =    470.50
  PIPE TRAVEL TIME(MIN.) =   0.47   Tc(MIN.) =   22.93
  LONGEST FLOWPATH FROM NODE    990.00 TO NODE    996.00 =    1777.00 FEET.


+-----------------------------------------------------------------------------+
|                                                                             |
|                                                                             |
|                                                                             |
|                                                                             |
+-----------------------------------------------------------------------------+


+-----------------------------------------------------------------------------+
| The following information is per the Hydrology Study for Rolling Hills       |
| Ranch Neighborhoods 9-12  (October 2003).                                    |
|                                                                              |
+-----------------------------------------------------------------------------+


*******************************************************************************
  FLOW PROCESS FROM NODE    997.00 TO NODE    997.00 IS CODE =    7
-------------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
===============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  20.04   RAIN INTENSITY(INCH/HOUR) =  3.34
  TOTAL AREA(ACRES) =   718.66   TOTAL RUNOFF(CFS) =   1373.90


*******************************************************************************
  FLOW PROCESS FROM NODE    997.00 TO NODE    998.00 IS CODE =   52
-------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
 ===========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    600.00  DOWNSTREAM(FEET) =    559.00
  CHANNEL LENGTH THRU SUBAREA(FEET) = 1925.00   CHANNEL SLOPE =  0.0213
  CHANNEL FLOW THRU SUBAREA(CFS) =    1373.90
  FLOW VELOCITY(FEET/SEC) = 15.88 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.02   Tc(MIN.) =   22.06
  LONGEST FLOWPATH FROM NODE   990.00 TO NODE    998.00 =   3702.00 FEET.

 ****************************************************************************
   FLOW PROCESS FROM NODE   997.00 TO NODE    998.00 IS CODE =  81
 ---------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 ===========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.135
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =    0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5634
  SUBAREA AREA(ACRES) =   32.59   SUBAREA RUNOFF(CFS) =    35.76
  TOTAL AREA(ACRES) =      751.2   TOTAL RUNOFF(CFS) =    1373.90
  TC(MIN.) =   22.06
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 ****************************************************************************
   FLOW PROCESS FROM NODE   998.00 TO NODE    998.00 IS CODE =   1
 ---------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 ===========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   22.06
  RAINFALL INTENSITY(INCH/HR) =   3.14
  TOTAL STREAM AREA(ACRES) =   751.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =   1373.90

 ****************************************************************************
   FLOW PROCESS FROM NODE   998.10 TO NODE    998.20 IS CODE =  21
 ---------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 ===========================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =    0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    745.00
  DOWNSTREAM ELEVATION(FEET) =    742.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.361
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.451
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.17

 ****************************************************************************
   FLOW PROCESS FROM NODE   998.20 TO NODE    998.30 IS CODE =  52
 ---------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
 ===========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    742.00  DOWNSTREAM(FEET) =   650.00
  CHANNEL LENGTH THRU SUBAREA(FEET) = 1153.00   CHANNEL SLOPE =  0.0798
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =        0.17
  FLOW VELOCITY(FEET/SEC) =   4.24 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.54   Tc(MIN.) =   13.90
  LONGEST FLOWPATH FROM NODE    998.10 TO NODE    998.30 =   1253.00 FEET.

 ****************************************************************************
   FLOW PROCESS FROM NODE   998.20 TO NODE    998.30 IS CODE =  81
 ---------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 ===========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.224
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =    0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   10.82   SUBAREA RUNOFF(CFS) =    16.00
  TOTAL AREA(ACRES) =       10.9   TOTAL RUNOFF(CFS) =      16.13
  TC(MIN.) =   13.90

 ****************************************************************************
   FLOW PROCESS FROM NODE   998.30 TO NODE    998.00 IS CODE =  52
 ---------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
```

```
    >>>>>TRAVELTIME THRU SUBAREA<<<<<
===========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    650.00  DOWNSTREAM(FEET) =    559.00
  CHANNEL LENGTH THRU SUBAREA(FEET) = 1816.00   CHANNEL SLOPE =  0.0501
  CHANNEL FLOW THRU SUBAREA(CFS) =      16.13
  FLOW VELOCITY(FEET/SEC) =   6.33 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.78   Tc(MIN.) =   18.68
  LONGEST FLOWPATH FROM NODE   998.10 TO NODE    998.00 =   3069.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE   998.30 TO NODE    998.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
===========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.491
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =    0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   36.38   SUBAREA RUNOFF(CFS) =   44.45
  TOTAL AREA(ACRES) =       47.3   TOTAL RUNOFF(CFS) =      57.78
  TC(MIN.) =   18.68

******************************************************************************
  FLOW PROCESS FROM NODE   998.00 TO NODE    998.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
===========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.68
  RAINFALL INTENSITY(INCH/HR) =   3.49
  TOTAL STREAM AREA(ACRES) =    47.29
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     57.78

  ** CONFLUENCE DATA **
  STREAM    RUNOFF      Tc       INTENSITY      AREA
  NUMBER     (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1     1373.90    22.06       3.135        751.25
     2       57.78    18.68       3.491         47.29

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF      Tc      INTENSITY
  NUMBER     (CFS)    (MIN.)   (INCH/HOUR)
     1     1220.83    18.68      3.491
     2     1425.80    22.06      3.135

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1425.80   Tc(MIN.) =   22.06
  TOTAL AREA(ACRES) =        798.5
  LONGEST FLOWPATH FROM NODE   990.00 TO NODE    998.00 =   3702.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE   998.00 TO NODE    999.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
===========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    559.00  DOWNSTREAM(FEET) =    550.00
  FLOW LENGTH(FEET) =    210.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  90.0 INCH PIPE IS  68.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) = 39.79
  ESTIMATED PIPE DIAMETER(INCH) = 90.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    1425.80
  PIPE TRAVEL TIME(MIN.) =   0.09   Tc(MIN.) =   22.15
  LONGEST FLOWPATH FROM NODE   990.00 TO NODE    999.00 =   3912.00 FEET.
