THE RANCH PLAN PLANNED COMMUNITY

PLANNING AREAS 3 AND 4 RUNOFF MANAGEMENT PLAN

Michael Baker INTERNATIONAL

TECHNICAL APPENDIX B.4

PA-1, -2, -3 & -4 Constructed Regional Local Rational Method Expected Value (2-, 5-, 10-, 25-, 50- and 100-year)

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            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA A                                                     *
* RATIONAL METHOD - REGIONAL RAINFALL                                    *
* 2-YR EV AUGUST 2018 CCHIU                                              *
 ************************************************************************

  FILE NAME: 3A02EVRL.DAT
  TIME/DATE OF STUDY: 10:06 08/17/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  1.825
   2)   10.00;  1.217
   3)   15.00;  0.932
   4)   20.00;  0.766
   5)   25.00;  0.662
   6)   30.00;  0.587
   7)   40.00;  0.506
   8)   50.00;  0.449
   9)   60.00;  0.395
  10)   90.00;  0.340
  11)  120.00;  0.286
  12)  180.00;  0.232
  13)  360.00;  0.178
  14) 1200.00;  0.080
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
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    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   327.00
  ELEVATION DATA: UPSTREAM(FEET) =    725.00  DOWNSTREAM(FEET) =    642.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.413
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.288
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        1.10      0.60     1.000    56    9.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.68
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      0.68

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    642.00  DOWNSTREAM(FEET) =    605.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   385.00   CHANNEL SLOPE =  0.0961
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.153
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.90      0.60     1.000     -
  USER-DEFINED                -        2.60      0.60     1.000     -
  USER-DEFINED                -        0.70      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.983
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.76
  AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   1.71
  Tc(MIN.) =   11.12
  SUBAREA AREA(ACRES) =     4.20       SUBAREA RUNOFF(CFS) =    2.13
  EFFECTIVE AREA(ACRES) =      5.30     AREA-AVERAGED Fm(INCH/HR) =   0.59
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   0.99
  TOTAL AREA(ACRES) =        5.3         PEAK FLOW RATE(CFS) =       2.68

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
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```
  DEPTH(FEET) =  0.46   FLOW VELOCITY(FEET/SEC.) =   4.17
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     712.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  605.00  DOWNSTREAM ELEVATION(FEET) =  584.00
  STREET LENGTH(FEET) =   264.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       3.43
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    3.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.20
  STREET FLOW TRAVEL TIME(MIN.) =   0.86   Tc(MIN.) =   11.98
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.104
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.10      0.60     0.900     -
  USER-DEFINED               -        1.00      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.519
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    1.50
  EFFECTIVE AREA(ACRES) =      7.40    AREA-AVERAGED Fm(INCH/HR) =  0.51
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        7.4        PEAK FLOW RATE(CFS) =       3.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   4.66
  FLOW VELOCITY(FEET/SEC.) =  5.09   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     976.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  584.00  DOWNSTREAM ELEVATION(FEET) =  564.00
  STREET LENGTH(FEET) =   494.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
```



```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       7.59
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    8.91
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.21
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.35
  STREET FLOW TRAVEL TIME(MIN.) =   1.96   Tc(MIN.) =   13.93
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.993
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.10      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.900     -
  USER-DEFINED               -        6.60      0.60     0.100     -
  USER-DEFINED               -        1.80      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.271
  SUBAREA AREA(ACRES) =    9.80      SUBAREA RUNOFF(CFS) =    7.32
  EFFECTIVE AREA(ACRES) =     17.20    AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       17.2        PEAK FLOW RATE(CFS) =      10.52

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.43
  FLOW VELOCITY(FEET/SEC.) =  4.51   DEPTH*VELOCITY(FT*FT/SEC.) =   1.57
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   564.00  DOWNSTREAM(FEET) =   520.00
  FLOW LENGTH(FEET) =  1456.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.27
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.52
  PIPE TRAVEL TIME(MIN.) =   2.36    Tc(MIN.) =   16.30
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    2926.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.30
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.889
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  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.60      0.60     0.100     -
  USER-DEFINED               -        3.90      0.60     0.100     -
  USER-DEFINED               -        0.20      0.60     0.850     -
  USER-DEFINED               -        0.90      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.255
  SUBAREA AREA(ACRES) =     5.60      SUBAREA RUNOFF(CFS) =     3.71
  EFFECTIVE AREA(ACRES) =     22.80   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       22.8       PEAK FLOW RATE(CFS) =      12.62

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.30
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.889
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.60      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.850     -
  USER-DEFINED               -        0.40      0.60     0.900     -
  USER-DEFINED               -        5.00      0.60     0.100     -
  USER-DEFINED               -        2.10      0.60     0.850     -
  USER-DEFINED               -        0.80      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =     9.20      SUBAREA RUNOFF(CFS) =     5.37
  EFFECTIVE AREA(ACRES) =     32.00   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       32.0       PEAK FLOW RATE(CFS) =      18.00

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.30
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.889
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.80      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     1.80      SUBAREA RUNOFF(CFS) =     1.34
  EFFECTIVE AREA(ACRES) =     33.80   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       33.8       PEAK FLOW RATE(CFS) =      19.34

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
```



```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   520.00  DOWNSTREAM(FEET) =   503.00
  FLOW LENGTH(FEET) =   804.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.26
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.34
  PIPE TRAVEL TIME(MIN.) =   1.31    Tc(MIN.) =   17.60
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    3730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.60
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.846
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.80      0.60     0.100     -
  USER-DEFINED               -        7.60      0.60     0.100     -
  USER-DEFINED               -        0.40      0.60     0.850     -
  USER-DEFINED               -       10.50      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.125
  SUBAREA AREA(ACRES) =   21.60      SUBAREA RUNOFF(CFS) =   14.98
  EFFECTIVE AREA(ACRES) =     55.40   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       55.4       PEAK FLOW RATE(CFS) =      33.00

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.60
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.846
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        6.80      0.60     0.100     -
  USER-DEFINED               -       12.10      0.60     0.100     -
  USER-DEFINED               -        1.00      0.60     0.850     -
  USER-DEFINED               -        4.50      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.131
  SUBAREA AREA(ACRES) =   24.40      SUBAREA RUNOFF(CFS) =   16.85
  EFFECTIVE AREA(ACRES) =     79.80   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.25
  TOTAL AREA(ACRES) =       79.8       PEAK FLOW RATE(CFS) =      49.85

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   503.00  DOWNSTREAM(FEET) =   485.00
  FLOW LENGTH(FEET) =   808.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.30
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.85
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =   18.61
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =    4538.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.61
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.812
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.40      0.60     0.100     -
  USER-DEFINED               -        6.70      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.850     -
  USER-DEFINED               -        2.50      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.106
  SUBAREA AREA(ACRES) =   12.70      SUBAREA RUNOFF(CFS) =    8.55
  EFFECTIVE AREA(ACRES) =     92.50   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.23
  TOTAL AREA(ACRES) =       92.5       PEAK FLOW RATE(CFS) =      55.99

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.61
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.812
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        7.20      0.60     0.100     -
  USER-DEFINED               -        0.70      0.60     0.850     -
  USER-DEFINED               -        7.60      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.850     -
  USER-DEFINED               -        4.70      0.60     0.100     -
  USER-DEFINED               -        0.40      0.60     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.150
  SUBAREA AREA(ACRES) =   20.90      SUBAREA RUNOFF(CFS) =   13.58
  EFFECTIVE AREA(ACRES) =    113.40   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =      113.4       PEAK FLOW RATE(CFS) =      69.57

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  31
```



```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   933.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  34.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.28
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      69.57
  PIPE TRAVEL TIME(MIN.) =   1.88    Tc(MIN.) =   20.49
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    5471.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.49
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.756
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.50      0.60     0.100     -
  USER-DEFINED               -        0.60      0.60     0.900     -
  USER-DEFINED               -        2.80      0.60     0.100     -
  USER-DEFINED               -        0.80      0.60     0.900     -
  USER-DEFINED               -        0.60      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.235
  SUBAREA AREA(ACRES) =    8.30      SUBAREA RUNOFF(CFS) =    4.59
  EFFECTIVE AREA(ACRES) =    121.70   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =      121.7       PEAK FLOW RATE(CFS) =      69.57
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.49
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.756
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.40      0.60     0.200     -
  USER-DEFINED               -        5.50      0.60     0.200     -
  USER-DEFINED               -        3.20      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =    5.21
  EFFECTIVE AREA(ACRES) =    130.80   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =      130.8       PEAK FLOW RATE(CFS) =      73.63

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =   20.49
  RAINFALL INTENSITY(INCH/HR) =   0.76
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.22
  EFFECTIVE STREAM AREA(ACRES) =     130.80
  TOTAL STREAM AREA(ACRES) =     130.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      73.63

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    645.00  DOWNSTREAM(FEET) =    625.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.417
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.774
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         -        0.40      0.60     0.900    56    8.68
  COMMERCIAL                 -        0.30      0.60     0.100    56    5.42
  PUBLIC PARK                -        1.30      0.60     0.850    56    8.61
  RESIDENTIAL
  ".4 DWELLING/ACRE"         -        1.00      0.60     0.900    56    8.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.798
  SUBAREA RUNOFF(CFS) =      3.50
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =      3.50

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  625.00  DOWNSTREAM ELEVATION(FEET) =  595.00
  STREET LENGTH(FEET) =   517.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       5.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.09
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.34
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =    7.27
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.549
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.30      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.900     -
  USER-DEFINED               -        1.00      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.223
  SUBAREA AREA(ACRES) =    3.90      SUBAREA RUNOFF(CFS) =    4.97
  EFFECTIVE AREA(ACRES) =      6.90    AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        6.9        PEAK FLOW RATE(CFS) =       7.86

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.22
  FLOW VELOCITY(FEET/SEC.) =  4.93   DEPTH*VELOCITY(FT*FT/SEC.) =   1.52
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     847.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  595.00  DOWNSTREAM ELEVATION(FEET) =  585.00
  STREET LENGTH(FEET) =   389.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      12.24
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =    8.93
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.348
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  USER-DEFINED               -        5.00      0.60     0.100     -
  USER-DEFINED               -        2.20      0.60     0.900     -
  USER-DEFINED               -        1.00      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.335
  SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =    8.77
  EFFECTIVE AREA(ACRES) =     15.40    AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       15.4        PEAK FLOW RATE(CFS) =      15.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.71
  FLOW VELOCITY(FEET/SEC.) =  4.11   DEPTH*VELOCITY(FT*FT/SEC.) =   1.67
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    113.00 =    1236.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 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) =   565.00
  FLOW LENGTH(FEET) =   702.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.79
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.38
  PIPE TRAVEL TIME(MIN.) =   1.08    Tc(MIN.) =   10.01
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    114.00 =    1938.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.01
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.216
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.60      0.60     0.100     -
  USER-DEFINED               -        0.20      0.60     0.850     -
  USER-DEFINED               -        1.10      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    2.46
  EFFECTIVE AREA(ACRES) =     18.30   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       18.3       PEAK FLOW RATE(CFS) =      16.02

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.01
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.216
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        9.00      0.60     0.100     -
  USER-DEFINED               -        1.90      0.60     0.850     -
  USER-DEFINED               -        2.70      0.60     0.900     -
  USER-DEFINED               -        4.10      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.313
  SUBAREA AREA(ACRES) =   18.00      SUBAREA RUNOFF(CFS) =   16.67
  EFFECTIVE AREA(ACRES) =     36.30   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       36.3       PEAK FLOW RATE(CFS) =      32.69

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.01
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.216
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.50      0.60     0.100     -
  USER-DEFINED               -        1.20      0.60     0.850     -
  USER-DEFINED               -        3.80      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.515
  SUBAREA AREA(ACRES) =    9.50      SUBAREA RUNOFF(CFS) =    7.76
  EFFECTIVE AREA(ACRES) =     45.80   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       45.8       PEAK FLOW RATE(CFS) =      40.45

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.01
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.216
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.30      0.60     1.000     -
  USER-DEFINED               -        0.30      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =    3.11
  EFFECTIVE AREA(ACRES) =     51.40   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       51.4       PEAK FLOW RATE(CFS) =      43.56

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 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) =   535.00
  FLOW LENGTH(FEET) =  1017.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.28
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.56
  PIPE TRAVEL TIME(MIN.) =   1.19    Tc(MIN.) =   11.20
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    115.00 =    2955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.20
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.149
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.40      0.60     0.100     -
  USER-DEFINED               -       11.00      0.60     0.100     -
  USER-DEFINED               -        1.80      0.60     0.850     -
  USER-DEFINED               -        1.50      0.60     0.900     -
  USER-DEFINED               -        3.20      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.222
  SUBAREA AREA(ACRES) =   20.90      SUBAREA RUNOFF(CFS) =   19.10
  EFFECTIVE AREA(ACRES) =     72.30   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       72.3       PEAK FLOW RATE(CFS) =      59.53

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   535.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =  1110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.64
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      59.53
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =   12.19
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =    4065.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.19
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.092
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  USER-DEFINED               -        3.10      0.60     0.100     -
  USER-DEFINED               -        1.40      0.60     0.850     -
  USER-DEFINED               -        1.10      0.60     0.900     -
  USER-DEFINED               -        5.10      0.60     0.100     -
  USER-DEFINED               -        1.90      0.60     0.850     -
  USER-DEFINED               -        3.60      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.485
  SUBAREA AREA(ACRES) =   16.20      SUBAREA RUNOFF(CFS) =   11.68
  EFFECTIVE AREA(ACRES) =     88.50   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       88.5       PEAK FLOW RATE(CFS) =      67.53

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.19
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.092
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.70      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.850     -
  USER-DEFINED               -        0.50      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.244
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    2.81
  EFFECTIVE AREA(ACRES) =     91.80   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       91.8       PEAK FLOW RATE(CFS) =      70.34

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =   12.19
  RAINFALL INTENSITY(INCH/HR) =   1.09
  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =      91.80
  TOTAL STREAM AREA(ACRES) =      91.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      70.34

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       73.63   20.49    0.756  0.60( 0.13) 0.22     130.8     100.00
      2       70.34   12.19    1.092  0.60( 0.24) 0.40      91.8     110.00

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

```
 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      137.70   12.19    1.092  0.60( 0.19) 0.32     169.6     110.00
     2      116.17   20.49    0.756  0.60( 0.18) 0.29     222.6     100.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     137.70    Tc(MIN.) =    12.19
 EFFECTIVE AREA(ACRES) =     169.60   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.32
 TOTAL AREA(ACRES) =      222.6
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    5471.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    128.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   473.00
 FLOW LENGTH(FEET) =   900.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  51.0 INCH PIPE IS  40.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.35
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     137.70
 PIPE TRAVEL TIME(MIN.) =   1.32    Tc(MIN.) =   13.51
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    128.00 =    6371.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.51
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.017
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        1.10      0.60     0.100     -
 USER-DEFINED               -        3.60      0.60     0.100     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    4.70      SUBAREA RUNOFF(CFS) =    4.05
 EFFECTIVE AREA(ACRES) =    174.30   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.31
 TOTAL AREA(ACRES) =      227.3       PEAK FLOW RATE(CFS) =     137.70
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 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.) =   13.51
 RAINFALL INTENSITY(INCH/HR) =   1.02
```



```
 AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.60
 AREA-AVERAGED Ap =  0.31
 EFFECTIVE STREAM AREA(ACRES) =     174.30
 TOTAL STREAM AREA(ACRES) =     227.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     137.70

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
 ELEVATION DATA: UPSTREAM(FEET) =    640.00  DOWNSTREAM(FEET) =    634.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.880
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.596
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 -        0.50      0.60     0.100    56    6.88
 PUBLIC PARK                -        0.20      0.60     0.850    56   10.93
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       -        2.70      0.60     0.200    56    7.33
 RESIDENTIAL
 ".4 DWELLING/ACRE"         -        1.40      0.60     0.900    56   11.02
 PUBLIC PARK                -        0.10      0.60     0.850    56   10.93
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       -        1.30      0.60     0.200    56    7.33
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.381
 SUBAREA RUNOFF(CFS) =      7.63
 TOTAL AREA(ACRES) =      6.20   PEAK FLOW RATE(CFS) =      7.63

****************************************************************************
 FLOW PROCESS FROM NODE    121.00 TO NODE    121.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    6.88
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.596
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.20      0.60     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.19
 EFFECTIVE AREA(ACRES) =      6.40   AREA-AVERAGED Fm(INCH/HR) =  0.24
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.40
 TOTAL AREA(ACRES) =        6.4       PEAK FLOW RATE(CFS) =       7.82

****************************************************************************
 FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   634.00  DOWNSTREAM(FEET) =   626.00
  FLOW LENGTH(FEET) =   425.00   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.) =   8.00
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.82
  PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =    7.77
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     754.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.77
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.489
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.40      0.60     0.200     -
  USER-DEFINED               -        2.40      0.60     0.900     -
  USER-DEFINED               -        0.70      0.60     0.100     -
  USER-DEFINED               -        0.60      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.423
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   10.11
  EFFECTIVE AREA(ACRES) =     15.50   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       15.5       PEAK FLOW RATE(CFS) =      17.32

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   626.00  DOWNSTREAM(FEET) =   606.00
  FLOW LENGTH(FEET) =  1030.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.73
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.32
  PIPE TRAVEL TIME(MIN.) =   1.76    Tc(MIN.) =    9.53
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =    1784.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.53
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.274
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  USER-DEFINED               -        7.60      0.60     0.200     -
  USER-DEFINED               -        1.40      0.60     0.100     -
  USER-DEFINED               -        2.30      0.60     0.200     -
  USER-DEFINED               -        6.50      0.60     0.900     -
  USER-DEFINED               -        8.40      0.60     0.600     -
  USER-DEFINED               -        0.50      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.491
  SUBAREA AREA(ACRES) =   26.70      SUBAREA RUNOFF(CFS) =   23.54
  EFFECTIVE AREA(ACRES) =     42.20   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       42.2       PEAK FLOW RATE(CFS) =      37.86

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.53
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.274
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.30      0.60     0.100     -
  USER-DEFINED               -        1.10      0.60     0.850     -
  USER-DEFINED               -        2.00      0.60     0.200     -
  USER-DEFINED               -        3.80      0.60     0.900     -
  USER-DEFINED               -        3.80      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.642
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =    8.80
  EFFECTIVE AREA(ACRES) =     53.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       53.2       PEAK FLOW RATE(CFS) =      46.66

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   606.00  DOWNSTREAM(FEET) =   604.00
  FLOW LENGTH(FEET) =   222.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.14
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      46.66
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    9.93
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =    2006.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.93
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.225
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED              -        0.10      0.60     0.200     -
 USER-DEFINED              -        1.60      0.60     0.100     -
 USER-DEFINED              -        0.20      0.60     0.850     -
 USER-DEFINED              -        0.30      0.60     0.200     -
 USER-DEFINED              -        2.10      0.60     0.100     -
 USER-DEFINED              -        0.60      0.60     0.850     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.231
 SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =    4.79
 EFFECTIVE AREA(ACRES) =     58.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =       58.1       PEAK FLOW RATE(CFS) =      49.10

****************************************************************************
 FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.93
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.225
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED              -        0.20      0.60     0.200     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.20
 EFFECTIVE AREA(ACRES) =     58.30   AREA-AVERAGED Fm(INCH/HR) =  0.29
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =       58.3       PEAK FLOW RATE(CFS) =      49.30

****************************************************************************
 FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   604.00  DOWNSTREAM(FEET) =   546.00
 FLOW LENGTH(FEET) =  1271.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.48
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      49.30
 PIPE TRAVEL TIME(MIN.) =   1.21    Tc(MIN.) =   11.15
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    125.00 =    3277.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.15
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.152
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
 USER-DEFINED              -        0.50      0.60     0.200     -
 USER-DEFINED              -        1.20      0.60     0.100     -
 USER-DEFINED              -        1.20      0.60     0.900     -
 USER-DEFINED              -        0.10      0.60     0.200     -
 USER-DEFINED              -        1.60      0.60     0.100     -
 USER-DEFINED              -        3.00      0.60     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.550
 SUBAREA AREA(ACRES) =    7.60      SUBAREA RUNOFF(CFS) =    5.62
 EFFECTIVE AREA(ACRES) =     65.90   AREA-AVERAGED Fm(INCH/HR) =  0.29
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =       65.9       PEAK FLOW RATE(CFS) =      51.07

****************************************************************************
 FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.15
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.152
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED              -        1.90      0.60     0.200     -
 USER-DEFINED              -        0.60      0.60     0.900     -
 USER-DEFINED              -        0.30      0.60     0.600     -
 USER-DEFINED              -        5.00      0.60     0.200     -
 USER-DEFINED              -        2.30      0.60     0.850     -
 USER-DEFINED              -        3.50      0.60     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.530
 SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   10.21
 EFFECTIVE AREA(ACRES) =     79.50   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.49
 TOTAL AREA(ACRES) =       79.5       PEAK FLOW RATE(CFS) =      61.28

****************************************************************************
 FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.15
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.152
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED              -       10.20      0.60     0.600     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =    7.27
 EFFECTIVE AREA(ACRES) =     89.70   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =       89.7       PEAK FLOW RATE(CFS) =      68.55

****************************************************************************
 FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   546.00  DOWNSTREAM(FEET) =   525.00
  FLOW LENGTH(FEET) =   562.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.37
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.55
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   11.69
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    126.00 =    3839.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.69
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.121
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.90      0.60     0.200     -
  USER-DEFINED               -        0.10      0.60     0.100     -
  USER-DEFINED               -        0.60      0.60     0.900     -
  USER-DEFINED               -        6.00      0.60     0.200     -
  USER-DEFINED               -        1.10      0.60     0.100     -
  USER-DEFINED               -        4.70      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.395
  SUBAREA AREA(ACRES) =   18.40      SUBAREA RUNOFF(CFS) =   14.64
  EFFECTIVE AREA(ACRES) =    108.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      108.1       PEAK FLOW RATE(CFS) =      80.70

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    127.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   525.00  DOWNSTREAM(FEET) =   514.00
  FLOW LENGTH(FEET) =   607.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.71
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      80.70
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   12.42
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    127.00 =    4446.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.42
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.079
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```



```
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.50      0.60     0.100     -
  USER-DEFINED               -        0.20      0.60     0.850     -
  USER-DEFINED               -        1.10      0.60     0.200     -
  USER-DEFINED               -       12.70      0.60     0.100     -
  USER-DEFINED               -        0.80      0.60     0.850     -
  USER-DEFINED               -        4.10      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.303
  SUBAREA AREA(ACRES) =   20.40      SUBAREA RUNOFF(CFS) =   16.47
  EFFECTIVE AREA(ACRES) =    128.50   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      128.5       PEAK FLOW RATE(CFS) =      93.08

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.42
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.079
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.20      0.60     0.100     -
  USER-DEFINED               -        1.50      0.60     0.850     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.530
  SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    1.92
  EFFECTIVE AREA(ACRES) =    131.30   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      131.3       PEAK FLOW RATE(CFS) =      95.00

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.42
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.079
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.00      0.60     0.100     -
  USER-DEFINED               -        1.30      0.60     0.100     -
  USER-DEFINED               -       12.60      0.60     0.100     -
  USER-DEFINED               -        1.10      0.60     0.850     -
  USER-DEFINED               -        0.10      0.60     0.200     -
  USER-DEFINED               -        2.10      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.238
  SUBAREA AREA(ACRES) =   18.20      SUBAREA RUNOFF(CFS) =   15.33
  EFFECTIVE AREA(ACRES) =    149.50   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      149.5       PEAK FLOW RATE(CFS) =     110.33

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

```
 FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.00  DOWNSTREAM(FEET) =   473.00
 FLOW LENGTH(FEET) =   741.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.58
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     110.33
 PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   12.97
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    128.00 =    5187.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.97
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.048
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        2.20      0.60     0.100     -
 USER-DEFINED               -        0.40      0.60     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.223
 SUBAREA AREA(ACRES) =    2.60      SUBAREA RUNOFF(CFS) =    2.14
 EFFECTIVE AREA(ACRES) =    152.10   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =      152.1       PEAK FLOW RATE(CFS) =     110.33
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 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.) =   12.97
 RAINFALL INTENSITY(INCH/HR) =   1.05
 AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.60
 AREA-AVERAGED Ap =  0.43
 EFFECTIVE STREAM AREA(ACRES) =     152.10
 TOTAL STREAM AREA(ACRES) =     152.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     110.33

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      137.70   13.51    1.017  0.60( 0.19) 0.31     174.3     110.00
     1      116.17   21.87    0.727  0.60( 0.17) 0.29     227.3     100.00
     2      110.33   12.97    1.048  0.60( 0.26) 0.43     152.1     120.00
```



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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      247.42   12.97    1.048  0.60( 0.22) 0.37     319.4     120.00
     2      243.73   13.51    1.017  0.60( 0.22) 0.37     326.4     110.00
     3      181.78   21.87    0.727  0.60( 0.21) 0.34     379.4     100.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     247.42    Tc(MIN.) =    12.97
 EFFECTIVE AREA(ACRES) =     319.43   AREA-AVERAGED Fm(INCH/HR) =  0.22
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.37
 TOTAL AREA(ACRES) =      379.4
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    128.00 =    6371.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    129.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   473.00  DOWNSTREAM(FEET) =   455.00
 FLOW LENGTH(FEET) =  1494.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  60.0 INCH PIPE IS  45.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.66
 ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     247.42
 PIPE TRAVEL TIME(MIN.) =   1.59    Tc(MIN.) =   14.56
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    129.00 =    7865.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.56
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.957
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.60      0.60     0.100     -
 USER-DEFINED               -        0.60      0.60     0.900     -
 USER-DEFINED               -        1.80      0.60     0.100     -
 USER-DEFINED               -        1.40      0.60     0.900     -
 USER-DEFINED               -        0.80      0.60     0.100     -
 USER-DEFINED               -        1.60      0.60     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.524
 SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =    3.94
 EFFECTIVE AREA(ACRES) =    326.23   AREA-AVERAGED Fm(INCH/HR) =  0.22
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.37
 TOTAL AREA(ACRES) =      386.2       PEAK FLOW RATE(CFS) =     247.42
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
```

```
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   14.56
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.957
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.50      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.850     -
  USER-DEFINED               -        0.10      0.60     0.200     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  USER-DEFINED               -        1.50      0.60     0.600     -
  USER-DEFINED               -        0.20      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.344
  SUBAREA AREA(ACRES) =    4.70      SUBAREA RUNOFF(CFS) =    3.18
  EFFECTIVE AREA(ACRES) =    330.93   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      390.9       PEAK FLOW RATE(CFS) =     247.42
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

********************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   14.56
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.957
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.90      0.60     0.400     -
  USER-DEFINED               -        4.70      0.60     0.100     -
  USER-DEFINED               -        1.30      0.60     0.850     -
  USER-DEFINED               -        0.90      0.60     0.200     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  USER-DEFINED               -        3.80      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.386
  SUBAREA AREA(ACRES) =   13.70      SUBAREA RUNOFF(CFS) =    8.95
  EFFECTIVE AREA(ACRES) =    344.63   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      404.6       PEAK FLOW RATE(CFS) =     247.42
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

********************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   14.56
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.957
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.40      0.60     0.500     -
  USER-DEFINED               -        0.70      0.60     0.400     -
```



```
  USER-DEFINED               -        5.00      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.850     -
  USER-DEFINED               -       10.30      0.60     0.200     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
  SUBAREA AREA(ACRES) =   20.60      SUBAREA RUNOFF(CFS) =   14.93
  EFFECTIVE AREA(ACRES) =    365.23   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =      425.2       PEAK FLOW RATE(CFS) =     247.42
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

********************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   14.56
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.957
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.30      0.60     0.600     -
  USER-DEFINED               -        3.90      0.60     0.500     -
  USER-DEFINED               -        2.30      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.487
  SUBAREA AREA(ACRES) =    7.50      SUBAREA RUNOFF(CFS) =    4.49
  EFFECTIVE AREA(ACRES) =    372.73   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      432.7       PEAK FLOW RATE(CFS) =     247.42
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

********************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =  1786.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  40.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.42
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     247.42
  PIPE TRAVEL TIME(MIN.) =   1.46    Tc(MIN.) =   16.02
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    9651.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   16.02
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.898
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  USER-DEFINED               -        1.30      0.60     0.100     -
  USER-DEFINED               -        1.20      0.60     0.900     -
  USER-DEFINED               -        0.10      0.60     0.600     -
  USER-DEFINED               -        1.30      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.850     -
  USER-DEFINED               -        3.00      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.598
  SUBAREA AREA(ACRES) =    7.00      SUBAREA RUNOFF(CFS) =    3.40
  EFFECTIVE AREA(ACRES) =    379.73   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      439.7       PEAK FLOW RATE(CFS) =     247.42
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.02
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.898
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.50      0.60     0.600     -
  USER-DEFINED               -        0.80      0.60     0.100     -
  USER-DEFINED               -        1.30      0.60     0.900     -
  USER-DEFINED               -        3.30      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.599
  SUBAREA AREA(ACRES) =    7.90      SUBAREA RUNOFF(CFS) =    3.83
  EFFECTIVE AREA(ACRES) =    387.63   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      447.6       PEAK FLOW RATE(CFS) =     247.42
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    765.00  DOWNSTREAM(FEET) =    675.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.312
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.301
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
```



```
  "OPEN BRUSH"               -        1.50      0.60     1.000    56    9.31
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           -        0.40      0.60     1.000    56    9.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.20
  TOTAL AREA(ACRES) =      1.90   PEAK FLOW RATE(CFS) =      1.20

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    152.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    635.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   421.00   CHANNEL SLOPE =  0.0950
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.164
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.90      0.60     1.000     -
  USER-DEFINED               -        2.40      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.32
  AVERAGE FLOW DEPTH(FEET) =   0.49   TRAVEL TIME(MIN.) =   1.62
  Tc(MIN.) =   10.94
  SUBAREA AREA(ACRES) =     7.30       SUBAREA RUNOFF(CFS) =    3.70
  EFFECTIVE AREA(ACRES) =      9.20     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        9.2         PEAK FLOW RATE(CFS) =       4.67

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.57   FLOW VELOCITY(FEET/SEC.) =   4.80
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    152.00 =     751.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    153.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   635.00  DOWNSTREAM(FEET) =   631.00
  FLOW LENGTH(FEET) =   501.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.67
  PIPE TRAVEL TIME(MIN.) =   1.64    Tc(MIN.) =   12.57
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    153.00 =    1252.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    153.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   12.57
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.070
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        5.10      0.60     1.000     -
  USER-DEFINED                -        4.00      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =    3.85
  EFFECTIVE AREA(ACRES) =     18.30   AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       18.3       PEAK FLOW RATE(CFS) =       7.75

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   631.00  DOWNSTREAM(FEET) =   630.00
  FLOW LENGTH(FEET) =   711.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.92
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.75
  PIPE TRAVEL TIME(MIN.) =   4.06    Tc(MIN.) =   16.63
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    154.00 =    1963.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.63
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.878
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.30      0.60     1.000     -
  USER-DEFINED                -        5.70      0.60     1.000     -
  USER-DEFINED                -        3.40      0.60     1.000     -
  USER-DEFINED                -        0.10      0.60     1.000     -
  USER-DEFINED                -        2.10      0.60     1.000     -
  USER-DEFINED                -        1.60      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   13.20      SUBAREA RUNOFF(CFS) =    3.30
  EFFECTIVE AREA(ACRES) =     31.50   AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       31.5       PEAK FLOW RATE(CFS) =       7.88

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
================================================================================
  MAINLINE Tc(MIN.) =   16.63
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.878
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.20      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.05
  EFFECTIVE AREA(ACRES) =     31.70   AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       31.7       PEAK FLOW RATE(CFS) =       7.93

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   630.00  DOWNSTREAM(FEET) =   628.00
  FLOW LENGTH(FEET) =   910.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.55
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.93
  PIPE TRAVEL TIME(MIN.) =   4.27    Tc(MIN.) =   20.91
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    155.00 =    2873.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.91
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.747
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        1.60      0.60     1.000     -
  USER-DEFINED                -        1.60      0.60     1.000     -
  USER-DEFINED                -        1.80      0.60     1.000     -
  USER-DEFINED                -        1.50      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    6.50      SUBAREA RUNOFF(CFS) =    0.86
  EFFECTIVE AREA(ACRES) =     38.20   AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       38.2       PEAK FLOW RATE(CFS) =       7.93
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   629.00  DOWNSTREAM(FEET) =   610.00
```

```
  FLOW LENGTH(FEET) =   796.00   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.) =   8.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.93
  PIPE TRAVEL TIME(MIN.) =   1.51    Tc(MIN.) =   22.42
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    156.00 =    3669.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.42
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.716
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.90      0.60     1.000     -
  USER-DEFINED               -        0.40      0.60     1.000     -
  USER-DEFINED               -        1.30      0.60     1.000     -
  USER-DEFINED               -        4.50      0.60     1.000     -
  USER-DEFINED               -        1.30      0.60     1.000     -
  USER-DEFINED               -        3.70      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   13.10      SUBAREA RUNOFF(CFS) =    1.37
  EFFECTIVE AREA(ACRES) =     51.30   AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       51.3       PEAK FLOW RATE(CFS) =       7.93
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   610.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =  6198.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.83
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.93
  PIPE TRAVEL TIME(MIN.) =  10.51    Tc(MIN.) =   32.93
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```



```
      1       7.93   32.93    0.563  0.60( 0.60) 1.00      51.3     150.00
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      247.42   16.02    0.898  0.60( 0.22) 0.38     387.6     120.00
      2      243.73   16.56    0.880  0.60( 0.22) 0.37     394.6     110.00
      3      188.22   25.12    0.660  0.60( 0.21) 0.36     447.6     100.00
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    9651.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      253.57   16.02    0.898  0.60( 0.25) 0.41     412.6     120.00
      2      249.96   16.56    0.880  0.60( 0.25) 0.41     420.4     110.00
      3      195.31   25.12    0.660  0.60( 0.24) 0.41     486.7     100.00
      4      160.80   32.93    0.563  0.60( 0.25) 0.42     498.9     150.00
    TOTAL AREA(ACRES) =       498.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      253.57  Tc(MIN.) =   16.018
  EFFECTIVE AREA(ACRES) =    412.58  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =      498.9
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.02
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.898
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.60      0.60     1.000     -
  USER-DEFINED               -        1.30      0.60     1.000     -
  USER-DEFINED               -        2.60      0.60     0.900     -
  USER-DEFINED               -        1.90      0.60     1.000     -
  USER-DEFINED               -        0.70      0.60     1.000     -
  USER-DEFINED               -        0.80      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.971
  SUBAREA AREA(ACRES) =    8.90      SUBAREA RUNOFF(CFS) =    2.53
  EFFECTIVE AREA(ACRES) =    421.48   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      507.8       PEAK FLOW RATE(CFS) =     253.57
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.02
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.898
```

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	1.50	0.60	0.900	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 0.75
EFFECTIVE AREA(ACRES) = 423.88 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 510.2 PEAK FLOW RATE(CFS) = 253.57
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 510.2 TC(MIN.) = 16.02
EFFECTIVE AREA(ACRES) = 423.88 AREA-AVERAGED Fm(INCH/HR)= 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.427
PEAK FLOW RATE(CFS) = 253.57

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	253.57	16.02	0.898	0.60(0.26)	0.43	423.9	120.00
2	249.96	16.56	0.880	0.60(0.26)	0.43	431.7	110.00
3	195.31	25.12	0.660	0.60(0.25)	0.42	498.0	100.00
4	160.80	32.93	0.563	0.60(0.26)	0.43	510.2	150.00

==========

==========

END OF RATIONAL METHOD ANALYSIS

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                         Analysis prepared by:

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                          Santa Ana, CA 92707


 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA A                                                     *
* RATIONAL METHOD - REGIONAL RAINFALL                                    *
* 5-YR EV AUGUST 2018 CCHIU                                              *
 ************************************************************************

  FILE NAME: 3A05EVRL.DAT
  TIME/DATE OF STUDY: 09:54 08/17/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    5.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  2.642
   2)   10.00;  1.762
   3)   15.00;  1.304
   4)   20.00;  1.115
   5)   25.00;  0.974
   6)   30.00;  0.875
   7)   40.00;  0.748
   8)   50.00;  0.665
   9)   60.00;  0.603
  10)   90.00;  0.500
  11)  120.00;  0.441
  12)  180.00;  0.369
  13)  360.00;  0.272
  14) 1200.00;  0.119
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   327.00
  ELEVATION DATA: UPSTREAM(FEET) =    725.00  DOWNSTREAM(FEET) =    642.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.413
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.865
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        1.10      0.50     1.000    56    9.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.35
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      1.35

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    642.00  DOWNSTREAM(FEET) =    605.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   385.00   CHANNEL SLOPE =  0.0961
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.686
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.90      0.50     1.000     -
  USER-DEFINED                -        2.60      0.50     1.000     -
  USER-DEFINED                -        0.70      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.983
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.61
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.53
  AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   1.42
  Tc(MIN.) =   10.83
  SUBAREA AREA(ACRES) =     4.20       SUBAREA RUNOFF(CFS) =    4.51
  EFFECTIVE AREA(ACRES) =      5.30     AREA-AVERAGED Fm(INCH/HR) =   0.49
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   0.99
  TOTAL AREA(ACRES) =        5.3         PEAK FLOW RATE(CFS) =       5.69

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   5.04
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     712.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  605.00  DOWNSTREAM ELEVATION(FEET) =  584.00
  STREET LENGTH(FEET) =   264.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       6.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.03
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.48
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.58
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =   11.63
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.612
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.10      0.50     0.900     -
  USER-DEFINED               -        1.00      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.519
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    2.56
  EFFECTIVE AREA(ACRES) =      7.40    AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        7.4        PEAK FLOW RATE(CFS) =       7.89

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   7.59
  FLOW VELOCITY(FEET/SEC.) =  5.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.66
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     976.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  584.00  DOWNSTREAM ELEVATION(FEET) =  564.00
  STREET LENGTH(FEET) =   494.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
```