===========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =       798.5  TC(MIN.) =     22.15
  PEAK FLOW RATE(CFS)    =    1425.80
===========================================================================
===========================================================================
  END OF RATIONAL METHOD ANALYSIS
```
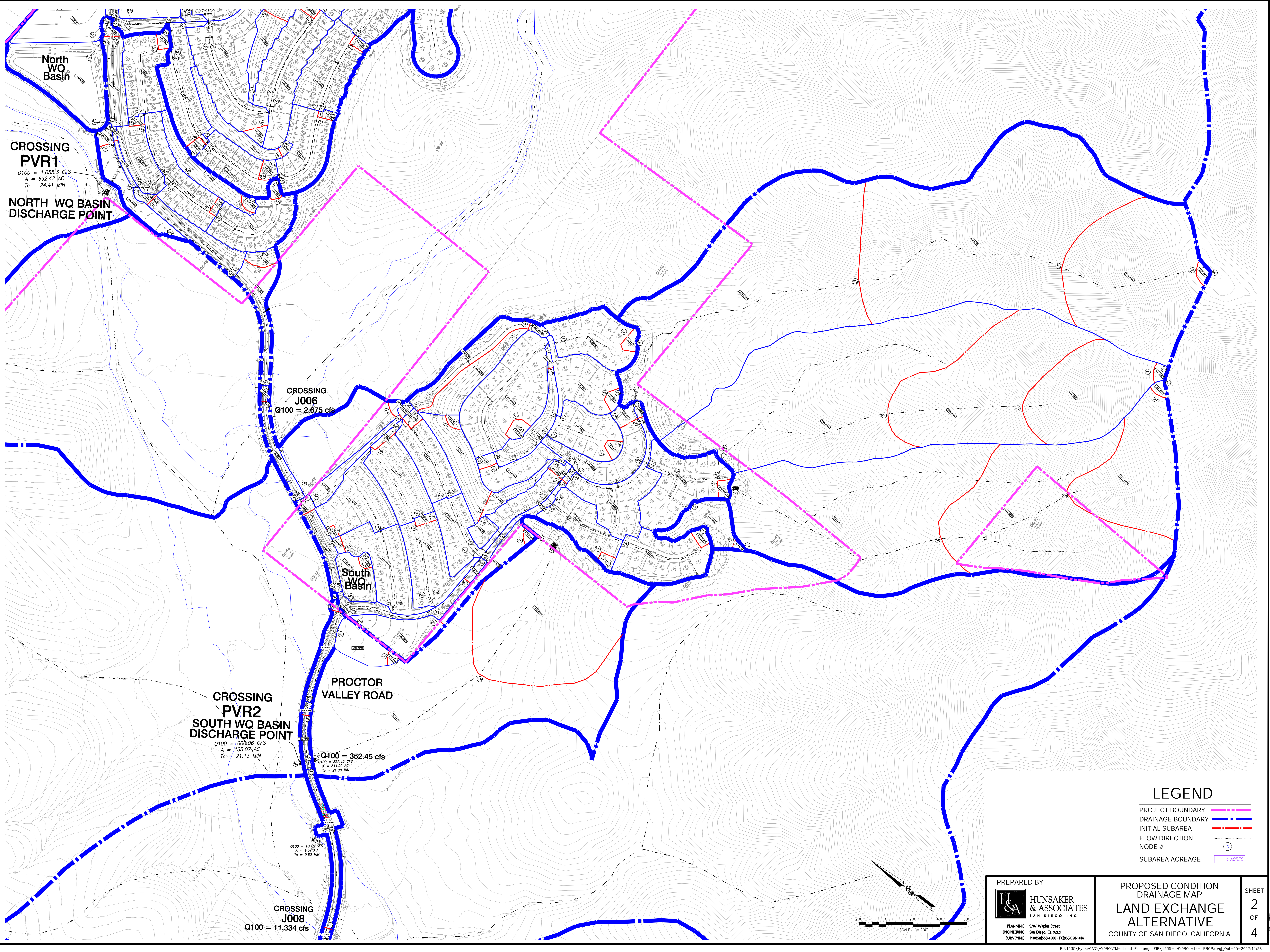
CHAPTER 4

4.1.5 – Rational Method Proposed Condition Hydrology Maps

PROCTOR VALLEY ROAD

PROCTOR VALLEY ROAD

PROCTOR VALLEY ROAD

CROSSING PVR1
Q100 = 1055.3 CFS
A = 892.42 AC
Tc = 24.41 MIN

North WQ Basin

NORTH WQ BASIN DISCHARGE POINT

LEGEND
PROJECT BOUNDARY
DRAINAGE BOUNDARY
INITIAL SUBAREA
FLOW DIRECTION
NODE #
SUBAREA ACREAGE

PREPARED BY:

HUNSAKER
& ASSOCIATES
S A N D I E G O, I N C.
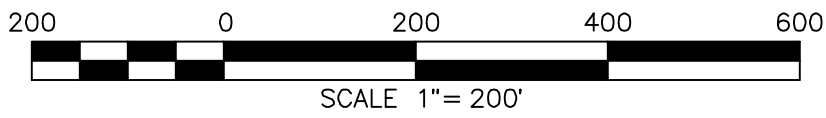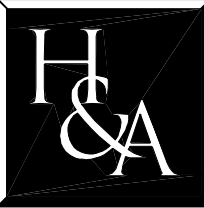
PLANNING
ENGINEERING
SURVEYING

PROPOSED CONDITION
DRAINAGE MAP

LAND EXCHANGE
ALTERNATIVE

COUNTY OF SAN DIEGO, CALIFORNIA

SHEET

1
OF
4

North
WQ
Basin

CROSSING
PVR1
Q100 = 1,055.3 CFS
A = 692.42 AC
Tc = 24.41 MIN

NORTH WQ BASIN
DISCHARGE POINT

CROSSING
J006
Q100 = 2,675 cfs

South
WQ
Basin

PROCTOR
VALLEY ROAD

CROSSING
PVR2
SOUTH WQ BASIN
DISCHARGE POINT
Q100 = 600.06 CFS
A = 455.07 AC
Tc = 21.13 MIN

Q100 = 352.45 cfs
Q100 = 352.45 CFS
A = 311.82 AC
Tc = 21.08 MIN

Q100 = 18.16 CFS
A = 4.59 AC
Tc = 9.83 MIN

CROSSING
J008
Q100 = 11,334 cfs

LEGEND

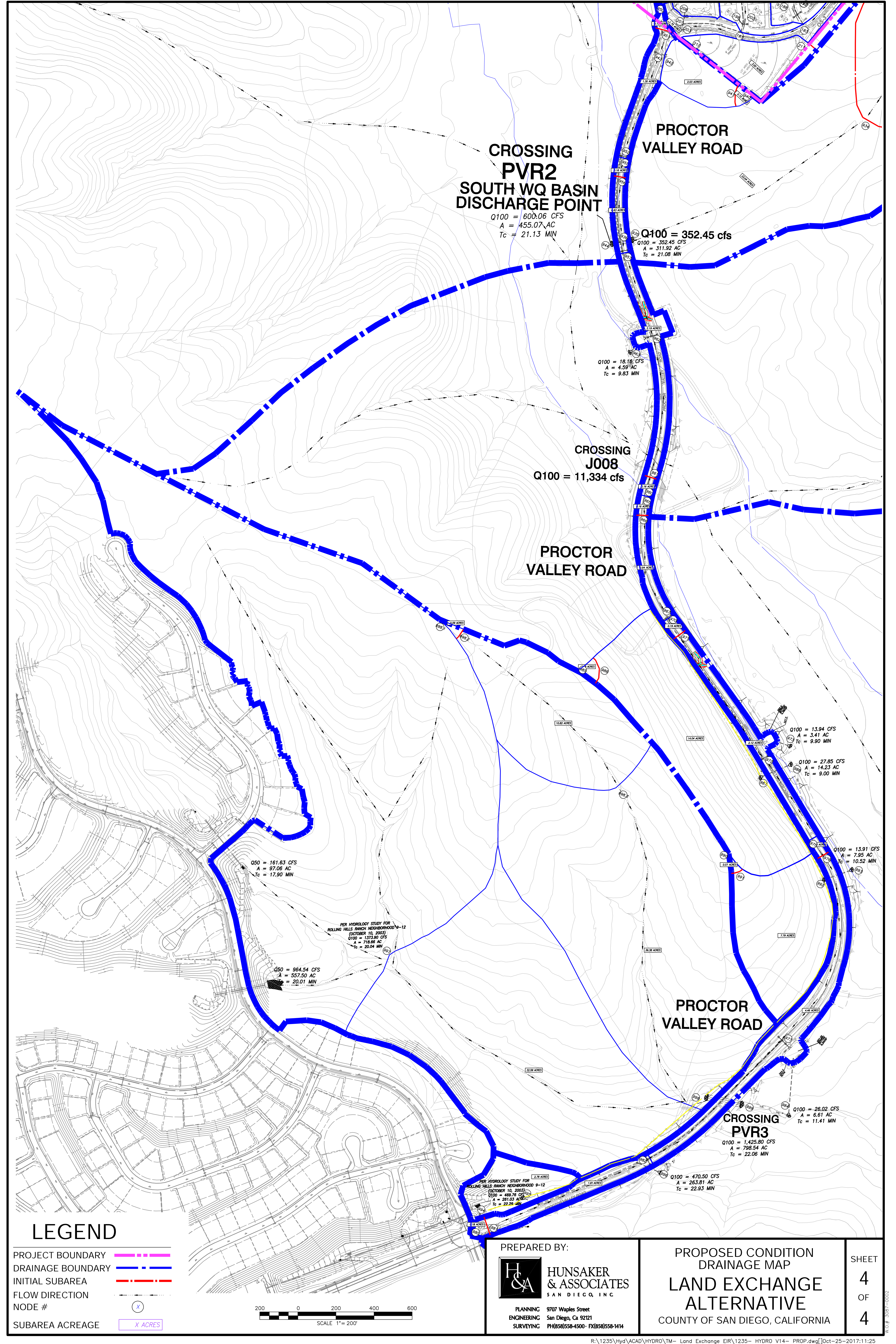|	
PROJECT BOUNDARY	
DRAINAGE BOUNDARY	
INITIAL SUBAREA	
FLOW DIRECTION	
NODE #	
SUBAREA ACREAGE	X ACRES

PREPARED BY:

H&A
HUNSAKER
& ASSOCIATES
SAN DIEGO, INC

PLANNING   9707 Waples Street
ENGINEERING   San Diego, Ca 92121
SURVEYING   PH(858)558-4500 · FX(858)558-1414

PROPOSED CONDITION
DRAINAGE MAP
LAND EXCHANGE
**ALTERNATIVE**
COUNTY OF SAN DIEGO, CALIFORNIA

SHEET
2
OF
4

200 0   200   400   600
SCALE 1"= 200'

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Page 310

BASIN #9
(SWALE)

BASIN #8
(SWALE)

PROCTOR
VALLEY ROAD

BASIN #6

MWS#1& 2

PROCTOR
VALLEY ROAD

BASIN #7

MWS#3 & 4

PROCTOR
VALLEY ROAD

LEGEND

PROJECT BOUNDARY	
DRAINAGE BOUNDARY	
INITIAL SUBAREA	
FLOW DIRECTION	
NODE #	Ⓧ
SUBAREA ACREAGE	X ACRES

200   0   200   400   600
SCALE 1"= 200'

PROPOSED CONDITION
DRAINAGE MAP
LAND EXCHANGE
ALTERNATIVE
COUNTY OF SAN DIEGO, CALIFORNIA

SHEET
3
OF
4

R:\1235\Hyd\ACAD\HYDRO\TM- Land Exchange EIR\1235- HYDRO V14- PROP.dwg[]Jan-29-2018:13:26

CROSSING
PVR2
SOUTH WQ BASIN
DISCHARGE POINT
Q100 = 600.06 CFS
A = 455.07 AC
Tc = 21.13 MIN

PROCTOR
VALLEY ROAD

Q100 = 352.45 cfs
Q100 = 352.45 CFS
A = 311.92 AC
Tc = 21.08 MIN

Q100 = 18.16 CFS
A = 4.59 AC
Tc = 9.83 MIN

CROSSING
J008
Q100 = 11,334 cfs

PROCTOR
VALLEY ROAD

Q100 = 13.94 CFS
A = 3.41 AC
Tc = 9.90 MIN

Q100 = 27.85 CFS
A = 14.23 AC
Tc = 9.00 MIN

Q100 = 13.91 CFS
A = 7.95 AC
Tc = 10.52 MIN

Q50 = 161.63 CFS
A = 97.06 AC
Tc = 17.90 MIN

PER HYDROLOGY STUDY FOR
ROLLING HILLS RANCH NEIGHBORHOOD 9-12
(OCTOBER 10, 2003)
Q100 = 137.50 CFS
A = 718.66 AC
Tc = 20.04 MIN

Q50 = 964.54 CFS
A = 557.50 AC
Tc = 20.01 MIN

PROCTOR
VALLEY ROAD

Q100 = 26.02 CFS
A = 6.61 AC
Tc = 11.41 MIN

CROSSING
PVR3
Q100 = 1,425.80 CFS
A = 798.54 AC
Tc = 22.06 MIN

Q100 = 470.50 CFS
A = 263.81 AC
Tc = 22.93 MIN

PER HYDROLOGY STUDY FOR
ROLLING HILLS RANCH NEIGHBORHOOD 9-12
(OCTOBER 10, 2003)
Q100 = 469.76 CFS
A = 281.03 AC
Tc = 22.29 MIN

LEGEND

PROJECT BOUNDARY
DRAINAGE BOUNDARY
INITIAL SUBAREA
FLOW DIRECTION
NODE #   (x)
SUBAREA ACREAGE   X ACRES

PROPOSED CONDITION
DRAINAGE MAP
**LAND EXCHANGE
ALTERNATIVE**
COUNTY OF SAN DIEGO, CALIFORNIA

SHEET
4
OF
4

SCALE 1"= 200'

200 0 200 400 600

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CHAPTER 5

100-Year Unit Hydrograph Hydrologic Model
for
Proposed Conditions

CHAPTER 5

5.1 – Unit Hydrograph Hydrologic Analysis (HEC HMS)
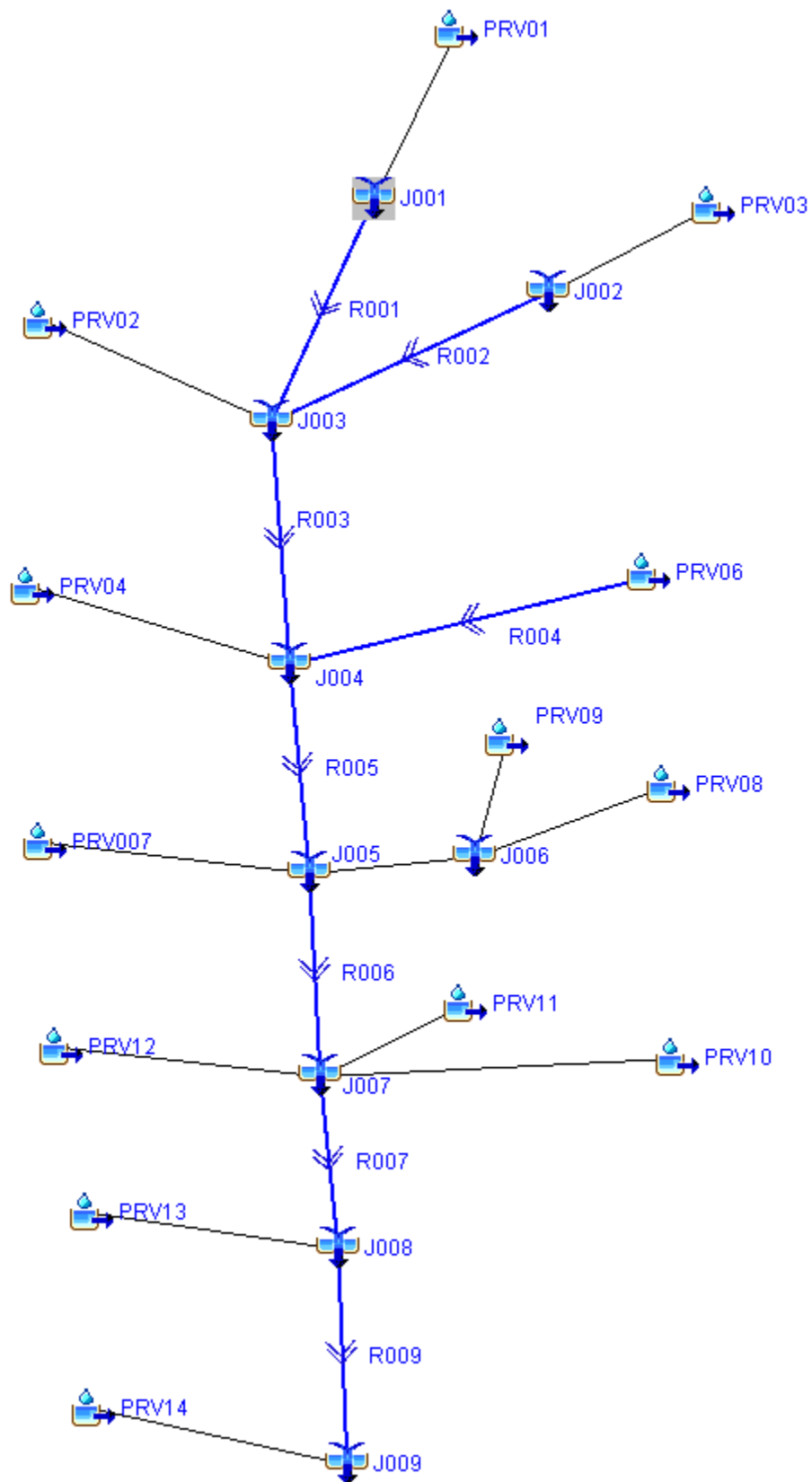
HEC-HMS Basin Input-Proposed Conditions

Subarea	Area (ft^2)	Area (mi^2)	"n" value	L (ft)	L$_c$ (ft)	L (miles)	L$_c$ (miles)	Elev$_1$ (ft)	Elev$_2$ (ft)	Elev$_{(1-2)}$ (ft)	Slope (ft/mile)	Corps T$_1$ (hrs)	NRCS T$_1$ (hrs)	NRCS T$_1$ (min)
PRV01	41547092.4	1.490	0.050	10200	5571	1.932	1.055	1148.0	868.0	280	144.941	0.61	0.52	31.10
PRV02	45198362.1	1.621	0.050	8232	3865	1.559	0.732	2510.0	820.0	1690	1083.965	0.33	0.28	16.80
PRV03	33654203.7	1.207	0.050	10119	5744	1.916	1.088	1620.0	890.0	730	380.907	0.51	0.43	26.03
PRV04	25073572.8	0.899	0.050	7749	3323	1.468	0.629	2060.0	618.0	1442	982.547	0.31	0.26	15.76
PRV06	13664384.9	0.490	0.050	6623	3953	1.254	0.749	1910.0	750.0	1160	924.777	0.32	0.27	16.05
PRV07	18068957.3	0.648	0.050	11593	6021	2.196	1.140	2560.0	588.0	1972	898.142	0.47	0.39	23.66
PRV08	38388604.6	1.377	0.050	10817	4868	2.049	0.922	1910.0	610.0	1300	634.557	0.45	0.38	22.69
PRV09	16497871.7	0.592	0.018	9559	4996	1.810	0.946	1340.0	647.0	693	382.785	0.17	0.14	8.36
PRV10	13686799.8	0.491	0.050	8973	5061	1.699	0.959	1870.0	580.0	1290	759.077	0.41	0.34	20.69
PRV11	6141025.1	0.220	0.018	4950	2506	0.938	0.475	770.0	580.0	190	202.667	0.12	0.09	5.49
PRV12	14223154.7	0.510	0.050	6658	3964	1.261	0.751	1095.0	568.0	527	417.927	0.37	0.31	18.81
PRV13	3517726.8	0.126	0.050	2752	1823	0.521	0.345	774.0	558.0	216	414.419	0.20	0.16	9.79
PRV14	30059449.2	1.078	0.050	11978	8327	2.269	1.577	1720.0	515.0	1205	531.174	0.59	0.50	30.08
Total Check	299721205.090	10.751												

Lag Equations from SD County Manual (2003)

Corps T$_1$ = 24n((L x L$_c$)/(s$^{0.5}$))^m

NRCS T$_1$ = T$_p$-0.5D

T$_p$=0.862*Corps T$_1$