```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      13.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.79
  STREET FLOW TRAVEL TIME(MIN.) =   1.72   Tc(MIN.) =   13.35
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.455
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.10      0.50     0.100     -
  USER-DEFINED               -        0.30      0.50     0.900     -
  USER-DEFINED               -        6.60      0.50     0.100     -
  USER-DEFINED               -        1.80      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.271
  SUBAREA AREA(ACRES) =    9.80      SUBAREA RUNOFF(CFS) =   11.64
  EFFECTIVE AREA(ACRES) =     17.20    AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       17.2        PEAK FLOW RATE(CFS) =      18.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.40
  FLOW VELOCITY(FEET/SEC.) =  5.14   DEPTH*VELOCITY(FT*FT/SEC.) =   2.07
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   564.00  DOWNSTREAM(FEET) =   520.00
  FLOW LENGTH(FEET) =  1456.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.78
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.48
  PIPE TRAVEL TIME(MIN.) =   2.06    Tc(MIN.) =   15.41
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    2926.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.41
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.289
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.60      0.50     0.100     -
  USER-DEFINED               -        3.90      0.50     0.100     -
  USER-DEFINED               -        0.20      0.50     0.850     -
  USER-DEFINED               -        0.90      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.255
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =    5.85
  EFFECTIVE AREA(ACRES) =     22.80   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       22.8       PEAK FLOW RATE(CFS) =      21.75

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.41
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.289
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.60      0.50     0.100     -
  USER-DEFINED               -        0.30      0.50     0.850     -
  USER-DEFINED               -        0.40      0.50     0.900     -
  USER-DEFINED               -        5.00      0.50     0.100     -
  USER-DEFINED               -        2.10      0.50     0.850     -
  USER-DEFINED               -        0.80      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    9.20      SUBAREA RUNOFF(CFS) =    9.01
  EFFECTIVE AREA(ACRES) =     32.00   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       32.0       PEAK FLOW RATE(CFS) =      30.77

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.41
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.289
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.80      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    2.01
  EFFECTIVE AREA(ACRES) =     33.80   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       33.8       PEAK FLOW RATE(CFS) =      32.77

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```



```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   520.00  DOWNSTREAM(FEET) =   503.00
  FLOW LENGTH(FEET) =   804.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.84
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.77
  PIPE TRAVEL TIME(MIN.) =   1.13    Tc(MIN.) =   16.54
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    3730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.54
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.246
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.80      0.50     0.100     -
  USER-DEFINED               -        7.60      0.50     0.100     -
  USER-DEFINED               -        0.40      0.50     0.850     -
  USER-DEFINED               -       10.50      0.50     0.100     -
  USER-DEFINED               -        0.30      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.125
  SUBAREA AREA(ACRES) =   21.60      SUBAREA RUNOFF(CFS) =   23.00
  EFFECTIVE AREA(ACRES) =     55.40   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       55.4       PEAK FLOW RATE(CFS) =      54.47

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.54
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.246
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        6.80      0.50     0.100     -
  USER-DEFINED               -       12.10      0.50     0.100     -
  USER-DEFINED               -        1.00      0.50     0.850     -
  USER-DEFINED               -        4.50      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.131
  SUBAREA AREA(ACRES) =   24.40      SUBAREA RUNOFF(CFS) =   25.92
  EFFECTIVE AREA(ACRES) =     79.80   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.25
  TOTAL AREA(ACRES) =       79.8       PEAK FLOW RATE(CFS) =      80.40

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   503.00  DOWNSTREAM(FEET) =   485.00
  FLOW LENGTH(FEET) =   808.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.00
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      80.40
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =   17.44
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =    4538.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.44
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.212
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.40      0.50     0.100     -
  USER-DEFINED               -        6.70      0.50     0.100     -
  USER-DEFINED               -        0.10      0.50     0.850     -
  USER-DEFINED               -        2.50      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.106
  SUBAREA AREA(ACRES) =   12.70      SUBAREA RUNOFF(CFS) =   13.25
  EFFECTIVE AREA(ACRES) =     92.50   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.23
  TOTAL AREA(ACRES) =       92.5       PEAK FLOW RATE(CFS) =      91.20

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.44
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.212
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        7.20      0.50     0.100     -
  USER-DEFINED               -        0.70      0.50     0.850     -
  USER-DEFINED               -        7.60      0.50     0.100     -
  USER-DEFINED               -        0.30      0.50     0.850     -
  USER-DEFINED               -        4.70      0.50     0.100     -
  USER-DEFINED               -        0.40      0.50     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.150
  SUBAREA AREA(ACRES) =   20.90      SUBAREA RUNOFF(CFS) =   21.38
  EFFECTIVE AREA(ACRES) =    113.40   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =      113.4       PEAK FLOW RATE(CFS) =     112.59

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
```



```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   933.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  40.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.41
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     112.59
  PIPE TRAVEL TIME(MIN.) =   1.65    Tc(MIN.) =   19.09
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    5471.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.09
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.149
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.50      0.50     0.100     -
  USER-DEFINED               -        0.60      0.50     0.900     -
  USER-DEFINED               -        2.80      0.50     0.100     -
  USER-DEFINED               -        0.80      0.50     0.900     -
  USER-DEFINED               -        0.60      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.235
  SUBAREA AREA(ACRES) =    8.30      SUBAREA RUNOFF(CFS) =    7.71
  EFFECTIVE AREA(ACRES) =    121.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =      121.7       PEAK FLOW RATE(CFS) =     113.92

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.09
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.149
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.40      0.50     0.200     -
  USER-DEFINED               -        5.50      0.50     0.200     -
  USER-DEFINED               -        3.20      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =    8.59
  EFFECTIVE AREA(ACRES) =    130.80   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =      130.8       PEAK FLOW RATE(CFS) =     122.52

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =   19.09
  RAINFALL INTENSITY(INCH/HR) =   1.15
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.22
  EFFECTIVE STREAM AREA(ACRES) =     130.80
  TOTAL STREAM AREA(ACRES) =     130.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     122.52

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    645.00  DOWNSTREAM(FEET) =    625.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.417
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.569
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          -        0.40      0.50     0.900    56    8.68
  COMMERCIAL                  -        0.30      0.50     0.100    56    5.42
  PUBLIC PARK                 -        1.30      0.50     0.850    56    8.61
  RESIDENTIAL
  ".4 DWELLING/ACRE"          -        1.00      0.50     0.900    56    8.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.798
  SUBAREA RUNOFF(CFS) =      5.86
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =      5.86

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  625.00  DOWNSTREAM ELEVATION(FEET) =  595.00
  STREET LENGTH(FEET) =   517.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       9.65
```



```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.67
  STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =    7.10
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.272
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        2.30      0.50     0.100     -
  USER-DEFINED                -        0.30      0.50     0.900     -
  USER-DEFINED                -        1.00      0.50     0.100     -
  USER-DEFINED                -        0.30      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.223
  SUBAREA AREA(ACRES) =    3.90      SUBAREA RUNOFF(CFS) =    7.58
  EFFECTIVE AREA(ACRES) =      6.90    AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        6.9        PEAK FLOW RATE(CFS) =      12.64

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.43
  FLOW VELOCITY(FEET/SEC.) =  5.42   DEPTH*VELOCITY(FT*FT/SEC.) =   1.89
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     847.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  595.00  DOWNSTREAM ELEVATION(FEET) =  585.00
  STREET LENGTH(FEET) =   389.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      19.70
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.37
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.89
  STREET FLOW TRAVEL TIME(MIN.) =   1.48   Tc(MIN.) =    8.59
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.011
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        5.00      0.50     0.100     -
  USER-DEFINED                -        2.20      0.50     0.900     -
```

```
  USER-DEFINED               -        1.00      0.50     0.100     -
  USER-DEFINED               -        0.30      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.335
  SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =   14.10
  EFFECTIVE AREA(ACRES) =     15.40    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       15.4        PEAK FLOW RATE(CFS) =      25.12

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.84
  FLOW VELOCITY(FEET/SEC.) =  4.61   DEPTH*VELOCITY(FT*FT/SEC.) =   2.14
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    113.00 =    1236.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 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) =   565.00
  FLOW LENGTH(FEET) =   702.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  17.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.03
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.12
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =    9.56
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    114.00 =    1938.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.56
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.840
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.60      0.50     0.100     -
  USER-DEFINED               -        0.20      0.50     0.850     -
  USER-DEFINED               -        1.10      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    4.21
  EFFECTIVE AREA(ACRES) =     18.30   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       18.3       PEAK FLOW RATE(CFS) =      26.95

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.56
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.840
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```



```
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        9.00      0.50     0.100     -
  USER-DEFINED               -        1.90      0.50     0.850     -
  USER-DEFINED               -        2.70      0.50     0.900     -
  USER-DEFINED               -        4.10      0.50     0.100     -
  USER-DEFINED               -        0.30      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.313
  SUBAREA AREA(ACRES) =   18.00      SUBAREA RUNOFF(CFS) =   27.27
  EFFECTIVE AREA(ACRES) =     36.30   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       36.3       PEAK FLOW RATE(CFS) =      54.23

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.56
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.840
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.50      0.50     0.100     -
  USER-DEFINED               -        1.20      0.50     0.850     -
  USER-DEFINED               -        3.80      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.515
  SUBAREA AREA(ACRES) =    9.50      SUBAREA RUNOFF(CFS) =   13.53
  EFFECTIVE AREA(ACRES) =     45.80   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       45.8       PEAK FLOW RATE(CFS) =      67.76

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.56
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.840
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.30      0.50     1.000     -
  USER-DEFINED               -        0.30      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =    6.75
  EFFECTIVE AREA(ACRES) =     51.40   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       51.4       PEAK FLOW RATE(CFS) =      74.51

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 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) =   535.00
  FLOW LENGTH(FEET) =  1017.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.33
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      74.51
  PIPE TRAVEL TIME(MIN.) =   1.04    Tc(MIN.) =   10.60
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    115.00 =    2955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.60
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.707
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.40      0.50     0.100     -
  USER-DEFINED               -       11.00      0.50     0.100     -
  USER-DEFINED               -        1.80      0.50     0.850     -
  USER-DEFINED               -        1.50      0.50     0.900     -
  USER-DEFINED               -        3.20      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.222
  SUBAREA AREA(ACRES) =   20.90      SUBAREA RUNOFF(CFS) =   30.03
  EFFECTIVE AREA(ACRES) =     72.30   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       72.3       PEAK FLOW RATE(CFS) =      98.41

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   535.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =  1110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.22
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      98.41
  PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =   11.47
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =    4065.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.47
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.628
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.10      0.50     0.100     -
  USER-DEFINED               -        1.40      0.50     0.850     -
```



```
  USER-DEFINED               -        1.10      0.50     0.900     -
  USER-DEFINED               -        5.10      0.50     0.100     -
  USER-DEFINED               -        1.90      0.50     0.850     -
  USER-DEFINED               -        3.60      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.485
  SUBAREA AREA(ACRES) =   16.20      SUBAREA RUNOFF(CFS) =   20.19
  EFFECTIVE AREA(ACRES) =     88.50   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       88.5       PEAK FLOW RATE(CFS) =     113.41

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.47
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.628
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.70      0.50     0.100     -
  USER-DEFINED               -        0.10      0.50     0.850     -
  USER-DEFINED               -        0.50      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.244
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    4.47
  EFFECTIVE AREA(ACRES) =     91.80   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       91.8       PEAK FLOW RATE(CFS) =     117.88

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =   11.47
  RAINFALL INTENSITY(INCH/HR) =   1.63
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =      91.80
  TOTAL STREAM AREA(ACRES) =      91.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     117.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      122.52   19.09    1.149  0.50( 0.11) 0.22     130.8     100.00
      2      117.88   11.47    1.628  0.50( 0.20) 0.40      91.8     110.00

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

  ** PEAK FLOW RATE TABLE **
```

```
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1      225.29   11.47    1.628  0.50( 0.16) 0.32     170.4     110.00
    2      200.89   19.09    1.149  0.50( 0.15) 0.29     222.6     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     225.29    Tc(MIN.) =    11.47
  EFFECTIVE AREA(ACRES) =     170.37   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =      222.6
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    5471.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    128.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   473.00
  FLOW LENGTH(FEET) =   900.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  47.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.99
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     225.29
  PIPE TRAVEL TIME(MIN.) =   1.15    Tc(MIN.) =   12.62
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    128.00 =    6371.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.62
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.522
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.10      0.50     0.100     -
  USER-DEFINED               -        3.60      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    4.70      SUBAREA RUNOFF(CFS) =    6.23
  EFFECTIVE AREA(ACRES) =    175.07   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =      227.3       PEAK FLOW RATE(CFS) =     225.29
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 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.) =   12.62
  RAINFALL INTENSITY(INCH/HR) =   1.52
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.50
```



```
  AREA-AVERAGED Ap =  0.31
  EFFECTIVE STREAM AREA(ACRES) =     175.07
  TOTAL STREAM AREA(ACRES) =     227.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     225.29

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =    640.00  DOWNSTREAM(FEET) =    634.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.880
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.311
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 -        0.50      0.50     0.100    56    6.88
  PUBLIC PARK                -        0.20      0.50     0.850    56   10.93
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        2.70      0.50     0.200    56    7.33
  RESIDENTIAL
  ".4 DWELLING/ACRE"         -        1.40      0.50     0.900    56   11.02
  PUBLIC PARK                -        0.10      0.50     0.850    56   10.93
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        1.30      0.50     0.200    56    7.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.381
  SUBAREA RUNOFF(CFS) =     11.83
  TOTAL AREA(ACRES) =      6.20   PEAK FLOW RATE(CFS) =     11.83

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    121.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.88
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.311
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.33
  EFFECTIVE AREA(ACRES) =      6.40   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        6.4       PEAK FLOW RATE(CFS) =      12.17

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   634.00  DOWNSTREAM(FEET) =   626.00
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.17
  PIPE TRAVEL TIME(MIN.) =   0.81    Tc(MIN.) =    7.69
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     754.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.69
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.169
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.40      0.50     0.200     -
  USER-DEFINED               -        2.40      0.50     0.900     -
  USER-DEFINED               -        0.70      0.50     0.100     -
  USER-DEFINED               -        0.60      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.423
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   16.03
  EFFECTIVE AREA(ACRES) =     15.50   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       15.5       PEAK FLOW RATE(CFS) =      27.37

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   626.00  DOWNSTREAM(FEET) =   606.00
  FLOW LENGTH(FEET) =  1030.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.79
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.37
  PIPE TRAVEL TIME(MIN.) =   1.59    Tc(MIN.) =    9.28
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =    1784.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.28
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.889
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        7.60      0.50     0.200     -
  USER-DEFINED               -        1.40      0.50     0.100     -
  USER-DEFINED               -        2.30      0.50     0.200     -
```



```
  USER-DEFINED               -        6.50      0.50     0.900     -
  USER-DEFINED               -        8.40      0.50     0.600     -
  USER-DEFINED               -        0.50      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.491
  SUBAREA AREA(ACRES) =   26.70      SUBAREA RUNOFF(CFS) =   39.48
  EFFECTIVE AREA(ACRES) =     42.20   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       42.2       PEAK FLOW RATE(CFS) =      62.95

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.28
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.889
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.30      0.50     0.100     -
  USER-DEFINED               -        1.10      0.50     0.850     -
  USER-DEFINED               -        2.00      0.50     0.200     -
  USER-DEFINED               -        3.80      0.50     0.900     -
  USER-DEFINED               -        3.80      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.642
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =   15.52
  EFFECTIVE AREA(ACRES) =     53.20   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       53.2       PEAK FLOW RATE(CFS) =      78.47

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   606.00  DOWNSTREAM(FEET) =   604.00
  FLOW LENGTH(FEET) =   222.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.60
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      78.47
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    9.63
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =    2006.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.63
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.827
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     0.200     -
```

```
  USER-DEFINED               -        1.60      0.50     0.100     -
  USER-DEFINED               -        0.20      0.50     0.850     -
  USER-DEFINED               -        0.30      0.50     0.200     -
  USER-DEFINED               -        2.10      0.50     0.100     -
  USER-DEFINED               -        0.60      0.50     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.231
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =    7.55
  EFFECTIVE AREA(ACRES) =     58.10   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       58.1       PEAK FLOW RATE(CFS) =      83.08

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.63
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.827
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.31
  EFFECTIVE AREA(ACRES) =     58.30   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       58.3       PEAK FLOW RATE(CFS) =      83.39

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   604.00  DOWNSTREAM(FEET) =   546.00
  FLOW LENGTH(FEET) =  1271.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  21.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.94
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      83.39
  PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =   10.69
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    125.00 =    3277.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.69
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.699
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.50      0.50     0.200     -
  USER-DEFINED               -        1.20      0.50     0.100     -
  USER-DEFINED               -        1.20      0.50     0.900     -
```



```
  USER-DEFINED               -        0.10      0.50     0.200     -
  USER-DEFINED               -        1.60      0.50     0.100     -
  USER-DEFINED               -        3.00      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.550
  SUBAREA AREA(ACRES) =    7.60      SUBAREA RUNOFF(CFS) =    9.74
  EFFECTIVE AREA(ACRES) =     65.90   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       65.9       PEAK FLOW RATE(CFS) =      86.38

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.69
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.699
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.90      0.50     0.200     -
  USER-DEFINED               -        0.60      0.50     0.900     -
  USER-DEFINED               -        0.30      0.50     0.600     -
  USER-DEFINED               -        5.00      0.50     0.200     -
  USER-DEFINED               -        2.30      0.50     0.850     -
  USER-DEFINED               -        3.50      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.530
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   17.55
  EFFECTIVE AREA(ACRES) =     79.50   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       79.5       PEAK FLOW RATE(CFS) =     103.93

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.69
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.699
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       10.20      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =   12.84
  EFFECTIVE AREA(ACRES) =     89.70   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       89.7       PEAK FLOW RATE(CFS) =     116.76

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   546.00  DOWNSTREAM(FEET) =   525.00
```

```
  FLOW LENGTH(FEET) =   562.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.70
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     116.76
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   11.17
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    126.00 =    3839.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.17
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.655
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.90      0.50     0.200     -
  USER-DEFINED               -        0.10      0.50     0.100     -
  USER-DEFINED               -        0.60      0.50     0.900     -
  USER-DEFINED               -        6.00      0.50     0.200     -
  USER-DEFINED               -        1.10      0.50     0.100     -
  USER-DEFINED               -        4.70      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.395
  SUBAREA AREA(ACRES) =   18.40      SUBAREA RUNOFF(CFS) =   24.14
  EFFECTIVE AREA(ACRES) =    108.10   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      108.1       PEAK FLOW RATE(CFS) =     137.38

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    127.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   525.00  DOWNSTREAM(FEET) =   514.00
  FLOW LENGTH(FEET) =   607.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.80
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     137.38
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   11.81
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    127.00 =    4446.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.81
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.596
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.50      0.50     0.100     -
  USER-DEFINED               -        0.20      0.50     0.850     -
```



```
  USER-DEFINED               -        1.10      0.50     0.200     -
  USER-DEFINED               -       12.70      0.50     0.100     -
  USER-DEFINED               -        0.80      0.50     0.850     -
  USER-DEFINED               -        4.10      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.303
  SUBAREA AREA(ACRES) =   20.40      SUBAREA RUNOFF(CFS) =   26.53
  EFFECTIVE AREA(ACRES) =    128.50   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      128.5       PEAK FLOW RATE(CFS) =     158.21

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.81
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.596
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.20      0.50     0.100     -
  USER-DEFINED               -        1.50      0.50     0.850     -
  USER-DEFINED               -        0.10      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.530
  SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    3.35
  EFFECTIVE AREA(ACRES) =    131.30   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      131.3       PEAK FLOW RATE(CFS) =     161.56

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.81
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.596
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.00      0.50     0.100     -
  USER-DEFINED               -        1.30      0.50     0.100     -
  USER-DEFINED               -       12.60      0.50     0.100     -
  USER-DEFINED               -        1.10      0.50     0.850     -
  USER-DEFINED               -        0.10      0.50     0.200     -
  USER-DEFINED               -        2.10      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.238
  SUBAREA AREA(ACRES) =   18.20      SUBAREA RUNOFF(CFS) =   24.20
  EFFECTIVE AREA(ACRES) =    149.50   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      149.5       PEAK FLOW RATE(CFS) =     185.76

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   514.00  DOWNSTREAM(FEET) =   473.00
  FLOW LENGTH(FEET) =   741.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.08
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     185.76
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   12.28
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    128.00 =    5187.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.28
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.553
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.20      0.50     0.100     -
  USER-DEFINED               -        0.40      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.223
  SUBAREA AREA(ACRES) =    2.60      SUBAREA RUNOFF(CFS) =    3.37
  EFFECTIVE AREA(ACRES) =    152.10   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      152.1       PEAK FLOW RATE(CFS) =     185.76
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 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.) =   12.28
  RAINFALL INTENSITY(INCH/HR) =   1.55
  AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.43
  EFFECTIVE STREAM AREA(ACRES) =     152.10
  TOTAL STREAM AREA(ACRES) =     152.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     185.76

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      225.29   12.62    1.522  0.50( 0.16) 0.31     175.1     110.00
      1      200.89   20.28    1.107  0.50( 0.14) 0.29     227.3     100.00
      2      185.76   12.28    1.553  0.50( 0.21) 0.43     152.1     120.00

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



```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      409.97   12.28    1.553  0.50( 0.18) 0.37     322.4     120.00
      2      406.71   12.62    1.522  0.50( 0.18) 0.37     327.2     110.00
      3      324.78   20.28    1.107  0.50( 0.17) 0.34     379.4     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     409.97    Tc(MIN.) =    12.28
  EFFECTIVE AREA(ACRES) =     322.43   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      379.4
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    128.00 =    6371.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    129.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   473.00  DOWNSTREAM(FEET) =   455.00
  FLOW LENGTH(FEET) =  1494.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  72.0 INCH PIPE IS  54.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.72
  ESTIMATED PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     409.97
  PIPE TRAVEL TIME(MIN.) =   1.41    Tc(MIN.) =   13.69
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    129.00 =    7865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.69
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.424
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.60      0.50     0.100     -
  USER-DEFINED               -        0.60      0.50     0.900     -
  USER-DEFINED               -        1.80      0.50     0.100     -
  USER-DEFINED               -        1.40      0.50     0.900     -
  USER-DEFINED               -        0.80      0.50     0.100     -
  USER-DEFINED               -        1.60      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.524
  SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =    7.11
  EFFECTIVE AREA(ACRES) =    329.23   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      386.2       PEAK FLOW RATE(CFS) =     409.97
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 MAINLINE Tc(MIN.) =   13.69
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.424
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        2.50      0.50     0.100     -
 USER-DEFINED               -        0.30      0.50     0.850     -
 USER-DEFINED               -        0.10      0.50     0.200     -
 USER-DEFINED               -        0.10      0.50     0.900     -
 USER-DEFINED               -        1.50      0.50     0.600     -
 USER-DEFINED               -        0.20      0.50     0.500     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.344
 SUBAREA AREA(ACRES) =    4.70      SUBAREA RUNOFF(CFS) =    5.30
 EFFECTIVE AREA(ACRES) =    333.93   AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.37
 TOTAL AREA(ACRES) =      390.9       PEAK FLOW RATE(CFS) =     409.97
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.69
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.424
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        2.90      0.50     0.400     -
 USER-DEFINED               -        4.70      0.50     0.100     -
 USER-DEFINED               -        1.30      0.50     0.850     -
 USER-DEFINED               -        0.90      0.50     0.200     -
 USER-DEFINED               -        0.10      0.50     0.900     -
 USER-DEFINED               -        3.80      0.50     0.600     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.386
 SUBAREA AREA(ACRES) =   13.70      SUBAREA RUNOFF(CFS) =   15.18
 EFFECTIVE AREA(ACRES) =    347.63   AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.37
 TOTAL AREA(ACRES) =      404.6       PEAK FLOW RATE(CFS) =     409.97
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.69
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.424
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        4.40      0.50     0.500     -
 USER-DEFINED               -        0.70      0.50     0.400     -
 USER-DEFINED               -        5.00      0.50     0.100     -
 USER-DEFINED               -        0.10      0.50     0.850     -
 USER-DEFINED               -       10.30      0.50     0.200     -
```



```
 USER-DEFINED               -        0.10      0.50     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
 SUBAREA AREA(ACRES) =   20.60      SUBAREA RUNOFF(CFS) =   24.06
 EFFECTIVE AREA(ACRES) =    368.23   AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =      425.2       PEAK FLOW RATE(CFS) =     411.85

****************************************************************************
 FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.69
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.424
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        1.30      0.50     0.600     -
 USER-DEFINED               -        3.90      0.50     0.500     -
 USER-DEFINED               -        2.30      0.50     0.400     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.487
 SUBAREA AREA(ACRES) =    7.50      SUBAREA RUNOFF(CFS) =    7.97
 EFFECTIVE AREA(ACRES) =    375.73   AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.37
 TOTAL AREA(ACRES) =      432.7       PEAK FLOW RATE(CFS) =     419.82

****************************************************************************
 FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   410.00
 FLOW LENGTH(FEET) =  1786.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  63.0 INCH PIPE IS  48.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  23.46
 ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     419.82
 PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =   14.96
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    9651.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.96
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.308
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        1.30      0.50     0.100     -
 USER-DEFINED               -        1.20      0.50     0.900     -
 USER-DEFINED               -        0.10      0.50     0.600     -
 USER-DEFINED               -        1.30      0.50     0.100     -
 USER-DEFINED               -        0.10      0.50     0.850     -
```

```
  USER-DEFINED               -        3.00      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.598
  SUBAREA AREA(ACRES) =     7.00      SUBAREA RUNOFF(CFS) =     6.36
  EFFECTIVE AREA(ACRES) =    382.73   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      439.7       PEAK FLOW RATE(CFS) =     419.82
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.96
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.308
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.50      0.50     0.600     -
  USER-DEFINED               -        0.80      0.50     0.100     -
  USER-DEFINED               -        1.30      0.50     0.900     -
  USER-DEFINED               -        3.30      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.599
  SUBAREA AREA(ACRES) =     7.90      SUBAREA RUNOFF(CFS) =     7.17
  EFFECTIVE AREA(ACRES) =    390.63   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      447.6       PEAK FLOW RATE(CFS) =     419.82
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    765.00  DOWNSTREAM(FEET) =    675.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.312
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.883
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        1.50      0.50     1.000    56    9.31
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           -        0.40      0.50     1.000    56    9.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
```



```
  SUBAREA RUNOFF(CFS) =      2.36
  TOTAL AREA(ACRES) =      1.90   PEAK FLOW RATE(CFS) =      2.36

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    152.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    635.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   421.00   CHANNEL SLOPE =  0.0950
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.701
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.90      0.50     1.000     -
  USER-DEFINED               -        2.40      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.17
  AVERAGE FLOW DEPTH(FEET) =   0.64   TRAVEL TIME(MIN.) =   1.36
  Tc(MIN.) =   10.67
  SUBAREA AREA(ACRES) =     7.30       SUBAREA RUNOFF(CFS) =     7.89
  EFFECTIVE AREA(ACRES) =      9.20     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        9.2         PEAK FLOW RATE(CFS) =       9.94

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.76   FLOW VELOCITY(FEET/SEC.) =   5.76
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    152.00 =     751.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    153.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   635.00  DOWNSTREAM(FEET) =   631.00
  FLOW LENGTH(FEET) =   501.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.11
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.94
  PIPE TRAVEL TIME(MIN.) =   1.37    Tc(MIN.) =   12.04
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    153.00 =    1252.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    153.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.04
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.576
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED             -        5.10      0.50     1.000     -
  USER-DEFINED             -        4.00      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =    8.81
  EFFECTIVE AREA(ACRES) =     18.30   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       18.3       PEAK FLOW RATE(CFS) =      17.71

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   631.00  DOWNSTREAM(FEET) =   630.00
  FLOW LENGTH(FEET) =   711.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.60
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.71
  PIPE TRAVEL TIME(MIN.) =   3.29    Tc(MIN.) =   15.33
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    154.00 =    1963.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.33
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.292
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.30      0.50     1.000     -
  USER-DEFINED               -        5.70      0.50     1.000     -
  USER-DEFINED               -        3.40      0.50     1.000     -
  USER-DEFINED               -        0.10      0.50     1.000     -
  USER-DEFINED               -        2.10      0.50     1.000     -
  USER-DEFINED               -        1.60      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   13.20      SUBAREA RUNOFF(CFS) =    9.40
  EFFECTIVE AREA(ACRES) =     31.50   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       31.5       PEAK FLOW RATE(CFS) =      22.44

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.33
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.292
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  USER-DEFINED               -        0.20      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.14
  EFFECTIVE AREA(ACRES) =     31.70   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       31.7       PEAK FLOW RATE(CFS) =      22.58

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   630.00  DOWNSTREAM(FEET) =   628.00
  FLOW LENGTH(FEET) =   910.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.51
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.58
  PIPE TRAVEL TIME(MIN.) =   3.36    Tc(MIN.) =   18.69
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    155.00 =    2873.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.69
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.165
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.60      0.50     1.000     -
  USER-DEFINED               -        1.60      0.50     1.000     -
  USER-DEFINED               -        1.80      0.50     1.000     -
  USER-DEFINED               -        1.50      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    6.50      SUBAREA RUNOFF(CFS) =    3.89
  EFFECTIVE AREA(ACRES) =     38.20   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       38.2       PEAK FLOW RATE(CFS) =      22.84

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   629.00  DOWNSTREAM(FEET) =   610.00
  FLOW LENGTH(FEET) =   796.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.01
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.84
  PIPE TRAVEL TIME(MIN.) =   1.21    Tc(MIN.) =   19.89
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    156.00 =    3669.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.89
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.119
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.90      0.50     1.000     -
  USER-DEFINED               -        0.40      0.50     1.000     -
  USER-DEFINED               -        1.30      0.50     1.000     -
  USER-DEFINED               -        4.50      0.50     1.000     -
  USER-DEFINED               -        1.30      0.50     1.000     -
  USER-DEFINED               -        3.70      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   13.10      SUBAREA RUNOFF(CFS) =    7.30
  EFFECTIVE AREA(ACRES) =     51.30   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       51.3       PEAK FLOW RATE(CFS) =      28.57

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   610.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =  6198.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.43
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.57
  PIPE TRAVEL TIME(MIN.) =   7.69    Tc(MIN.) =   27.58
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       28.57   27.58    0.923  0.50( 0.50) 1.00      51.3     150.00
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      419.82   14.96    1.308  0.50( 0.19) 0.37     390.6     120.00
      2      414.48   15.30    1.293  0.50( 0.19) 0.37     395.4     110.00
      3      347.17   23.09    1.028  0.50( 0.18) 0.36     447.6     100.00
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    9651.00 FEET.
```



```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      448.39   14.96    1.308  0.50( 0.21) 0.42     418.4     120.00
      2      443.05   15.30    1.293  0.50( 0.21) 0.42     423.8     110.00
      3      375.74   23.09    1.028  0.50( 0.21) 0.41     490.5     100.00
      4      332.86   27.58    0.923  0.50( 0.21) 0.42     498.9     150.00
    TOTAL AREA(ACRES) =       498.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      448.39  Tc(MIN.) =   14.955
  EFFECTIVE AREA(ACRES) =    418.45  AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      498.9
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.96
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.308
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.60      0.50     1.000     -
  USER-DEFINED               -        1.30      0.50     1.000     -
  USER-DEFINED               -        2.60      0.50     0.900     -
  USER-DEFINED               -        1.90      0.50     1.000     -
  USER-DEFINED               -        0.70      0.50     1.000     -
  USER-DEFINED               -        0.80      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.971
  SUBAREA AREA(ACRES) =    8.90      SUBAREA RUNOFF(CFS) =    6.59
  EFFECTIVE AREA(ACRES) =    427.35   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      507.8       PEAK FLOW RATE(CFS) =     448.39
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.96
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.308
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     0.850     -
  USER-DEFINED               -        1.50      0.50     0.900     -
  USER-DEFINED               -        0.40      0.50     1.000     -
  USER-DEFINED               -        0.10      0.50     1.000     -
  USER-DEFINED               -        0.30      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.919
```

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 1.83
EFFECTIVE AREA(ACRES) = 429.75 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 510.2 PEAK FLOW RATE(CFS) = 448.39
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 510.2 TC(MIN.) = 14.96
EFFECTIVE AREA(ACRES) = 429.75 AREA-AVERAGED Fm(INCH/HR)= 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.430
PEAK FLOW RATE(CFS) = 448.39

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	448.39	14.96	1.308	0.50(0.22)	0.43	429.7	120.00
2	443.05	15.30	1.293	0.50(0.21)	0.43	435.1	110.00
3	375.74	23.09	1.028	0.50(0.21)	0.42	501.8	100.00
4	332.86	27.58	0.923	0.50(0.22)	0.43	510.2	150.00

==========

==========

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                        Analysis prepared by:

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 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA A                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 10-YR EV AUGUST 2018 CCHIU                                           *
 **********************************************************************

  FILE NAME: 3A10EVRL.DAT
  TIME/DATE OF STUDY: 09:30 08/17/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  3.774
   2)   10.00;  2.517
   3)   15.00;  1.863
   4)   20.00;  1.593
   5)   25.00;  1.391
   6)   30.00;  1.250
   7)   40.00;  1.068
   8)   50.00;  0.950
   9)   60.00;  0.862
  10)   90.00;  0.714
  11)  120.00;  0.630
  12)  180.00;  0.528
  13)  360.00;  0.388
  14) 1200.00;  0.170
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   327.00
  ELEVATION DATA: UPSTREAM(FEET) =    725.00  DOWNSTREAM(FEET) =    642.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.413
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.665
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.10      0.30     1.000    66    9.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.34
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      2.34

**************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    642.00  DOWNSTREAM(FEET) =    605.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   385.00   CHANNEL SLOPE =  0.0961
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.433
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.90      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.60      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.983
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.23
  AVERAGE FLOW DEPTH(FEET) =   0.64   TRAVEL TIME(MIN.) =   1.23
  Tc(MIN.) =   10.64
  SUBAREA AREA(ACRES) =     4.20       SUBAREA RUNOFF(CFS) =    8.08
  EFFECTIVE AREA(ACRES) =      5.30     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.99
```

```
  TOTAL AREA(ACRES) =        5.3         PEAK FLOW RATE(CFS) =      10.19

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.76   FLOW VELOCITY(FEET/SEC.) =   5.88
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     712.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  605.00  DOWNSTREAM ELEVATION(FEET) =  584.00
  STREET LENGTH(FEET) =   264.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      12.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.03
  STREET FLOW TRAVEL TIME(MIN.) =   0.72   Tc(MIN.) =   11.36
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.339
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  COMMERCIAL                 B        1.00      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.519
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    4.13
  EFFECTIVE AREA(ACRES) =      7.40    AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        7.4         PEAK FLOW RATE(CFS) =      13.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.12
  FLOW VELOCITY(FEET/SEC.) =  6.26   DEPTH*VELOCITY(FT*FT/SEC.) =   2.15
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     976.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  584.00  DOWNSTREAM ELEVATION(FEET) =  564.00
```



```
  STREET LENGTH(FEET) =   494.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      22.95
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   14.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.39
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.29
  STREET FLOW TRAVEL TIME(MIN.) =   1.53   Tc(MIN.) =   12.89
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.139
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  COMMERCIAL                 B        6.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.80      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.271
  SUBAREA AREA(ACRES) =    9.80      SUBAREA RUNOFF(CFS) =   18.15
  EFFECTIVE AREA(ACRES) =     17.20    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       17.2        PEAK FLOW RATE(CFS) =      30.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.60
  FLOW VELOCITY(FEET/SEC.) =  5.78   DEPTH*VELOCITY(FT*FT/SEC.) =   2.65
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   564.00  DOWNSTREAM(FEET) =   520.00
  FLOW LENGTH(FEET) =  1456.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.26
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.69
  PIPE TRAVEL TIME(MIN.) =   1.83    Tc(MIN.) =   14.72
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    2926.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
```

```
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.72
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.900
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  COMMERCIAL                 B        3.90      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.255
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =    9.19
  EFFECTIVE AREA(ACRES) =     22.80   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       22.8       PEAK FLOW RATE(CFS) =      36.17

******************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.72
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.900
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  COMMERCIAL                 B        5.00      0.30     0.100    56
  PUBLIC PARK                B        2.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.80      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    9.20      SUBAREA RUNOFF(CFS) =   14.74
  EFFECTIVE AREA(ACRES) =     32.00   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       32.0       PEAK FLOW RATE(CFS) =      50.91

******************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.72
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.900
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.80      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```



```
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    3.03
  EFFECTIVE AREA(ACRES) =     33.80   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       33.8       PEAK FLOW RATE(CFS) =      53.93

******************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   520.00  DOWNSTREAM(FEET) =   503.00
  FLOW LENGTH(FEET) =   804.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.12
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.93
  PIPE TRAVEL TIME(MIN.) =   1.02    Tc(MIN.) =   15.74
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    3730.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.74
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.823
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.80      0.30     0.100    56
  COMMERCIAL                 B        7.60      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  COMMERCIAL                 B       10.50      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.125
  SUBAREA AREA(ACRES) =   21.60      SUBAREA RUNOFF(CFS) =   34.71
  EFFECTIVE AREA(ACRES) =     55.40   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       55.4       PEAK FLOW RATE(CFS) =      86.31

******************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.74
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.823
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        6.80      0.30     0.100    56
  COMMERCIAL                 B       12.10      0.30     0.100    56
  PUBLIC PARK                B        1.00      0.30     0.850    56
  COMMERCIAL                 B        4.50      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.131
SUBAREA AREA(ACRES) = 24.40 SUBAREA RUNOFF(CFS) = 39.17
EFFECTIVE AREA(ACRES) = 79.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 79.8 PEAK FLOW RATE(CFS) = 125.48

****
FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 485.00
FLOW LENGTH(FEET) = 808.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.71
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 125.48
PIPE TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 16.55
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 107.00 = 4538.00 FEET.

****
FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 16.55
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.779
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.40	0.30	0.100	56
COMMERCIAL	B	6.70	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
COMMERCIAL	B	2.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.106
SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 19.98
EFFECTIVE AREA(ACRES) = 92.50 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 142.33

****
FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 16.55
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.779
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	7.20	0.30	0.100	56
PUBLIC PARK	B	0.70	0.30	0.850	56
COMMERCIAL	B	7.60	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56
COMMERCIAL	B	4.70	0.30	0.100	56
PUBLIC PARK	B	0.40	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.150
SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 32.62
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 174.96

****
FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 933.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 47.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.49
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 174.96
PIPE TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 18.03
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

****
FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 18.03
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.699
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.50	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
COMMERCIAL	B	2.80	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
COMMERCIAL	B	0.60	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 12.17
EFFECTIVE AREA(ACRES) = 121.70 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 121.7 PEAK FLOW RATE(CFS) = 178.96

****
FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 18.03
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.699
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.40	0.30	0.200	56
APARTMENTS	B	5.50	0.30	0.200	56