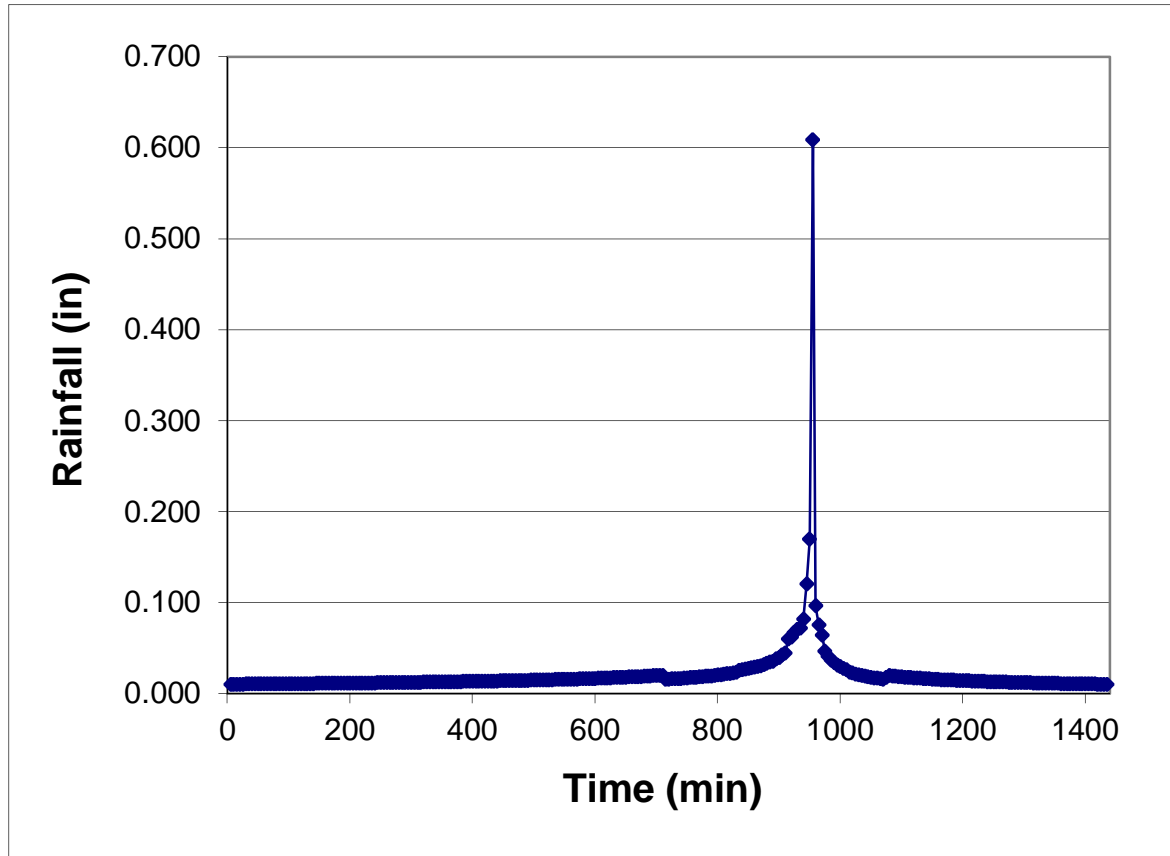**HEC-HMS Routing Input-Proposed Conditions**

Subarea	Reach	U/S Node	D/S Node	Length (ft)	U/S Elev (ft)	D/S Elev (ft)	Slope (ft/ft)	Slope (ft/mi)	"n" value	Channel Type	Dimensions
PRV01	R001	J001	J003	2189	868.0	818.0	0.02284	120.60302	0.05	Trap	50' (W), 3H:1V
PRV03	R002	J002	J003	2563	885.0	818.0	0.02614	138.02575	0.05	Trap	30' (W), 3H:1V
PRV04	R003	J003	J004	8454	818.0	615.0	0.02401	126.78495	0.018	Trap	30' (W), 3H:1V
PRV06	R004	PRV06	J004	4976	750.0	615.0	0.02713	143.24759	0.05	Trap	30' (W), 3H:1V
PRV07	R005	J004	J005	2399	615.0	587.0	0.01167	61.62568	0.05	Trap	50' (W), 8H:1V
PRV12	R006	J005	J007	2125	587.0	568.0	0.00894	47.20941	0.05	Trap	50' (W), 8H:1V
PRV13	R007	J007	J008	1429	568.0	558.0	0.00700	36.94892	0.05	Trap	20' (W), 3H:1V
PRV14	R008	J008	J009	4448	558.0	515.0	0.00967	51.04317	0.05	Trap	20' (W), 3H:1V

Proposed Conditions

Subarea	Total Acres	Soil Type	Acreage	CN	Soil Type	Acreage	CN	Soil Type	Acreage	CN	Soil Type	Acreage	CN	$CN_{2.0}$	$CN_{2.7}$
PRV01	953.79	A	155.7	41	B	71.7	64	C	591.5	75	D	134.89	85	70	81
PRV02	1037.61	A	0	0	B	0	62	C	0	74	D	1037.61	85	85	91
PRV03	772.59	A	0	0	B	0	62	C	0	74	D	772.59	85	85	91
PRV04	575.61	A	0	0	B	0	62	C	0	74	D	575.61	85	85	91
PRV06	313.69	A	0	0	B	0	62	C	0	74	D	313.69	85	85	91
PRV07	414.81	A	0	0	B	0	62	C	0	74	D	414.81	85	85	91
PRV08	881.28	A	0	0	B	0	62	C	0	74	D	881.28	85	85	91
PRV09	378.74	A	0	61	B	0	75	C	0	83	D	378.74	87	87	93
PRV10	314.21	A	0	0	B	0	62	C	0	74	D	314.21	85	85	91
PRV11	140.98	A	0	61	B	0	75	C	0	83	D	140.98	87	87	93
PRV12	326.52	A	0	0	B	0	62	C	0	74	D	326.52	85	85	91
PRV13	80.76	A	0	0	B	0	62	C	0	74	D	80.76	85	85	91
PRV14	690.07	A	0	0	B	0	62	C	0	74	D	690.07	85	85	91

OTAY RANCH VILLAGE 14

HEC HMS HYETOGRAPH CALCULATIONS

CALCULATED RAINFALL SORTED IN (2/3,1/3) DISTRIBUTION

SD COUNTY HYETOGRAPH CALCULATIONS

Area	(sq ft)	(sq mi)	
PRV01	41547092.4	1.49	953.79
PRV02	45198362.07	1.62	1037.61
PRV03	33654203.68	1.21	772.59
PRV04	25073572.81	0.90	575.61
PRV06	13664384.94	0.49	313.69
PRV07	18068957.34	0.65	414.81
PRV08	38388604.64	1.38	881.28
PRV09	16497871.65	0.59	378.74
PRV10	13686799.82	0.49	314.21
PRV11	6141025.13	0.22	140.98
PRV12	14223154.66	0.51	326.52
PRV13	3517726.75	0.13	80.76
PRV14	30059449.2	1.08	690.07
Total	299721205.1	10.75	6880.65

Watershed area		**Rainfall Depth-Area Adjustment Data Points**					
(sq mi)		30	60	180		360	1440
	10	0.9	0.947	0.97		0.98	0.985 Taken from Table 4-1
	10.75	**0.895**	**0.943**	**0.969**		**0.979**	**0.984** Interpolated
	20	0.834	0.9	0.952		0.963	0.975 Taken from Table 4-1

P(6)=   3.1 in

CALCULATED RAINFALL SORTED IN (2/3,1/3) DISTRIBUTION

RAINFALL DISTRIBUTION SORTED IN ORDER OF INCREASING DURATION

Duration (min)	Rainfall Precipitation for Duration (in)	Depth Area Adjustment for Duration	Depth-Area Adjusted Precipitation (in)	Hyetograph Ordinate (in)		Sorted Hyetograph Ordinate (in)