```
  APARTMENTS                  B        3.20      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   13.43
  EFFECTIVE AREA(ACRES) =    130.80   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =      130.8       PEAK FLOW RATE(CFS) =     192.39

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =   18.03
  RAINFALL INTENSITY(INCH/HR) =   1.70
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.22
  EFFECTIVE STREAM AREA(ACRES) =     130.80
  TOTAL STREAM AREA(ACRES) =     130.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     192.39

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    645.00  DOWNSTREAM(FEET) =    625.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.417
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.669
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56    8.68
  COMMERCIAL                 B        0.30      0.30     0.100    56    5.42
  PUBLIC PARK                B        1.30      0.30     0.850    56    8.61
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.00      0.30     0.900    56    8.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.798
  SUBAREA RUNOFF(CFS) =      9.26
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =      9.26

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  625.00  DOWNSTREAM ELEVATION(FEET) =  595.00
  STREET LENGTH(FEET) =   517.00   CURB HEIGHT(INCHES) =  8.0
```



```
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      14.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.04
  STREET FLOW TRAVEL TIME(MIN.) =   1.54   Tc(MIN.) =    6.96
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.282
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  COMMERCIAL                 B        1.00      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.223
  SUBAREA AREA(ACRES) =    3.90      SUBAREA RUNOFF(CFS) =   11.28
  EFFECTIVE AREA(ACRES) =      6.90    AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        6.9        PEAK FLOW RATE(CFS) =      19.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.70
  FLOW VELOCITY(FEET/SEC.) =  5.97   DEPTH*VELOCITY(FT*FT/SEC.) =   2.32
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     847.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  595.00  DOWNSTREAM ELEVATION(FEET) =  585.00
  STREET LENGTH(FEET) =   389.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      30.40
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.49
  HALFSTREET FLOOD WIDTH(FEET) =   18.16
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.84
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.36
 STREET FLOW TRAVEL TIME(MIN.) =   1.34   Tc(MIN.) =    8.30
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.945
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        5.00      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
 COMMERCIAL                 B        1.00      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.335
 SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =   21.76
 EFFECTIVE AREA(ACRES) =     15.40    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
 TOTAL AREA(ACRES) =       15.4        PEAK FLOW RATE(CFS) =      39.17

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  20.12
 FLOW VELOCITY(FEET/SEC.) =  5.14   DEPTH*VELOCITY(FT*FT/SEC.) =   2.68
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    113.00 =    1236.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 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) =   565.00
 FLOW LENGTH(FEET) =   702.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.83
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      39.17
 PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =    9.14
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    114.00 =    1938.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.14
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.732
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.60      0.30     0.100    56
 PUBLIC PARK                B        0.20      0.30     0.850    56
 RESIDENTIAL
```



```
 ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
 SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    6.78
 EFFECTIVE AREA(ACRES) =     18.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =       18.3       PEAK FLOW RATE(CFS) =      43.00

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.14
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.732
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        9.00      0.30     0.100    56
 PUBLIC PARK                B        1.90      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.70      0.30     0.900    56
 COMMERCIAL                 B        4.10      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.313
 SUBAREA AREA(ACRES) =   18.00      SUBAREA RUNOFF(CFS) =   42.75
 EFFECTIVE AREA(ACRES) =     36.30   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       36.3       PEAK FLOW RATE(CFS) =      85.74

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.14
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.732
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        4.50      0.30     0.100    56
 PUBLIC PARK                B        1.20      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        3.80      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.515
 SUBAREA AREA(ACRES) =    9.50      SUBAREA RUNOFF(CFS) =   22.04
 EFFECTIVE AREA(ACRES) =     45.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
 TOTAL AREA(ACRES) =       45.8       PEAK FLOW RATE(CFS) =     107.78

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =    9.14
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.732
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.30      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.30      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   12.26
  EFFECTIVE AREA(ACRES) =     51.40   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       51.4       PEAK FLOW RATE(CFS) =     120.04

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 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) =   535.00
  FLOW LENGTH(FEET) =  1017.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.33
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     120.04
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   10.07
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    115.00 =    2955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.07
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.508
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.40      0.30     0.100    56
  COMMERCIAL                 B       11.00      0.30     0.100    56
  PUBLIC PARK                B        1.80      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
  COMMERCIAL                 B        3.20      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.222
  SUBAREA AREA(ACRES) =   20.90      SUBAREA RUNOFF(CFS) =   45.93
  EFFECTIVE AREA(ACRES) =     72.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       72.3       PEAK FLOW RATE(CFS) =     155.59

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```



```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   535.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =  1110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.76
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     155.59
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   10.85
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =    4065.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.85
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.406
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.10      0.30     0.100    56
  PUBLIC PARK                B        1.40      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  COMMERCIAL                 B        5.10      0.30     0.100    56
  PUBLIC PARK                B        1.90      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.60      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.485
  SUBAREA AREA(ACRES) =   16.20      SUBAREA RUNOFF(CFS) =   32.96
  EFFECTIVE AREA(ACRES) =     88.50   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       88.5       PEAK FLOW RATE(CFS) =     181.93

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.85
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.406
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.70      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.244
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    6.93
  EFFECTIVE AREA(ACRES) =     91.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       91.8       PEAK FLOW RATE(CFS) =     188.86

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

```
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =   10.85
 RAINFALL INTENSITY(INCH/HR) =   2.41
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.40
 EFFECTIVE STREAM AREA(ACRES) =      91.80
 TOTAL STREAM AREA(ACRES) =      91.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     188.86

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      192.39   18.03    1.699  0.30( 0.07) 0.22     130.8     100.00
     2      188.86   10.85    2.406  0.30( 0.12) 0.40      91.8     110.00

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      354.66   10.85    2.406  0.30( 0.09) 0.32     170.5     110.00
     2      322.84   18.03    1.699  0.30( 0.09) 0.29     222.6     100.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     354.66    Tc(MIN.) =    10.85
 EFFECTIVE AREA(ACRES) =     170.49   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.32
 TOTAL AREA(ACRES) =      222.6
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    5471.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    128.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   473.00
 FLOW LENGTH(FEET) =   900.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  75.0 INCH PIPE IS  55.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.57
 ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     354.66
 PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =   11.88
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    128.00 =    6371.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
 MAINLINE Tc(MIN.) =   11.88
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.272
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.10      0.30      0.100    56
 COMMERCIAL                 B        3.60      0.30      0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =     4.70      SUBAREA RUNOFF(CFS) =     9.48
 EFFECTIVE AREA(ACRES) =    175.19   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
 TOTAL AREA(ACRES) =      227.3       PEAK FLOW RATE(CFS) =     354.66
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 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.) =   11.88
 RAINFALL INTENSITY(INCH/HR) =   2.27
 AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.31
 EFFECTIVE STREAM AREA(ACRES) =     175.19
 TOTAL STREAM AREA(ACRES) =     227.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     354.66

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
 ELEVATION DATA: UPSTREAM(FEET) =    640.00  DOWNSTREAM(FEET) =    634.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.880
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.301
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        0.50      0.30      0.100    56    6.88
 PUBLIC PARK                B        0.20      0.30      0.850    56   10.93
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        2.70      0.30      0.200    56    7.33
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.40      0.30      0.900    56   11.02
 PUBLIC PARK                B        0.10      0.30      0.850    56   10.93
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        1.30      0.30      0.200    56    7.33
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.381
 SUBAREA RUNOFF(CFS) =     17.78
```

```
  TOTAL AREA(ACRES) =      6.20   PEAK FLOW RATE(CFS) =     17.78

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    121.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.88
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.301
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.55
  EFFECTIVE AREA(ACRES) =      6.40   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        6.4       PEAK FLOW RATE(CFS) =      18.33

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   634.00  DOWNSTREAM(FEET) =   626.00
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.69
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.33
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =    7.61
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     754.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.61
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.118
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.40      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.423
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   24.49
  EFFECTIVE AREA(ACRES) =     15.50   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
```



```
  TOTAL AREA(ACRES) =       15.5       PEAK FLOW RATE(CFS) =      41.76

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   626.00  DOWNSTREAM(FEET) =   606.00
  FLOW LENGTH(FEET) =  1030.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.19
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.76
  PIPE TRAVEL TIME(MIN.) =   1.41    Tc(MIN.) =    9.02
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =    1784.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.02
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.763
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        7.60      0.30     0.200    56
  COMMERCIAL                 B        1.40      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        6.50      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        8.40      0.30     0.600    56
  APARTMENTS                 B        0.50      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.491
  SUBAREA AREA(ACRES) =   26.70      SUBAREA RUNOFF(CFS) =   62.87
  EFFECTIVE AREA(ACRES) =     42.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       42.2       PEAK FLOW RATE(CFS) =      99.69

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.02
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.763
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.30      0.30     0.100    56
  PUBLIC PARK                B        1.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.00      0.30     0.200    56
  RESIDENTIAL
```

```
  ".4 DWELLING/ACRE"         B        3.80      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.80      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.642
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =   25.45
  EFFECTIVE AREA(ACRES) =     53.20   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       53.2       PEAK FLOW RATE(CFS) =     125.14

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   606.00  DOWNSTREAM(FEET) =   604.00
  FLOW LENGTH(FEET) =   222.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  38.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.73
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     125.14
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    9.34
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =    2006.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.684
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        1.60      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  APARTMENTS                 B        0.30      0.30     0.200    56
  COMMERCIAL                 B        2.10      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.231
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =   11.53
  EFFECTIVE AREA(ACRES) =     58.10   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       58.1       PEAK FLOW RATE(CFS) =     132.88

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.684
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.47
  EFFECTIVE AREA(ACRES) =     58.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       58.3       PEAK FLOW RATE(CFS) =     133.35

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   604.00  DOWNSTREAM(FEET) =   546.00
  FLOW LENGTH(FEET) =  1271.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.80
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     133.35
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =   10.31
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    125.00 =    3277.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.31
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.477
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.50      0.30     0.200    56
  COMMERCIAL                 B        1.20      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        1.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.00      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.550
  SUBAREA AREA(ACRES) =    7.60      SUBAREA RUNOFF(CFS) =   15.81
  EFFECTIVE AREA(ACRES) =     65.90   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       65.9       PEAK FLOW RATE(CFS) =     138.28

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.31
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.477
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        1.90      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.60      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        0.30      0.30     0.600    56
  APARTMENTS                B        5.00      0.30     0.200    56
  PUBLIC PARK               B        2.30      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        3.50      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.530
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   28.37
  EFFECTIVE AREA(ACRES) =     79.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       79.5       PEAK FLOW RATE(CFS) =     166.66

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.31
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.477
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B       10.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =   21.09
  EFFECTIVE AREA(ACRES) =     89.70   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       89.7       PEAK FLOW RATE(CFS) =     187.74

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   546.00  DOWNSTREAM(FEET) =   525.00
  FLOW LENGTH(FEET) =   562.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.52
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     187.74
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   10.72
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    126.00 =    3839.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.72
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.422
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        5.90      0.30     0.200    56
  COMMERCIAL                B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.60      0.30     0.900    56
  APARTMENTS                B        6.00      0.30     0.200    56
  COMMERCIAL                B        1.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        4.70      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.395
  SUBAREA AREA(ACRES) =   18.40      SUBAREA RUNOFF(CFS) =   38.15
  EFFECTIVE AREA(ACRES) =    108.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      108.1       PEAK FLOW RATE(CFS) =     221.50

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    127.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   525.00  DOWNSTREAM(FEET) =   514.00
  FLOW LENGTH(FEET) =   607.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  39.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.82
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     221.50
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   11.29
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    127.00 =    4446.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.348
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        1.50      0.30     0.100    56
  PUBLIC PARK               B        0.20      0.30     0.850    56
  APARTMENTS                B        1.10      0.30     0.200    56
  COMMERCIAL                B       12.70      0.30     0.100    56
  PUBLIC PARK               B        0.80      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        4.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.303
  SUBAREA AREA(ACRES) =   20.40      SUBAREA RUNOFF(CFS) =   41.44
  EFFECTIVE AREA(ACRES) =    128.50   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      128.5       PEAK FLOW RATE(CFS) =     255.72

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

```
 FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.29
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.348
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.20      0.30     0.100    56
 PUBLIC PARK                B        1.50      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.530
 SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    5.52
 EFFECTIVE AREA(ACRES) =    131.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
 TOTAL AREA(ACRES) =      131.3       PEAK FLOW RATE(CFS) =     261.24

****************************************************************************
 FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.29
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.348
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.00      0.30     0.100    56
 COMMERCIAL                 B        1.30      0.30     0.100    56
 COMMERCIAL                 B       12.60      0.30     0.100    56
 PUBLIC PARK                B        1.10      0.30     0.850    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.238
 SUBAREA AREA(ACRES) =   18.20      SUBAREA RUNOFF(CFS) =   37.29
 EFFECTIVE AREA(ACRES) =    149.50   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =      149.5       PEAK FLOW RATE(CFS) =     298.53

****************************************************************************
 FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.00  DOWNSTREAM(FEET) =   473.00
 FLOW LENGTH(FEET) =   741.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  36.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  28.98
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     298.53
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   11.72
```



```
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    128.00 =    5187.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.72
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.292
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        2.20      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.223
 SUBAREA AREA(ACRES) =    2.60      SUBAREA RUNOFF(CFS) =    5.21
 EFFECTIVE AREA(ACRES) =    152.10   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =      152.1       PEAK FLOW RATE(CFS) =     298.53
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 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.) =   11.72
 RAINFALL INTENSITY(INCH/HR) =   2.29
 AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.43
 EFFECTIVE STREAM AREA(ACRES) =     152.10
 TOTAL STREAM AREA(ACRES) =     152.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     298.53

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      354.66   11.88    2.272  0.30( 0.09) 0.31     175.2     110.00
     1      322.84   19.09    1.642  0.30( 0.09) 0.29     227.3     100.00
     2      298.53   11.72    2.292  0.30( 0.13) 0.43     152.1     120.00

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      651.78   11.72    2.292  0.30( 0.11) 0.37     324.9     120.00
     2      650.32   11.88    2.272  0.30( 0.11) 0.37     327.3     110.00
     3      531.70   19.09    1.642  0.30( 0.10) 0.34     379.4     100.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =     651.78    Tc(MIN.) =    11.72
  EFFECTIVE AREA(ACRES) =     324.94   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      379.4
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    128.00 =    6371.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    129.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   473.00  DOWNSTREAM(FEET) =   455.00
  FLOW LENGTH(FEET) =  1494.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  84.0 INCH PIPE IS  67.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.70
  ESTIMATED PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     651.78
  PIPE TRAVEL TIME(MIN.) =   1.26    Tc(MIN.) =   12.98
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    129.00 =    7865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.98
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.127
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  COMMERCIAL                 B        1.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.40      0.30     0.900    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.60      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.524
  SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =   12.06
  EFFECTIVE AREA(ACRES) =    331.74   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      386.2       PEAK FLOW RATE(CFS) =     651.78
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.98
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.127
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  COMMERCIAL                 B        2.50      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.50      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.20      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.344
  SUBAREA AREA(ACRES) =    4.70      SUBAREA RUNOFF(CFS) =    8.56
  EFFECTIVE AREA(ACRES) =    336.44   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      390.9       PEAK FLOW RATE(CFS) =     651.78
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.98
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.127
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.90      0.30     0.400    56
  COMMERCIAL                 B        4.70      0.30     0.100    56
  PUBLIC PARK                B        1.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.90      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.80      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.386
  SUBAREA AREA(ACRES) =   13.70      SUBAREA RUNOFF(CFS) =   24.80
  EFFECTIVE AREA(ACRES) =    350.14   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      404.6       PEAK FLOW RATE(CFS) =     651.78
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.98
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.127
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.40      0.30     0.500    56
```

```
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
  COMMERCIAL                 B        5.00      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       10.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
  SUBAREA AREA(ACRES) =   20.60      SUBAREA RUNOFF(CFS) =   38.03
  EFFECTIVE AREA(ACRES) =    370.74   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =      425.2       PEAK FLOW RATE(CFS) =     673.46

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.98
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.127
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.30      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.90      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.487
  SUBAREA AREA(ACRES) =    7.50      SUBAREA RUNOFF(CFS) =   13.37
  EFFECTIVE AREA(ACRES) =    378.24   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      432.7       PEAK FLOW RATE(CFS) =     686.83

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =  1786.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  75.0 INCH PIPE IS  59.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.40
  ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     686.83
  PIPE TRAVEL TIME(MIN.) =   1.13    Tc(MIN.) =   14.11
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    9651.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   14.11
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.980
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.00      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.598
  SUBAREA AREA(ACRES) =    7.00      SUBAREA RUNOFF(CFS) =   11.34
  EFFECTIVE AREA(ACRES) =    385.24   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      439.7       PEAK FLOW RATE(CFS) =     686.83
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.11
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.980
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.50      0.30     0.600    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.599
  SUBAREA AREA(ACRES) =    7.90      SUBAREA RUNOFF(CFS) =   12.80
  EFFECTIVE AREA(ACRES) =    393.14   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      447.6       PEAK FLOW RATE(CFS) =     686.83
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    765.00  DOWNSTREAM(FEET) =    675.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.312
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.690
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.50      0.30     1.000    66    9.31
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.40      0.30     1.000    65    9.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.09
  TOTAL AREA(ACRES) =      1.90   PEAK FLOW RATE(CFS) =      4.09

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    152.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    635.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   421.00   CHANNEL SLOPE =  0.0950
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.453
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        4.90      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        2.40      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.17
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.95
  AVERAGE FLOW DEPTH(FEET) =   0.79   TRAVEL TIME(MIN.) =   1.18
  Tc(MIN.) =   10.49
  SUBAREA AREA(ACRES) =     7.30       SUBAREA RUNOFF(CFS) =   14.14
  EFFECTIVE AREA(ACRES) =      9.20     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        9.2         PEAK FLOW RATE(CFS) =      17.83

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.94   FLOW VELOCITY(FEET/SEC.) =   6.71
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    152.00 =     751.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    153.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```



```
  ELEVATION DATA: UPSTREAM(FEET) =   635.00  DOWNSTREAM(FEET) =   631.00
  FLOW LENGTH(FEET) =   501.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.93
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.83
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =   11.70
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    153.00 =    1252.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    153.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.70
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.295
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.10      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        4.00      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =     9.10      SUBAREA RUNOFF(CFS) =   16.34
  EFFECTIVE AREA(ACRES) =     18.30   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       18.3       PEAK FLOW RATE(CFS) =      32.86

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   631.00  DOWNSTREAM(FEET) =   630.00
  FLOW LENGTH(FEET) =   711.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.22
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.86
  PIPE TRAVEL TIME(MIN.) =   2.81    Tc(MIN.) =   14.50
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    154.00 =    1963.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.928
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.30      0.30     1.000    63
  NATURAL FAIR COVER
```

```
  "CHAPARRAL,NARROWLEAF"     B        5.70      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.40      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        2.10      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.60      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   13.20      SUBAREA RUNOFF(CFS) =   19.34
  EFFECTIVE AREA(ACRES) =     31.50   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       31.5       PEAK FLOW RATE(CFS) =      46.15

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.928
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.20      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.29
  EFFECTIVE AREA(ACRES) =     31.70   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       31.7       PEAK FLOW RATE(CFS) =      46.45

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   630.00  DOWNSTREAM(FEET) =   628.00
  FLOW LENGTH(FEET) =   910.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.48
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      46.45
  PIPE TRAVEL TIME(MIN.) =   2.77    Tc(MIN.) =   17.27
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    155.00 =    2873.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.27
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.740
  SUBAREA LOSS RATE DATA(AMC  II):
```



```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.60      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.60      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.80      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.50      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    6.50      SUBAREA RUNOFF(CFS) =    8.43
  EFFECTIVE AREA(ACRES) =     38.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       38.2       PEAK FLOW RATE(CFS) =      49.52

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   629.00  DOWNSTREAM(FEET) =   610.00
  FLOW LENGTH(FEET) =   796.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.68
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.52
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =   18.24
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    156.00 =    3669.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.688
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.90      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.40      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.30      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.50      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        1.30      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.70      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   13.10      SUBAREA RUNOFF(CFS) =   16.36
  EFFECTIVE AREA(ACRES) =     51.30   AREA-AVERAGED Fm(INCH/HR) =  0.30
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       51.3       PEAK FLOW RATE(CFS) =      64.08

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   610.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =  6198.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.15
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.08
  PIPE TRAVEL TIME(MIN.) =   6.40    Tc(MIN.) =   24.64
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       64.08   24.64    1.406  0.30( 0.30) 1.00      51.3     150.00
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      686.83   14.11    1.980  0.30( 0.11) 0.37     393.1     120.00
      2      683.99   14.27    1.959  0.30( 0.11) 0.37     395.5     110.00
      3      573.32   21.58    1.529  0.30( 0.11) 0.36     447.6     100.00
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    9651.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      742.58   14.11    1.980  0.30( 0.13) 0.42     422.5     120.00
      2      739.67   14.27    1.959  0.30( 0.13) 0.42     425.2     110.00
      3      635.72   21.58    1.529  0.30( 0.12) 0.41     492.5     100.00
      4      587.61   24.64    1.406  0.30( 0.13) 0.42     498.9     150.00
    TOTAL AREA(ACRES) =       498.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      742.58  Tc(MIN.) =   14.108
  EFFECTIVE AREA(ACRES) =    422.51  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      498.9
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   14.11
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.980
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "FALLOW"                   B        1.60      0.30      1.000    86
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.30      0.30      1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.60      0.30      0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        1.90      0.30      1.000    65
  AGRICULTURAL POOR COVER
  "FALLOW"                   B        0.70      0.30      1.000    86
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.80      0.30      1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.971
  SUBAREA AREA(ACRES) =    8.90      SUBAREA RUNOFF(CFS) =   13.52
  EFFECTIVE AREA(ACRES) =    431.41   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      507.8       PEAK FLOW RATE(CFS) =     742.58
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.11
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.980
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.10      0.30      0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.50      0.30      0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.40      0.30      1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30      1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30      0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.919
  SUBAREA AREA(ACRES) =    2.40      SUBAREA RUNOFF(CFS) =    3.68
  EFFECTIVE AREA(ACRES) =    433.81   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      510.2       PEAK FLOW RATE(CFS) =     742.58
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      510.2  TC(MIN.) =     14.11
  EFFECTIVE AREA(ACRES) =    433.81  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.432
  PEAK FLOW RATE(CFS)   =     742.58
```

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	742.58	14.11	1.980	0.30(0.13)	0.43	433.8	120.00
2	739.67	14.27	1.959	0.30(0.13)	0.43	436.5	110.00
3	635.72	21.58	1.529	0.30(0.13)	0.43	503.8	100.00
4	587.61	24.64	1.406	0.30(0.13)	0.43	510.2	150.00

END OF RATIONAL METHOD ANALYSIS

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:

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                         Santa Ana, CA 92707


 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA A                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 25-YR EV AUGUST 2018 CCHIU                                           *
 ***********************************************************************

  FILE NAME: 3A25EVRL.DAT
  TIME/DATE OF STUDY: 09:27 08/17/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  4.828
   2)   10.00;  3.154
   3)   15.00;  2.415
   4)   20.00;  2.000
   5)   25.00;  1.745
   6)   30.00;  1.533
   7)   40.00;  1.333
   8)   50.00;  1.180
   9)   60.00;  1.055
  10)   90.00;  0.886
  11)  120.00;  0.775
  12)  180.00;  0.646
  13)  360.00;  0.475
  14) 1200.00;  0.208
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   327.00
  ELEVATION DATA: UPSTREAM(FEET) =    725.00  DOWNSTREAM(FEET) =    642.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.413
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.351
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.10      0.30     1.000    66    9.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.02
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      3.02

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    642.00  DOWNSTREAM(FEET) =    605.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   385.00   CHANNEL SLOPE =  0.0961
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.070
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.90      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.60      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.983
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.27
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.55
  AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   1.16
  Tc(MIN.) =   10.57
  SUBAREA AREA(ACRES) =     4.20       SUBAREA RUNOFF(CFS) =   10.49
  EFFECTIVE AREA(ACRES) =      5.30     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.99
```

```
  TOTAL AREA(ACRES) =        5.3         PEAK FLOW RATE(CFS) =      13.23

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =   6.22
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     712.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  605.00  DOWNSTREAM ELEVATION(FEET) =  584.00
  STREET LENGTH(FEET) =   264.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      15.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   10.82
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.28
  STREET FLOW TRAVEL TIME(MIN.) =   0.69   Tc(MIN.) =   11.26
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.968
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  COMMERCIAL                 B        1.00      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.519
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    5.32
  EFFECTIVE AREA(ACRES) =      7.40    AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        7.4         PEAK FLOW RATE(CFS) =      18.06

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.45
  FLOW VELOCITY(FEET/SEC.) =  6.62   DEPTH*VELOCITY(FT*FT/SEC.) =   2.43
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     976.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  584.00  DOWNSTREAM ELEVATION(FEET) =  564.00
```



```
  STREET LENGTH(FEET) =   494.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      29.86
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.45
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.61
  STREET FLOW TRAVEL TIME(MIN.) =   1.44   Tc(MIN.) =   12.69
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.756
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  COMMERCIAL                 B        6.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.80      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.271
  SUBAREA AREA(ACRES) =    9.80      SUBAREA RUNOFF(CFS) =   23.59
  EFFECTIVE AREA(ACRES) =     17.20    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       17.2        PEAK FLOW RATE(CFS) =      40.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.55
  FLOW VELOCITY(FEET/SEC.) =  6.16   DEPTH*VELOCITY(FT*FT/SEC.) =   3.04
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   564.00  DOWNSTREAM(FEET) =   520.00
  FLOW LENGTH(FEET) =  1456.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.23
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.24
  PIPE TRAVEL TIME(MIN.) =   1.71    Tc(MIN.) =   14.40
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    2926.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
```

```
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.40
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.504
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  COMMERCIAL                 B        3.90      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.255
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   12.23
  EFFECTIVE AREA(ACRES) =     22.80   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       22.8       PEAK FLOW RATE(CFS) =      48.57

******************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.40
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.504
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  COMMERCIAL                 B        5.00      0.30     0.100    56
  PUBLIC PARK                B        2.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.80      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    9.20      SUBAREA RUNOFF(CFS) =   19.74
  EFFECTIVE AREA(ACRES) =     32.00   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       32.0       PEAK FLOW RATE(CFS) =      68.30

******************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.40
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.504
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.80      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```



```
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    4.01
  EFFECTIVE AREA(ACRES) =     33.80   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       33.8       PEAK FLOW RATE(CFS) =      72.31

******************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   520.00  DOWNSTREAM(FEET) =   503.00
  FLOW LENGTH(FEET) =   804.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.00
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      72.31
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =   15.36
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    3730.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.36
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.385
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.80      0.30     0.100    56
  COMMERCIAL                 B        7.60      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  COMMERCIAL                 B       10.50      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.125
  SUBAREA AREA(ACRES) =   21.60      SUBAREA RUNOFF(CFS) =   45.64
  EFFECTIVE AREA(ACRES) =     55.40   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       55.4       PEAK FLOW RATE(CFS) =     114.36

******************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.36
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.385
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        6.80      0.30     0.100    56
  COMMERCIAL                 B       12.10      0.30     0.100    56
  PUBLIC PARK                B        1.00      0.30     0.850    56
  COMMERCIAL                 B        4.50      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.131
SUBAREA AREA(ACRES) = 24.40 SUBAREA RUNOFF(CFS) = 51.52
EFFECTIVE AREA(ACRES) = 79.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 79.8 PEAK FLOW RATE(CFS) = 165.88

****
FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 485.00
FLOW LENGTH(FEET) = 808.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.66
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 165.88
PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 16.12
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 107.00 = 4538.00 FEET.

****
FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 16.12
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.322
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.40	0.30	0.100	56
COMMERCIAL	B	6.70	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
COMMERCIAL	B	2.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.106
SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 26.18
EFFECTIVE AREA(ACRES) = 92.50 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 187.51

****
FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 16.12
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.322
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	7.20	0.30	0.100	56
PUBLIC PARK	B	0.70	0.30	0.850	56
COMMERCIAL	B	7.60	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56
COMMERCIAL	B	4.70	0.30	0.100	56
PUBLIC PARK	B	0.40	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.150
SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 42.83
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 230.35

****
FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 933.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 53.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.19
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 230.35
PIPE TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 17.51
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

****
FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 17.51
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.207
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.50	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
COMMERCIAL	B	2.80	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
COMMERCIAL	B	0.60	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 15.96
EFFECTIVE AREA(ACRES) = 121.70 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 121.7 PEAK FLOW RATE(CFS) = 234.53

****
FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 17.51
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.207
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.40	0.30	0.200	56
APARTMENTS	B	5.50	0.30	0.200	56

```
  APARTMENTS                  B        3.20      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   17.58
  EFFECTIVE AREA(ACRES) =    130.80   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =      130.8       PEAK FLOW RATE(CFS) =     252.12

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =   17.51
  RAINFALL INTENSITY(INCH/HR) =   2.21
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.22
  EFFECTIVE STREAM AREA(ACRES) =     130.80
  TOTAL STREAM AREA(ACRES) =     130.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     252.12

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    645.00  DOWNSTREAM(FEET) =    625.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.417
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.688
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56    8.68
  COMMERCIAL                 B        0.30      0.30     0.100    56    5.42
  PUBLIC PARK                B        1.30      0.30     0.850    56    8.61
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.00      0.30     0.900    56    8.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.798
  SUBAREA RUNOFF(CFS) =     12.01
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =     12.01

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  625.00  DOWNSTREAM ELEVATION(FEET) =  595.00
  STREET LENGTH(FEET) =   517.00   CURB HEIGHT(INCHES) =  8.0
```



```
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      19.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.31
  STREET FLOW TRAVEL TIME(MIN.) =   1.44   Tc(MIN.) =    6.86
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.205
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  COMMERCIAL                 B        1.00      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.223
  SUBAREA AREA(ACRES) =    3.90      SUBAREA RUNOFF(CFS) =   14.52
  EFFECTIVE AREA(ACRES) =      6.90    AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        6.9        PEAK FLOW RATE(CFS) =      25.23

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.18
  FLOW VELOCITY(FEET/SEC.) =  6.34   DEPTH*VELOCITY(FT*FT/SEC.) =   2.64
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     847.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  595.00  DOWNSTREAM ELEVATION(FEET) =  585.00
  STREET LENGTH(FEET) =   389.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      39.33
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.52
  HALFSTREET FLOOD WIDTH(FEET) =   20.12
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.16
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.70
 STREET FLOW TRAVEL TIME(MIN.) =   1.26   Tc(MIN.) =    8.12
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.785
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        5.00      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
 COMMERCIAL                 B        1.00      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.335
 SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =   28.18
 EFFECTIVE AREA(ACRES) =     15.40    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
 TOTAL AREA(ACRES) =       15.4        PEAK FLOW RATE(CFS) =      50.80

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.56   HALFSTREET FLOOD WIDTH(FEET) =  22.30
 FLOW VELOCITY(FEET/SEC.) =  5.48   DEPTH*VELOCITY(FT*FT/SEC.) =   3.07
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    113.00 =    1236.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 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) =   565.00
 FLOW LENGTH(FEET) =   702.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.77
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      50.80
 PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =    8.91
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    114.00 =    1938.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.91
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.519
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.60      0.30     0.100    56
 PUBLIC PARK                B        0.20      0.30     0.850    56
 RESIDENTIAL
```



```
 ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
 SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    8.83
 EFFECTIVE AREA(ACRES) =     18.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =       18.3       PEAK FLOW RATE(CFS) =      55.96

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.91
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.519
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        9.00      0.30     0.100    56
 PUBLIC PARK                B        1.90      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.70      0.30     0.900    56
 COMMERCIAL                 B        4.10      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.313
 SUBAREA AREA(ACRES) =   18.00      SUBAREA RUNOFF(CFS) =   55.50
 EFFECTIVE AREA(ACRES) =     36.30   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       36.3       PEAK FLOW RATE(CFS) =     111.45

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.91
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.519
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        4.50      0.30     0.100    56
 PUBLIC PARK                B        1.20      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        3.80      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.515
 SUBAREA AREA(ACRES) =    9.50      SUBAREA RUNOFF(CFS) =   28.77
 EFFECTIVE AREA(ACRES) =     45.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
 TOTAL AREA(ACRES) =       45.8       PEAK FLOW RATE(CFS) =     140.22

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 MAINLINE Tc(MIN.) =    8.91
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.519
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        5.30      0.30     1.000    66
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.30      0.30     1.000    65
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   16.23
 EFFECTIVE AREA(ACRES) =     51.40   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
 TOTAL AREA(ACRES) =       51.4       PEAK FLOW RATE(CFS) =     156.45

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 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) =   535.00
 FLOW LENGTH(FEET) =  1017.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.40
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     156.45
 PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =    9.78
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    115.00 =    2955.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.78
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.227
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        3.40      0.30     0.100    56
 COMMERCIAL                 B       11.00      0.30     0.100    56
 PUBLIC PARK                B        1.80      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
 COMMERCIAL                 B        3.20      0.30     0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.222
 SUBAREA AREA(ACRES) =   20.90      SUBAREA RUNOFF(CFS) =   59.44
 EFFECTIVE AREA(ACRES) =     72.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
 TOTAL AREA(ACRES) =       72.3       PEAK FLOW RATE(CFS) =     202.36

****************************************************************************
 FLOW PROCESS FROM NODE    115.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```



```
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   535.00  DOWNSTREAM(FEET) =   480.00
 FLOW LENGTH(FEET) =  1110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  25.13
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     202.36
 PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   10.52
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =    4065.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.52
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.077
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        3.10      0.30     0.100    56
 PUBLIC PARK                B        1.40      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
 COMMERCIAL                 B        5.10      0.30     0.100    56
 PUBLIC PARK                B        1.90      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        3.60      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.485
 SUBAREA AREA(ACRES) =   16.20      SUBAREA RUNOFF(CFS) =   42.75
 EFFECTIVE AREA(ACRES) =     88.50   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =       88.5       PEAK FLOW RATE(CFS) =     235.38

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.52
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.077
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        2.70      0.30     0.100    56
 PUBLIC PARK                B        0.10      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.244
 SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    8.92
 EFFECTIVE AREA(ACRES) =     91.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
 TOTAL AREA(ACRES) =       91.8       PEAK FLOW RATE(CFS) =     244.30

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

```
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =   10.52
 RAINFALL INTENSITY(INCH/HR) =   3.08
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.40
 EFFECTIVE STREAM AREA(ACRES) =      91.80
 TOTAL STREAM AREA(ACRES) =      91.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     244.30

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      252.12   17.51    2.207  0.30( 0.07) 0.22     130.8     100.00
     2      244.30   10.52    3.077  0.30( 0.12) 0.40      91.8     110.00

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      457.34   10.52    3.077  0.30( 0.09) 0.32     170.4     110.00
     2      424.49   17.51    2.207  0.30( 0.09) 0.29     222.6     100.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     457.34    Tc(MIN.) =    10.52
 EFFECTIVE AREA(ACRES) =     170.38   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.32
 TOTAL AREA(ACRES) =      222.6
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    5471.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    128.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   473.00
 FLOW LENGTH(FEET) =   900.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  81.0 INCH PIPE IS  62.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.42
 ESTIMATED PIPE DIAMETER(INCH) =  81.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     457.34
 PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =   11.49
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    128.00 =    6371.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
 MAINLINE Tc(MIN.) =   11.49
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.934
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.10      0.30      0.100    56
 COMMERCIAL                 B        3.60      0.30      0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =     4.70      SUBAREA RUNOFF(CFS) =   12.28
 EFFECTIVE AREA(ACRES) =    175.08   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
 TOTAL AREA(ACRES) =      227.3       PEAK FLOW RATE(CFS) =     457.34
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 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.) =   11.49
 RAINFALL INTENSITY(INCH/HR) =   2.93
 AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.31
 EFFECTIVE STREAM AREA(ACRES) =     175.08
 TOTAL STREAM AREA(ACRES) =     227.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     457.34

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
 ELEVATION DATA: UPSTREAM(FEET) =    640.00  DOWNSTREAM(FEET) =    634.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.880
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.199
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        0.50      0.30      0.100    56    6.88
 PUBLIC PARK                B        0.20      0.30      0.850    56   10.93
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        2.70      0.30      0.200    56    7.33
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.40      0.30      0.900    56   11.02
 PUBLIC PARK                B        0.10      0.30      0.850    56   10.93
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        1.30      0.30      0.200    56    7.33
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.381
 SUBAREA RUNOFF(CFS) =     22.79
```

```
  TOTAL AREA(ACRES) =      6.20   PEAK FLOW RATE(CFS) =     22.79

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    121.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.88
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.199
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.71
  EFFECTIVE AREA(ACRES) =      6.40   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        6.4       PEAK FLOW RATE(CFS) =      23.50

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   634.00  DOWNSTREAM(FEET) =   626.00
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.41
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.50
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =    7.56
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     754.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.56
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.971
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.40      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.423
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   31.48
  EFFECTIVE AREA(ACRES) =     15.50   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
```



```
  TOTAL AREA(ACRES) =       15.5       PEAK FLOW RATE(CFS) =      53.67

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   626.00  DOWNSTREAM(FEET) =   606.00
  FLOW LENGTH(FEET) =  1030.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.59
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.67
  PIPE TRAVEL TIME(MIN.) =   1.36    Tc(MIN.) =    8.92
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =    1784.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.92
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.515
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        7.60      0.30     0.200    56
  COMMERCIAL                 B        1.40      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        6.50      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        8.40      0.30     0.600    56
  APARTMENTS                 B        0.50      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.491
  SUBAREA AREA(ACRES) =   26.70      SUBAREA RUNOFF(CFS) =   80.91
  EFFECTIVE AREA(ACRES) =     42.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       42.2       PEAK FLOW RATE(CFS) =     128.21

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.92
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.515
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.30      0.30     0.100    56
  PUBLIC PARK                B        1.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.00      0.30     0.200    56
  RESIDENTIAL
```

```
  ".4 DWELLING/ACRE"         B        3.80      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.80      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.642
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =   32.89
  EFFECTIVE AREA(ACRES) =     53.20   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       53.2       PEAK FLOW RATE(CFS) =     161.10

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   606.00  DOWNSTREAM(FEET) =   604.00
  FLOW LENGTH(FEET) =   222.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.62
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     161.10
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    9.22
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =    2006.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.22
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.416
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        1.60      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  APARTMENTS                 B        0.30      0.30     0.200    56
  COMMERCIAL                 B        2.10      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.231
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =   14.76
  EFFECTIVE AREA(ACRES) =     58.10   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       58.1       PEAK FLOW RATE(CFS) =     171.16

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.22
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.416
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.60
  EFFECTIVE AREA(ACRES) =     58.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       58.3       PEAK FLOW RATE(CFS) =     171.76

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   604.00  DOWNSTREAM(FEET) =   546.00
  FLOW LENGTH(FEET) =  1271.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.75
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     171.76
  PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =   10.11
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    125.00 =    3277.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.11
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.138
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.50      0.30     0.200    56
  COMMERCIAL                 B        1.20      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        1.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.00      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.550
  SUBAREA AREA(ACRES) =    7.60      SUBAREA RUNOFF(CFS) =   20.34
  EFFECTIVE AREA(ACRES) =     65.90   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       65.9       PEAK FLOW RATE(CFS) =     177.50

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.11
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.138
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        1.90      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.60      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        0.30      0.30     0.600    56
  APARTMENTS                B        5.00      0.30     0.200    56
  PUBLIC PARK               B        2.30      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        3.50      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.530
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   36.46
  EFFECTIVE AREA(ACRES) =     79.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       79.5       PEAK FLOW RATE(CFS) =     213.96

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.11
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.138
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B       10.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =   27.15
  EFFECTIVE AREA(ACRES) =     89.70   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       89.7       PEAK FLOW RATE(CFS) =     241.11

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   546.00  DOWNSTREAM(FEET) =   525.00
  FLOW LENGTH(FEET) =   562.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  36.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.77
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     241.11
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   10.50
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    126.00 =    3839.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.50
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.080
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        5.90      0.30     0.200    56
  COMMERCIAL                B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.60      0.30     0.900    56
  APARTMENTS                B        6.00      0.30     0.200    56
  COMMERCIAL                B        1.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        4.70      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.395
  SUBAREA AREA(ACRES) =   18.40      SUBAREA RUNOFF(CFS) =   49.04
  EFFECTIVE AREA(ACRES) =    108.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      108.1       PEAK FLOW RATE(CFS) =     285.45

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    127.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   525.00  DOWNSTREAM(FEET) =   514.00
  FLOW LENGTH(FEET) =   607.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  45.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.66
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     285.45
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   11.04
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    127.00 =    4446.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.04
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.000
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        1.50      0.30     0.100    56
  PUBLIC PARK               B        0.20      0.30     0.850    56
  APARTMENTS                B        1.10      0.30     0.200    56
  COMMERCIAL                B       12.70      0.30     0.100    56
  PUBLIC PARK               B        0.80      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        4.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.303
  SUBAREA AREA(ACRES) =   20.40      SUBAREA RUNOFF(CFS) =   53.40
  EFFECTIVE AREA(ACRES) =    128.50   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      128.5       PEAK FLOW RATE(CFS) =     331.06

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