5	0.681	0.895	0.609	0.609	1	0.010
10	0.871	0.895	0.779	0.170	2	0.010
15	1.005	0.895	0.900	0.121	3	0.010
20	1.113	0.895	0.997	0.097	4	0.011
25	1.205	0.895	1.079	0.082	5	0.011
30	1.286	0.895	1.151	0.072	6	0.011
35	1.358	0.903	1.227	0.076	7	0.011
40	1.424	0.911	1.298	0.071	8	0.011
45	1.485	0.919	1.365	0.067	9	0.011
50	1.541	0.927	1.429	0.064	10	0.011
55	1.594	0.935	1.491	0.062	11	0.011
60	1.644	0.943	1.552	0.060	12	0.011
65	1.692	0.945	1.598	0.046	13	0.011
70	1.737	0.946	1.642	0.044	14	0.011
75	1.780	0.947	1.685	0.043	15	0.011
80	1.821	0.948	1.726	0.041	16	0.011
85	1.861	0.949	1.765	0.040	17	0.011
90	1.899	0.950	1.804	0.038	18	0.011
95	1.936	0.951	1.841	0.037	19	0.011
100	1.971	0.952	1.877	0.036	20	0.011
105	2.006	0.953	1.911	0.035	21	0.011
110	2.039	0.954	1.945	0.034	22	0.011
115	2.072	0.955	1.979	0.033	23	0.011
120	2.103	0.956	2.011	0.032	24	0.011
125	2.134	0.957	2.042	0.032	25	0.011
130	2.164	0.958	2.073	0.031	26	0.011
135	2.193	0.959	2.104	0.030	27	0.011

140	2.222	0.960	2.133	0.030	28	0.011
145	2.249	0.961	2.162	0.029	29	0.011
150	2.277	0.962	2.191	0.029	30	0.011
155	2.303	0.963	2.219	0.028	31	0.011
160	2.329	0.964	2.247	0.028	32	0.011
165	2.355	0.966	2.274	0.027	33	0.011
170	2.380	0.967	2.300	0.027	34	0.011
175	2.405	0.968	2.327	0.026	35	0.011
180	2.429	0.969	2.353	0.026	36	0.012
185	2.453	0.969	2.376	0.024	37	0.012
190	2.476	0.969	2.400	0.023	38	0.012
195	2.499	0.969	2.423	0.023	39	0.012
200	2.521	0.970	2.445	0.023	40	0.012
205	2.544	0.970	2.467	0.022	41	0.012
210	2.565	0.970	2.489	0.022	42	0.012
215	2.587	0.971	2.511	0.022	43	0.012
220	2.608	0.971	2.532	0.021	44	0.012
225	2.629	0.971	2.553	0.021	45	0.012
230	2.650	0.971	2.574	0.021	46	0.012
235	2.670	0.972	2.595	0.020	47	0.012
240	2.690	0.972	2.615	0.020	48	0.012
245	2.710	0.972	2.635	0.020	49	0.012
250	2.729	0.973	2.654	0.020	50	0.012
255	2.749	0.973	2.674	0.019	51	0.012
260	2.768	0.973	2.693	0.019	52	0.012
265	2.786	0.973	2.712	0.019	53	0.012
270	2.805	0.974	2.731	0.019	54	0.012
275	2.823	0.974	2.750	0.019	55	0.012
280	2.841	0.974	2.768	0.018	56	0.012
285	2.859	0.975	2.786	0.018	57	0.012
290	2.877	0.975	2.804	0.018	58	0.012
295	2.894	0.975	2.822	0.018	59	0.012
300	2.912	0.975	2.840	0.018	60	0.012
305	2.929	0.976	2.858	0.018	61	0.013
310	2.946	0.976	2.875	0.017	62	0.013
315	2.963	0.976	2.892	0.017	63	0.013
320	2.979	0.976	2.909	0.017	64	0.013
325	2.996	0.977	2.926	0.017	65	0.013
330	3.012	0.977	2.943	0.017	66	0.013
335	3.028	0.977	2.959	0.017	67	0.013
340	3.044	0.978	2.976	0.016	68	0.013
345	3.060	0.978	2.992	0.016	69	0.013
350	3.076	0.978	3.008	0.016	70	0.013
355	3.091	0.978	3.024	0.016	71	0.013
360	3.106	0.979	3.040	0.016	72	0.013
365	3.021	0.979	2.957	0.018	73	0.013