```
 FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.04
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.000
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.20      0.30     0.100    56
 PUBLIC PARK                B        1.50      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.530
 SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    7.16
 EFFECTIVE AREA(ACRES) =    131.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
 TOTAL AREA(ACRES) =      131.3       PEAK FLOW RATE(CFS) =     338.22

****************************************************************************
 FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.04
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.000
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.00      0.30     0.100    56
 COMMERCIAL                 B        1.30      0.30     0.100    56
 COMMERCIAL                 B       12.60      0.30     0.100    56
 PUBLIC PARK                B        1.10      0.30     0.850    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.238
 SUBAREA AREA(ACRES) =   18.20      SUBAREA RUNOFF(CFS) =   47.96
 EFFECTIVE AREA(ACRES) =    149.50   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =      149.5       PEAK FLOW RATE(CFS) =     386.18

****************************************************************************
 FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.00  DOWNSTREAM(FEET) =   473.00
 FLOW LENGTH(FEET) =   741.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  54.0 INCH PIPE IS  39.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  31.13
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     386.18
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   11.44
```



```
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    128.00 =    5187.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.44
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.941
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        2.20      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.223
 SUBAREA AREA(ACRES) =    2.60      SUBAREA RUNOFF(CFS) =    6.73
 EFFECTIVE AREA(ACRES) =    152.10   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =      152.1       PEAK FLOW RATE(CFS) =     386.18
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 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.) =   11.44
 RAINFALL INTENSITY(INCH/HR) =   2.94
 AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.43
 EFFECTIVE STREAM AREA(ACRES) =     152.10
 TOTAL STREAM AREA(ACRES) =     152.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     386.18

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      457.34   11.49    2.934  0.30( 0.09) 0.31     175.1     110.00
     1      424.49   18.50    2.124  0.30( 0.09) 0.29     227.3     100.00
     2      386.18   11.44    2.941  0.30( 0.13) 0.43     152.1     120.00

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      842.71   11.44    2.941  0.30( 0.11) 0.37     326.4     120.00
     2      842.50   11.49    2.934  0.30( 0.11) 0.37     327.2     110.00
     3      698.52   18.50    2.124  0.30( 0.10) 0.34     379.4     100.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =     842.71    Tc(MIN.) =    11.44
  EFFECTIVE AREA(ACRES) =     326.42   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      379.4
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    128.00 =    6371.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    129.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   473.00  DOWNSTREAM(FEET) =   455.00
  FLOW LENGTH(FEET) =  1494.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  93.0 INCH PIPE IS  73.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.07
  ESTIMATED PIPE DIAMETER(INCH) =  93.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     842.71
  PIPE TRAVEL TIME(MIN.) =   1.18    Tc(MIN.) =   12.62
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    129.00 =    7865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.62
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.766
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  COMMERCIAL                 B        1.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.40      0.30     0.900    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.60      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.524
  SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =   15.97
  EFFECTIVE AREA(ACRES) =    333.22   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      386.2       PEAK FLOW RATE(CFS) =     842.71
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.62
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.766
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  COMMERCIAL                 B        2.50      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.50      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.20      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.344
  SUBAREA AREA(ACRES) =    4.70      SUBAREA RUNOFF(CFS) =   11.27
  EFFECTIVE AREA(ACRES) =    337.92   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      390.9       PEAK FLOW RATE(CFS) =     842.71
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.62
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.766
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.90      0.30     0.400    56
  COMMERCIAL                 B        4.70      0.30     0.100    56
  PUBLIC PARK                B        1.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.90      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.80      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.386
  SUBAREA AREA(ACRES) =   13.70      SUBAREA RUNOFF(CFS) =   32.68
  EFFECTIVE AREA(ACRES) =    351.62   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      404.6       PEAK FLOW RATE(CFS) =     842.71
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.62
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.766
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.40      0.30     0.500    56
```

```
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
  COMMERCIAL                 B        5.00      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       10.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
  SUBAREA AREA(ACRES) =   20.60      SUBAREA RUNOFF(CFS) =   49.88
  EFFECTIVE AREA(ACRES) =    372.22   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =      425.2       PEAK FLOW RATE(CFS) =     890.28

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.62
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.766
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.30      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.90      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.487
  SUBAREA AREA(ACRES) =    7.50      SUBAREA RUNOFF(CFS) =   17.69
  EFFECTIVE AREA(ACRES) =    379.72   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =      432.7       PEAK FLOW RATE(CFS) =     907.97

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =  1786.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  84.0 INCH PIPE IS  65.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.43
  ESTIMATED PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     907.97
  PIPE TRAVEL TIME(MIN.) =   1.05    Tc(MIN.) =   13.67
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    9651.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   13.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.612
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.00      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.598
  SUBAREA AREA(ACRES) =    7.00      SUBAREA RUNOFF(CFS) =   15.32
  EFFECTIVE AREA(ACRES) =    386.72   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      439.7       PEAK FLOW RATE(CFS) =     907.97
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.612
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.50      0.30     0.600    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.599
  SUBAREA AREA(ACRES) =    7.90      SUBAREA RUNOFF(CFS) =   17.29
  EFFECTIVE AREA(ACRES) =    394.62   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      447.6       PEAK FLOW RATE(CFS) =     907.97
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    765.00  DOWNSTREAM(FEET) =    675.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.312
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.384
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.50      0.30     1.000    66    9.31
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.40      0.30     1.000    65    9.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      5.27
  TOTAL AREA(ACRES) =      1.90   PEAK FLOW RATE(CFS) =      5.27

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    152.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    635.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   421.00   CHANNEL SLOPE =  0.0950
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.092
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        4.90      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        2.40      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.33
  AVERAGE FLOW DEPTH(FEET) =   0.87   TRAVEL TIME(MIN.) =   1.11
  Tc(MIN.) =   10.42
  SUBAREA AREA(ACRES) =     7.30       SUBAREA RUNOFF(CFS) =   18.34
  EFFECTIVE AREA(ACRES) =      9.20     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        9.2         PEAK FLOW RATE(CFS) =      23.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.04   FLOW VELOCITY(FEET/SEC.) =   7.12
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    152.00 =     751.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    153.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```



```
  ELEVATION DATA: UPSTREAM(FEET) =   635.00  DOWNSTREAM(FEET) =   631.00
  FLOW LENGTH(FEET) =   501.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.45
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.12
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =   11.54
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    153.00 =    1252.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    153.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.54
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.926
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.10      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        4.00      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =     9.10      SUBAREA RUNOFF(CFS) =   21.51
  EFFECTIVE AREA(ACRES) =     18.30   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       18.3       PEAK FLOW RATE(CFS) =      43.25

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   631.00  DOWNSTREAM(FEET) =   630.00
  FLOW LENGTH(FEET) =   711.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  33.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.56
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.25
  PIPE TRAVEL TIME(MIN.) =   2.60    Tc(MIN.) =   14.14
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    154.00 =    1963.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.14
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.542
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.30      0.30     1.000    63
  NATURAL FAIR COVER
```

```
  "CHAPARRAL,NARROWLEAF"     B        5.70      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.40      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        2.10      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.60      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   13.20      SUBAREA RUNOFF(CFS) =   26.64
  EFFECTIVE AREA(ACRES) =     31.50   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       31.5       PEAK FLOW RATE(CFS) =      63.57

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.14
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.542
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.20      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.40
  EFFECTIVE AREA(ACRES) =     31.70   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       31.7       PEAK FLOW RATE(CFS) =      63.97

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   630.00  DOWNSTREAM(FEET) =   628.00
  FLOW LENGTH(FEET) =   910.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  36.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      63.97
  PIPE TRAVEL TIME(MIN.) =   2.55    Tc(MIN.) =   16.69
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    155.00 =    2873.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.69
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.275
  SUBAREA LOSS RATE DATA(AMC  II):
```



```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.60      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.60      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.80      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.50      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    6.50      SUBAREA RUNOFF(CFS) =   11.55
  EFFECTIVE AREA(ACRES) =     38.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       38.2       PEAK FLOW RATE(CFS) =      67.89

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   629.00  DOWNSTREAM(FEET) =   610.00
  FLOW LENGTH(FEET) =   796.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.72
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      67.89
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =   17.59
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    156.00 =    3669.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.59
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.200
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.90      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.40      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.30      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.50      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        1.30      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.70      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   13.10      SUBAREA RUNOFF(CFS) =   22.40
  EFFECTIVE AREA(ACRES) =     51.30   AREA-AVERAGED Fm(INCH/HR) =  0.30
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       51.3       PEAK FLOW RATE(CFS) =      87.71

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   610.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =  6198.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.29
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      87.71
  PIPE TRAVEL TIME(MIN.) =   5.97    Tc(MIN.) =   23.57
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       87.71   23.57    1.818  0.30( 0.30) 1.00      51.3     150.00
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      907.97   13.67    2.612  0.30( 0.11) 0.37     394.6     120.00
      2      907.27   13.72    2.604  0.30( 0.11) 0.37     395.4     110.00
      3      746.72   20.84    1.957  0.30( 0.11) 0.36     447.6     100.00
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    9651.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      985.44   13.67    2.612  0.30( 0.13) 0.42     424.4     120.00
      2      984.77   13.72    2.604  0.30( 0.13) 0.42     425.2     110.00
      3      831.39   20.84    1.957  0.30( 0.12) 0.41     493.0     100.00
      4      778.32   23.57    1.818  0.30( 0.13) 0.42     498.9     150.00
    TOTAL AREA(ACRES) =       498.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      985.44  Tc(MIN.) =   13.670
  EFFECTIVE AREA(ACRES) =    424.37  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      498.9
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   13.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.612
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "FALLOW"                   B        1.60      0.30     1.000    86
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.30      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.60      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        1.90      0.30     1.000    65
  AGRICULTURAL POOR COVER
  "FALLOW"                   B        0.70      0.30     1.000    86
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.80      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.971
  SUBAREA AREA(ACRES) =    8.90      SUBAREA RUNOFF(CFS) =   18.59
  EFFECTIVE AREA(ACRES) =    433.27   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      507.8       PEAK FLOW RATE(CFS) =     985.44
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.612
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.40      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.919
  SUBAREA AREA(ACRES) =    2.40      SUBAREA RUNOFF(CFS) =    5.05
  EFFECTIVE AREA(ACRES) =    435.67   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      510.2       PEAK FLOW RATE(CFS) =     985.44
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      510.2  TC(MIN.) =     13.67
  EFFECTIVE AREA(ACRES) =    435.67  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.432
  PEAK FLOW RATE(CFS)   =     985.44
```

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	985.44	13.67	2.612	0.30(0.13)	0.43	435.7	120.00
2	984.77	13.72	2.604	0.30(0.13)	0.43	436.5	110.00
3	831.39	20.84	1.957	0.30(0.13)	0.43	504.3	100.00
4	778.32	23.57	1.818	0.30(0.13)	0.43	510.2	150.00

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:

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                         Santa Ana, CA 92707


 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA A                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 50-YR EV AUGUST 2018 CCHIU                                           *
 **********************************************************************

  FILE NAME: 3A50EVRL.DAT
  TIME/DATE OF STUDY: 09:23 08/17/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  5.328
   2)   10.00;  3.431
   3)   15.00;  2.636
   4)   20.00;  2.205
   5)   25.00;  1.909
   6)   30.00;  1.717
   7)   40.00;  1.454
   8)   50.00;  1.293
   9)   60.00;  1.185
  10)   90.00;  0.982
  11)  120.00;  0.852
  12)  180.00;  0.728
  13)  360.00;  0.537
  14) 1200.00;  0.235
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   327.00
  ELEVATION DATA: UPSTREAM(FEET) =    725.00  DOWNSTREAM(FEET) =    642.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.413
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.654
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.10      0.30     1.000    66    9.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.32
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      3.32

**************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    642.00  DOWNSTREAM(FEET) =    605.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   385.00   CHANNEL SLOPE =  0.0961
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.345
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.90      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.60      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.983
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.09
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.69
  AVERAGE FLOW DEPTH(FEET) =   0.73   TRAVEL TIME(MIN.) =   1.13
  Tc(MIN.) =   10.54
  SUBAREA AREA(ACRES) =     4.20       SUBAREA RUNOFF(CFS) =   11.53
  EFFECTIVE AREA(ACRES) =      5.30     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.99
```

```
  TOTAL AREA(ACRES) =        5.3         PEAK FLOW RATE(CFS) =      14.54

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.87   FLOW VELOCITY(FEET/SEC.) =   6.37
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     712.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  605.00  DOWNSTREAM ELEVATION(FEET) =  584.00
  STREET LENGTH(FEET) =   264.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      17.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.39
  STREET FLOW TRAVEL TIME(MIN.) =   0.67   Tc(MIN.) =   11.21
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.238
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  COMMERCIAL                 B        1.00      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.519
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    5.83
  EFFECTIVE AREA(ACRES) =      7.40    AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        7.4         PEAK FLOW RATE(CFS) =      19.86

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  11.99
  FLOW VELOCITY(FEET/SEC.) =  6.72   DEPTH*VELOCITY(FT*FT/SEC.) =   2.53
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     976.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  584.00  DOWNSTREAM ELEVATION(FEET) =  564.00
```



```
  STREET LENGTH(FEET) =   494.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      32.80
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   17.07
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.87
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.74
  STREET FLOW TRAVEL TIME(MIN.) =   1.40   Tc(MIN.) =   12.61
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.015
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  COMMERCIAL                 B        6.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.80      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.271
  SUBAREA AREA(ACRES) =    9.80      SUBAREA RUNOFF(CFS) =   25.88
  EFFECTIVE AREA(ACRES) =     17.20    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       17.2        PEAK FLOW RATE(CFS) =      44.25

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.26
  FLOW VELOCITY(FEET/SEC.) =  6.31   DEPTH*VELOCITY(FT*FT/SEC.) =   3.20
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   564.00  DOWNSTREAM(FEET) =   520.00
  FLOW LENGTH(FEET) =  1456.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.46
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.25
  PIPE TRAVEL TIME(MIN.) =   1.68    Tc(MIN.) =   14.29
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    2926.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
```

```
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.29
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.748
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  COMMERCIAL                 B        3.90      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.255
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   13.47
  EFFECTIVE AREA(ACRES) =     22.80   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       22.8       PEAK FLOW RATE(CFS) =      53.59

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.29
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.748
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  COMMERCIAL                 B        5.00      0.30     0.100    56
  PUBLIC PARK                B        2.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.80      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    9.20      SUBAREA RUNOFF(CFS) =   21.76
  EFFECTIVE AREA(ACRES) =     32.00   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       32.0       PEAK FLOW RATE(CFS) =      75.35

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.29
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.748
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.80      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```



```
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    4.40
  EFFECTIVE AREA(ACRES) =     33.80   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       33.8       PEAK FLOW RATE(CFS) =      79.75

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   520.00  DOWNSTREAM(FEET) =   503.00
  FLOW LENGTH(FEET) =   804.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.66
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      79.75
  PIPE TRAVEL TIME(MIN.) =   0.91    Tc(MIN.) =   15.21
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    3730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.21
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.618
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.80      0.30     0.100    56
  COMMERCIAL                 B        7.60      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  COMMERCIAL                 B       10.50      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.125
  SUBAREA AREA(ACRES) =   21.60      SUBAREA RUNOFF(CFS) =   50.17
  EFFECTIVE AREA(ACRES) =     55.40   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       55.4       PEAK FLOW RATE(CFS) =     125.96

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.21
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.618
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        6.80      0.30     0.100    56
  COMMERCIAL                 B       12.10      0.30     0.100    56
  PUBLIC PARK                B        1.00      0.30     0.850    56
  COMMERCIAL                 B        4.50      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.131
SUBAREA AREA(ACRES) = 24.40 SUBAREA RUNOFF(CFS) = 56.63
EFFECTIVE AREA(ACRES) = 79.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 79.8 PEAK FLOW RATE(CFS) = 182.59

****
FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 485.00
FLOW LENGTH(FEET) = 808.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 35.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.31
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 182.59
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 15.94
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 107.00 = 4538.00 FEET.

****
FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 15.94
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.555
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.40	0.30	0.100	56
COMMERCIAL	B	6.70	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
COMMERCIAL	B	2.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.106
SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 28.84
EFFECTIVE AREA(ACRES) = 92.50 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 206.87

****
FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 15.94
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.555
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	7.20	0.30	0.100	56
PUBLIC PARK	B	0.70	0.30	0.850	56
COMMERCIAL	B	7.60	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56
COMMERCIAL	B	4.70	0.30	0.100	56
PUBLIC PARK	B	0.40	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.150
SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 47.21
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 254.08

****
FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 933.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.52
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 254.08
PIPE TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 17.29
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

****
FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 17.29
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.50	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
COMMERCIAL	B	2.80	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
COMMERCIAL	B	0.60	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 17.69
EFFECTIVE AREA(ACRES) = 121.70 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 121.7 PEAK FLOW RATE(CFS) = 259.89

****
FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 17.29
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.40	0.30	0.200	56
APARTMENTS	B	5.50	0.30	0.200	56