370	3.041	0.979	2.977	0.020	74	0.013
375	3.062	0.979	2.997	0.020	75	0.013
380	3.082	0.979	3.017	0.020	76	0.013
385	3.102	0.979	3.037	0.020	77	0.013
390	3.122	0.979	3.057	0.020	78	0.013
395	3.142	0.979	3.076	0.020	79	0.013
400	3.162	0.979	3.096	0.019	80	0.014
405	3.182	0.979	3.115	0.019	81	0.014
410	3.202	0.979	3.134	0.019	82	0.014
415	3.221	0.979	3.153	0.019	83	0.014
420	3.240	0.979	3.172	0.019	84	0.014
425	3.260	0.979	3.191	0.019	85	0.014
430	3.279	0.979	3.210	0.019	86	0.014

435	3.298	0.979	3.229	0.019	87	0.014
440	3.317	0.979	3.247	0.019	88	0.014
445	3.335	0.979	3.266	0.018	89	0.014
450	3.354	0.979	3.284	0.018	90	0.014
455	3.373	0.979	3.303	0.018	91	0.014
460	3.391	0.979	3.321	0.018	92	0.014
465	3.410	0.979	3.339	0.018	93	0.014
470	3.428	0.979	3.357	0.018	94	0.014
475	3.446	0.979	3.375	0.018	95	0.014
480	3.464	0.979	3.393	0.018	96	0.015
485	3.482	0.979	3.410	0.018	97	0.015
490	3.500	0.979	3.428	0.018	98	0.015
495	3.518	0.979	3.445	0.018	99	0.015
500	3.536	0.979	3.463	0.017	100	0.015
505	3.553	0.979	3.480	0.017	101	0.015
510	3.571	0.979	3.497	0.017	102	0.015
515	3.588	0.980	3.515	0.017	103	0.015
520	3.606	0.980	3.532	0.017	104	0.015
525	3.623	0.980	3.549	0.017	105	0.015
530	3.640	0.980	3.566	0.017	106	0.015
535	3.657	0.980	3.583	0.017	107	0.015
540	3.674	0.980	3.599	0.017	108	0.016
545	3.691	0.980	3.616	0.017	109	0.016
550	3.708	0.980	3.633	0.017	110	0.016
555	3.725	0.980	3.649	0.017	111	0.016
560	3.742	0.980	3.666	0.016	112	0.016
565	3.758	0.980	3.682	0.016	113	0.016
570	3.775	0.980	3.699	0.016	114	0.016
575	3.791	0.980	3.715	0.016	115	0.016
580	3.808	0.980	3.731	0.016	116	0.016
585	3.824	0.980	3.747	0.016	117	0.016
590	3.841	0.980	3.763	0.016	118	0.017
595	3.857	0.980	3.779	0.016	119	0.017
600	3.873	0.980	3.795	0.016	120	0.017
605	3.889	0.980	3.811	0.016	121	0.017
610	3.905	0.980	3.827	0.016	122	0.017
615	3.921	0.980	3.843	0.016	123	0.017
620	3.937	0.980	3.858	0.016	124	0.017
625	3.953	0.980	3.874	0.016	125	0.017
630	3.969	0.980	3.890	0.016	126	0.018
635	3.984	0.980	3.905	0.016	127	0.018
640	4.000	0.980	3.921	0.015	128	0.018
645	4.016	0.980	3.936	0.015	129	0.018
650	4.031	0.980	3.951	0.015	130	0.018
655	4.047	0.980	3.967	0.015	131	0.018
660	4.062	0.980	3.982	0.015	132	0.018
665	4.077	0.980	3.997	0.015	133	0.018
670	4.093	0.980	4.012	0.015	134	0.019
675	4.108	0.980	4.027	0.015	135	0.019
680	4.123	0.980	4.042	0.015	136	0.019
685	4.138	0.980	4.057	0.015	137	0.019
690	4.153	0.980	4.072	0.015	138	0.019
695	4.168	0.980	4.087	0.015	139	0.019
700	4.183	0.980	4.102	0.015	140	0.020
705	4.198	0.980	4.116	0.015	141	0.020
710	4.213	0.981	4.131	0.015	142	0.020
715	4.228	0.981	4.146	0.015	143	0.020
720	4.243	0.981	4.160	0.015	144	0.016
725	4.257	0.981	4.175	0.015	145	0.016

730	4.272	0.981	4.189	0.014	146	0.016
735	4.287	0.981	4.204	0.014	147	0.016
740	4.301	0.981	4.218	0.014	148	0.017
745	4.316	0.981	4.232	0.014	149	0.017
750	4.330	0.981	4.247	0.014	150	0.017
755	4.345	0.981	4.261	0.014	151	0.017
760	4.359	0.981	4.275	0.014	152	0.018
765	4.373	0.981	4.289	0.014	153	0.018
770	4.387	0.981	4.303	0.014	154	0.018
775	4.402	0.981	4.317	0.014	155	0.018
780	4.416	0.981	4.331	0.014	156	0.019
785	4.430	0.981	4.345	0.014	157	0.019
790	4.444	0.981	4.359	0.014	158	0.019
795	4.458	0.981	4.373	0.014	159	0.020
800	4.472	0.981	4.387	0.014	160	0.020
805	4.486	0.981	4.401	0.014	161	0.020
810	4.500	0.981	4.415	0.014	162	0.021
815	4.514	0.981	4.428	0.014	163	0.021
820	4.528	0.981	4.442	0.014	164	0.022
825	4.541	0.981	4.456	0.014	165	0.022
830	4.555	0.981	4.469	0.014	166	0.023
835	4.569	0.981	4.483	0.014	167	0.023
840	4.583	0.981	4.496	0.014	168	0.026
845	4.596	0.981	4.510	0.013	169	0.026
850	4.610	0.981	4.523	0.013	170	0.027
855	4.623	0.981	4.537	0.013	171	0.028
860	4.637	0.981	4.550	0.013	172	0.029
865	4.650	0.981	4.563	0.013	173	0.029
870	4.664	0.981	4.577	0.013	174	0.030
875	4.677	0.981	4.590	0.013	175	0.031
880	4.690	0.981	4.603	0.013	176	0.032
885	4.704	0.981	4.616	0.013	177	0.033
890	4.717	0.981	4.629	0.013	178	0.035
895	4.730	0.981	4.643	0.013	179	0.036
900	4.743	0.981	4.656	0.013	180	0.038
905	4.757	0.982	4.669	0.013	181	0.040
910	4.770	0.982	4.682	0.013	182	0.043
915	4.783	0.982	4.695	0.013	183	0.044
920	4.796	0.982	4.708	0.013	184	0.060
925	4.809	0.982	4.720	0.013	185	0.062
930	4.822	0.982	4.733	0.013	186	0.067
935	4.835	0.982	4.746	0.013	187	0.071
940	4.848	0.982	4.759	0.013	188	0.072
945	4.861	0.982	4.772	0.013	189	0.082
950	4.873	0.982	4.784	0.013	190	0.121
955	4.886	0.982	4.797	0.013	191	0.170
960	4.899	0.982	4.810	0.013	192	0.609
965	4.912	0.982	4.822	0.013	193	0.097
970	4.924	0.982	4.835	0.013	194	0.076
975	4.937	0.982	4.848	0.013	195	0.064
980	4.950	0.982	4.860	0.013	196	0.046
985	4.962	0.982	4.873	0.013	197	0.041
990	4.975	0.982	4.885	0.012	198	0.037
995	4.987	0.982	4.898	0.012	199	0.034
1000	5.000	0.982	4.910	0.012	200	0.032
1005	5.012	0.982	4.922	0.012	201	0.030
1010	5.025	0.982	4.935	0.012	202	0.028
1015	5.037	0.982	4.947	0.012	203	0.027
1020	5.050	0.982	4.959	0.012	204	0.024

1025	5.062	0.982	4.972	0.012	205	0.023
1030	5.074	0.982	4.984	0.012	206	0.022
1035	5.087	0.982	4.996	0.012	207	0.021
1040	5.099	0.982	5.008	0.012	208	0.020
1045	5.111	0.982	5.020	0.012	209	0.019
1050	5.123	0.982	5.033	0.012	210	0.019
1055	5.136	0.982	5.045	0.012	211	0.018
1060	5.148	0.982	5.057	0.012	212	0.018
1065	5.160	0.982	5.069	0.012	213	0.017
1070	5.172	0.982	5.081	0.012	214	0.017
1075	5.184	0.982	5.093	0.012	215	0.016
1080	5.196	0.982	5.105	0.012	216	0.018
1085	5.208	0.982	5.117	0.012	217	0.020
1090	5.220	0.982	5.129	0.012	218	0.020
1095	5.232	0.982	5.140	0.012	219	0.019
1100	5.244	0.983	5.152	0.012	220	0.019
1105	5.256	0.983	5.164	0.012	221	0.019
1110	5.268	0.983	5.176	0.012	222	0.018
1115	5.280	0.983	5.188	0.012	223	0.018
1120	5.292	0.983	5.199	0.012	224	0.018
1125	5.303	0.983	5.211	0.012	225	0.017
1130	5.315	0.983	5.223	0.012	226	0.017
1135	5.327	0.983	5.235	0.012	227	0.017
1140	5.339	0.983	5.246	0.012	228	0.017
1145	5.350	0.983	5.258	0.012	229	0.016
1150	5.362	0.983	5.269	0.012	230	0.016
1155	5.374	0.983	5.281	0.012	231	0.016
1160	5.385	0.983	5.293	0.012	232	0.016
1165	5.397	0.983	5.304	0.012	233	0.016
1170	5.408	0.983	5.316	0.012	234	0.016
1175	5.420	0.983	5.327	0.011	235	0.015
1180	5.431	0.983	5.339	0.011	236	0.015
1185	5.443	0.983	5.350	0.011	237	0.015
1190	5.454	0.983	5.361	0.011	238	0.015
1195	5.466	0.983	5.373	0.011	239	0.015
1200	5.477	0.983	5.384	0.011	240	0.015
1205	5.489	0.983	5.396	0.011	241	0.014
1210	5.500	0.983	5.407	0.011	242	0.014
1215	5.511	0.983	5.418	0.011	243	0.014
1220	5.523	0.983	5.429	0.011	244	0.014
1225	5.534	0.983	5.441	0.011	245	0.014
1230	5.545	0.983	5.452	0.011	246	0.014
1235	5.557	0.983	5.463	0.011	247	0.014
1240	5.568	0.983	5.474	0.011	248	0.013
1245	5.579	0.983	5.486	0.011	249	0.013
1250	5.590	0.983	5.497	0.011	250	0.013
1255	5.601	0.983	5.508	0.011	251	0.013
1260	5.612	0.983	5.519	0.011	252	0.013
1265	5.624	0.983	5.530	0.011	253	0.013
1270	5.635	0.983	5.541	0.011	254	0.013
1275	5.646	0.983	5.552	0.011	255	0.013
1280	5.657	0.983	5.563	0.011	256	0.013
1285	5.668	0.983	5.574	0.011	257	0.013
1290	5.679	0.983	5.585	0.011	258	0.012
1295	5.690	0.984	5.596	0.011	259	0.012
1300	5.701	0.984	5.607	0.011	260	0.012
1305	5.712	0.984	5.618	0.011	261	0.012
1310	5.723	0.984	5.629	0.011	262	0.012
1315	5.734	0.984	5.640	0.011	263	0.012

1320	5.745	0.984	5.651	0.011	264	0.012
1325	5.755	0.984	5.661	0.011	265	0.012
1330	5.766	0.984	5.672	0.011	266	0.012
1335	5.777	0.984	5.683	0.011	267	0.012
1340	5.788	0.984	5.694	0.011	268	0.012
1345	5.799	0.984	5.705	0.011	269	0.012
1350	5.809	0.984	5.715	0.011	270	0.011
1355	5.820	0.984	5.726	0.011	271	0.011
1360	5.831	0.984	5.737	0.011	272	0.011
1365	5.842	0.984	5.747	0.011	273	0.011
1370	5.852	0.984	5.758	0.011	274	0.011
1375	5.863	0.984	5.769	0.011	275	0.011
1380	5.874	0.984	5.779	0.011	276	0.011
1385	5.884	0.984	5.790	0.011	277	0.011
1390	5.895	0.984	5.801	0.011	278	0.011
1395	5.906	0.984	5.811	0.011	279	0.011
1400	5.916	0.984	5.822	0.011	280	0.011
1405	5.927	0.984	5.832	0.011	281	0.011
1410	5.937	0.984	5.843	0.011	282	0.011
1415	5.948	0.984	5.853	0.011	283	0.011
1420	5.958	0.984	5.864	0.010	284	0.011
1425	5.969	0.984	5.874	0.010	285	0.011
1430	5.979	0.984	5.885	0.010	286	0.011
1435	5.990	0.984	5.895	0.010	287	0.010
1440	6.000	0.984	5.905	0.010	288	0.010

CHAPTER 5

5.2 – Proposed Condition Hydrology Map (HEC HMS)