```
  APARTMENTS                  B        3.20      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   19.48
  EFFECTIVE AREA(ACRES) =    130.80   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =      130.8       PEAK FLOW RATE(CFS) =     279.37

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =   17.29
  RAINFALL INTENSITY(INCH/HR) =   2.44
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.22
  EFFECTIVE STREAM AREA(ACRES) =     130.80
  TOTAL STREAM AREA(ACRES) =     130.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     279.37

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    645.00  DOWNSTREAM(FEET) =    625.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.417
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  5.170
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.40      0.30     0.900    56    8.68
  COMMERCIAL                  B        0.30      0.30     0.100    56    5.42
  PUBLIC PARK                 B        1.30      0.30     0.850    56    8.61
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        1.00      0.30     0.900    56    8.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.798
  SUBAREA RUNOFF(CFS) =     13.31
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =     13.31

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  625.00  DOWNSTREAM ELEVATION(FEET) =  595.00
  STREET LENGTH(FEET) =   517.00   CURB HEIGHT(INCHES) =  8.0
```



```
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      21.33
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.24
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.42
  STREET FLOW TRAVEL TIME(MIN.) =   1.42   Tc(MIN.) =    6.84
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.630
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        2.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.30      0.30     0.900    56
  COMMERCIAL                  B        1.00      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.223
  SUBAREA AREA(ACRES) =    3.90      SUBAREA RUNOFF(CFS) =   16.02
  EFFECTIVE AREA(ACRES) =      6.90    AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        6.9        PEAK FLOW RATE(CFS) =      27.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.80
  FLOW VELOCITY(FEET/SEC.) =  6.48   DEPTH*VELOCITY(FT*FT/SEC.) =   2.77
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     847.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  595.00  DOWNSTREAM ELEVATION(FEET) =  585.00
  STREET LENGTH(FEET) =   389.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      43.43
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.54
  HALFSTREET FLOOD WIDTH(FEET) =   20.98
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.27
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.83
 STREET FLOW TRAVEL TIME(MIN.) =   1.23   Tc(MIN.) =    8.07
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.163
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        5.00      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
 COMMERCIAL                 B        1.00      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.335
 SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =   31.08
 EFFECTIVE AREA(ACRES) =     15.40    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
 TOTAL AREA(ACRES) =       15.4        PEAK FLOW RATE(CFS) =      56.05

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.58   HALFSTREET FLOOD WIDTH(FEET) =  23.16
 FLOW VELOCITY(FEET/SEC.) =  5.62   DEPTH*VELOCITY(FT*FT/SEC.) =   3.24
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    113.00 =    1236.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 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) =   565.00
 FLOW LENGTH(FEET) =   702.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.03
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      56.05
 PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =    8.85
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    114.00 =    1938.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.85
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.868
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.60      0.30     0.100    56
 PUBLIC PARK                B        0.20      0.30     0.850    56
 RESIDENTIAL
```



```
 ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
 SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    9.74
 EFFECTIVE AREA(ACRES) =     18.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =       18.3       PEAK FLOW RATE(CFS) =      61.70

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.85
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.868
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        9.00      0.30     0.100    56
 PUBLIC PARK                B        1.90      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.70      0.30     0.900    56
 COMMERCIAL                 B        4.10      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.313
 SUBAREA AREA(ACRES) =   18.00      SUBAREA RUNOFF(CFS) =   61.14
 EFFECTIVE AREA(ACRES) =     36.30   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       36.3       PEAK FLOW RATE(CFS) =     122.84

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.85
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.868
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        4.50      0.30     0.100    56
 PUBLIC PARK                B        1.20      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        3.80      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.515
 SUBAREA AREA(ACRES) =    9.50      SUBAREA RUNOFF(CFS) =   31.75
 EFFECTIVE AREA(ACRES) =     45.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
 TOTAL AREA(ACRES) =       45.8       PEAK FLOW RATE(CFS) =     154.58

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =    8.85
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.868
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.30      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.30      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   17.98
  EFFECTIVE AREA(ACRES) =     51.40   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       51.4       PEAK FLOW RATE(CFS) =     172.57

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 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) =   535.00
  FLOW LENGTH(FEET) =  1017.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.12
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     172.57
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =    9.69
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    115.00 =    2955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.69
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.548
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.40      0.30     0.100    56
  COMMERCIAL                 B       11.00      0.30     0.100    56
  PUBLIC PARK                B        1.80      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
  COMMERCIAL                 B        3.20      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.222
  SUBAREA AREA(ACRES) =   20.90      SUBAREA RUNOFF(CFS) =   65.49
  EFFECTIVE AREA(ACRES) =     72.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       72.3       PEAK FLOW RATE(CFS) =     223.26

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```



```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   535.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =  1110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.06
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     223.26
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   10.40
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =    4065.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.40
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.367
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.10      0.30     0.100    56
  PUBLIC PARK                B        1.40      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  COMMERCIAL                 B        5.10      0.30     0.100    56
  PUBLIC PARK                B        1.90      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.60      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.485
  SUBAREA AREA(ACRES) =   16.20      SUBAREA RUNOFF(CFS) =   46.97
  EFFECTIVE AREA(ACRES) =     88.50   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       88.5       PEAK FLOW RATE(CFS) =     258.47

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.40
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.367
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.70      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.244
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    9.78
  EFFECTIVE AREA(ACRES) =     91.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       91.8       PEAK FLOW RATE(CFS) =     268.25

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

```
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =   10.40
  RAINFALL INTENSITY(INCH/HR) =   3.37
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =      91.80
  TOTAL STREAM AREA(ACRES) =      91.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     268.25

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      279.37   17.29    2.438  0.30( 0.07) 0.22     130.8     100.00
      2      268.25   10.40    3.367  0.30( 0.12) 0.40      91.8     110.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      502.05   10.40    3.367  0.30( 0.09) 0.32     170.5     110.00
      2      470.88   17.29    2.438  0.30( 0.09) 0.29     222.6     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     502.05    Tc(MIN.) =    10.40
  EFFECTIVE AREA(ACRES) =     170.47   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =      222.6
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    5471.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    128.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   473.00
  FLOW LENGTH(FEET) =   900.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  84.0 INCH PIPE IS  64.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.79
  ESTIMATED PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     502.05
  PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =   11.35
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    128.00 =    6371.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   11.35
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.216
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.10      0.30      0.100    56
  COMMERCIAL                 B        3.60      0.30      0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     4.70      SUBAREA RUNOFF(CFS) =   13.48
  EFFECTIVE AREA(ACRES) =    175.17   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =      227.3       PEAK FLOW RATE(CFS) =     502.05
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 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.) =   11.35
  RAINFALL INTENSITY(INCH/HR) =   3.22
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.31
  EFFECTIVE STREAM AREA(ACRES) =     175.17
  TOTAL STREAM AREA(ACRES) =     227.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     502.05

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =    640.00  DOWNSTREAM(FEET) =    634.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.880
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.615
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.50      0.30      0.100    56    6.88
  PUBLIC PARK                B        0.20      0.30      0.850    56   10.93
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.70      0.30      0.200    56    7.33
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.40      0.30      0.900    56   11.02
  PUBLIC PARK                B        0.10      0.30      0.850    56   10.93
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.30      0.30      0.200    56    7.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.381
  SUBAREA RUNOFF(CFS) =     25.11
```

```
  TOTAL AREA(ACRES) =      6.20   PEAK FLOW RATE(CFS) =     25.11

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    121.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.88
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.615
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.78
  EFFECTIVE AREA(ACRES) =      6.40   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        6.4       PEAK FLOW RATE(CFS) =      25.89

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   634.00  DOWNSTREAM(FEET) =   626.00
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.58
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.89
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    7.55
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     754.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.55
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.361
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.40      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.423
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   34.68
  EFFECTIVE AREA(ACRES) =     15.50   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
```



```
  TOTAL AREA(ACRES) =       15.5       PEAK FLOW RATE(CFS) =      59.11

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   626.00  DOWNSTREAM(FEET) =   606.00
  FLOW LENGTH(FEET) =  1030.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.20
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      59.11
  PIPE TRAVEL TIME(MIN.) =   1.30    Tc(MIN.) =    8.85
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =    1784.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.85
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.867
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        7.60      0.30     0.200    56
  COMMERCIAL                 B        1.40      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        6.50      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        8.40      0.30     0.600    56
  APARTMENTS                 B        0.50      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.491
  SUBAREA AREA(ACRES) =   26.70      SUBAREA RUNOFF(CFS) =   89.39
  EFFECTIVE AREA(ACRES) =     42.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       42.2       PEAK FLOW RATE(CFS) =     141.62

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.85
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.867
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.30      0.30     0.100    56
  PUBLIC PARK                B        1.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.00      0.30     0.200    56
  RESIDENTIAL
```

```
  ".4 DWELLING/ACRE"         B        3.80      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.80      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.642
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =   36.38
  EFFECTIVE AREA(ACRES) =     53.20   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       53.2       PEAK FLOW RATE(CFS) =     178.00

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   606.00  DOWNSTREAM(FEET) =   604.00
  FLOW LENGTH(FEET) =   222.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  41.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.00
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     178.00
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    9.13
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =    2006.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.13
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.759
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        1.60      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  APARTMENTS                 B        0.30      0.30     0.200    56
  COMMERCIAL                 B        2.10      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.231
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =   16.27
  EFFECTIVE AREA(ACRES) =     58.10   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       58.1       PEAK FLOW RATE(CFS) =     189.10

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.13
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.759
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.67
  EFFECTIVE AREA(ACRES) =     58.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       58.3       PEAK FLOW RATE(CFS) =     189.77

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   604.00  DOWNSTREAM(FEET) =   546.00
  FLOW LENGTH(FEET) =  1271.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.07
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     189.77
  PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =   10.01
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    125.00 =    3277.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.01
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.429
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.50      0.30     0.200    56
  COMMERCIAL                 B        1.20      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        1.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.00      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.550
  SUBAREA AREA(ACRES) =    7.60      SUBAREA RUNOFF(CFS) =   22.32
  EFFECTIVE AREA(ACRES) =     65.90   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       65.9       PEAK FLOW RATE(CFS) =     194.74

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.01
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.429
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        1.90      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.60      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        0.30      0.30     0.600    56
  APARTMENTS                B        5.00      0.30     0.200    56
  PUBLIC PARK               B        2.30      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        3.50      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.530
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   40.02
  EFFECTIVE AREA(ACRES) =     79.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       79.5       PEAK FLOW RATE(CFS) =     234.76

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.01
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.429
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B       10.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =   29.82
  EFFECTIVE AREA(ACRES) =     89.70   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       89.7       PEAK FLOW RATE(CFS) =     264.59

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   546.00  DOWNSTREAM(FEET) =   525.00
  FLOW LENGTH(FEET) =   562.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  36.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.52
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     264.59
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   10.40
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    126.00 =    3839.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.40
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.368
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        5.90      0.30     0.200    56
  COMMERCIAL                B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.60      0.30     0.900    56
  APARTMENTS                B        6.00      0.30     0.200    56
  COMMERCIAL                B        1.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        4.70      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.395
  SUBAREA AREA(ACRES) =   18.40      SUBAREA RUNOFF(CFS) =   53.81
  EFFECTIVE AREA(ACRES) =    108.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      108.1       PEAK FLOW RATE(CFS) =     313.49

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    127.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   525.00  DOWNSTREAM(FEET) =   514.00
  FLOW LENGTH(FEET) =   607.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  46.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.26
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     313.49
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   10.92
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    127.00 =    4446.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.92
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.285
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        1.50      0.30     0.100    56
  PUBLIC PARK               B        0.20      0.30     0.850    56
  APARTMENTS                B        1.10      0.30     0.200    56
  COMMERCIAL                B       12.70      0.30     0.100    56
  PUBLIC PARK               B        0.80      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        4.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.303
  SUBAREA AREA(ACRES) =   20.40      SUBAREA RUNOFF(CFS) =   58.63
  EFFECTIVE AREA(ACRES) =    128.50   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      128.5       PEAK FLOW RATE(CFS) =     364.01

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

```
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.92
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.285
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.20      0.30     0.100    56
  PUBLIC PARK                B        1.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.530
  SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    7.88
  EFFECTIVE AREA(ACRES) =    131.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      131.3       PEAK FLOW RATE(CFS) =     371.88

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.92
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.285
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.00      0.30     0.100    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  COMMERCIAL                 B       12.60      0.30     0.100    56
  PUBLIC PARK                B        1.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.238
  SUBAREA AREA(ACRES) =   18.20      SUBAREA RUNOFF(CFS) =   52.63
  EFFECTIVE AREA(ACRES) =    149.50   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      149.5       PEAK FLOW RATE(CFS) =     424.51

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   514.00  DOWNSTREAM(FEET) =   473.00
  FLOW LENGTH(FEET) =   741.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  42.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  31.43
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     424.51
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   11.31
```



```
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    128.00 =    5187.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.31
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.222
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.20      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.223
  SUBAREA AREA(ACRES) =    2.60      SUBAREA RUNOFF(CFS) =    7.38
  EFFECTIVE AREA(ACRES) =    152.10   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      152.1       PEAK FLOW RATE(CFS) =     424.51
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 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.) =   11.31
  RAINFALL INTENSITY(INCH/HR) =   3.22
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.43
  EFFECTIVE STREAM AREA(ACRES) =     152.10
  TOTAL STREAM AREA(ACRES) =     152.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     424.51

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      502.05   11.35    3.216  0.30( 0.09) 0.31     175.2     110.00
      1      470.88   18.26    2.355  0.30( 0.09) 0.29     227.3     100.00
      2      424.51   11.31    3.222  0.30( 0.13) 0.43     152.1     120.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      925.88   11.31    3.222  0.30( 0.11) 0.37     326.7     120.00
      2      925.76   11.35    3.216  0.30( 0.11) 0.37     327.3     110.00
      3      776.37   18.26    2.355  0.30( 0.10) 0.34     379.4     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =     925.88    Tc(MIN.) =    11.31
  EFFECTIVE AREA(ACRES) =     326.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      379.4
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    128.00 =    6371.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    129.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   473.00  DOWNSTREAM(FEET) =   455.00
  FLOW LENGTH(FEET) =  1494.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  96.0 INCH PIPE IS  76.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.53
  ESTIMATED PIPE DIAMETER(INCH) =  96.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     925.88
  PIPE TRAVEL TIME(MIN.) =   1.16    Tc(MIN.) =   12.47
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    129.00 =    7865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.47
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.038
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  COMMERCIAL                 B        1.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.40      0.30     0.900    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.60      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.524
  SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =   17.63
  EFFECTIVE AREA(ACRES) =    333.50   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      386.2       PEAK FLOW RATE(CFS) =     925.88
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.47
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.038
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  COMMERCIAL                 B        2.50      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.50      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.20      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.344
  SUBAREA AREA(ACRES) =    4.70      SUBAREA RUNOFF(CFS) =   12.42
  EFFECTIVE AREA(ACRES) =    338.20   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      390.9       PEAK FLOW RATE(CFS) =     925.88
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.47
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.038
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.90      0.30     0.400    56
  COMMERCIAL                 B        4.70      0.30     0.100    56
  PUBLIC PARK                B        1.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.90      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.80      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.386
  SUBAREA AREA(ACRES) =   13.70      SUBAREA RUNOFF(CFS) =   36.03
  EFFECTIVE AREA(ACRES) =    351.90   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      404.6       PEAK FLOW RATE(CFS) =     927.19

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.47
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.038
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.40      0.30     0.500    56
  RESIDENTIAL
```

```
  "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
  COMMERCIAL                 B        5.00      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       10.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
  SUBAREA AREA(ACRES) =   20.60      SUBAREA RUNOFF(CFS) =   54.92
  EFFECTIVE AREA(ACRES) =    372.50   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =      425.2       PEAK FLOW RATE(CFS) =     982.11

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.47
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.038
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.30      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.90      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.487
  SUBAREA AREA(ACRES) =    7.50      SUBAREA RUNOFF(CFS) =   19.52
  EFFECTIVE AREA(ACRES) =    380.00   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =      432.7       PEAK FLOW RATE(CFS) =    1001.63

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =  1786.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  87.0 INCH PIPE IS  67.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.11
  ESTIMATED PIPE DIAMETER(INCH) =  87.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    1001.63
  PIPE TRAVEL TIME(MIN.) =   1.02    Tc(MIN.) =   13.49
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    9651.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.49
```



```
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.876
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.00      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.598
  SUBAREA AREA(ACRES) =    7.00      SUBAREA RUNOFF(CFS) =   16.99
  EFFECTIVE AREA(ACRES) =    387.00   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      439.7       PEAK FLOW RATE(CFS) =    1001.63
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.49
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.876
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.50      0.30     0.600    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.599
  SUBAREA AREA(ACRES) =    7.90      SUBAREA RUNOFF(CFS) =   19.17
  EFFECTIVE AREA(ACRES) =    394.90   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      447.6       PEAK FLOW RATE(CFS) =    1001.63
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    765.00  DOWNSTREAM(FEET) =    675.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.312
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.692
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        1.50      0.30     1.000    66    9.31
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        0.40      0.30     1.000    65    9.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      5.80
  TOTAL AREA(ACRES) =      1.90   PEAK FLOW RATE(CFS) =      5.80

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    152.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    635.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   421.00   CHANNEL SLOPE =  0.0950
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.368
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        4.90      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        2.40      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.89
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.49
  AVERAGE FLOW DEPTH(FEET) =   0.90   TRAVEL TIME(MIN.) =   1.08
  Tc(MIN.) =   10.39
  SUBAREA AREA(ACRES) =     7.30       SUBAREA RUNOFF(CFS) =   20.16
  EFFECTIVE AREA(ACRES) =      9.20     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        9.2         PEAK FLOW RATE(CFS) =      25.41

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.08   FLOW VELOCITY(FEET/SEC.) =   7.28
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    152.00 =     751.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    153.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   635.00  DOWNSTREAM(FEET) =   631.00
```



```
  FLOW LENGTH(FEET) =   501.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.52
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.41
  PIPE TRAVEL TIME(MIN.) =   1.11    Tc(MIN.) =   11.50
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    153.00 =    1252.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    153.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.50
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.192
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        5.10      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        4.00      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =     9.10      SUBAREA RUNOFF(CFS) =   23.69
  EFFECTIVE AREA(ACRES) =     18.30   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       18.3       PEAK FLOW RATE(CFS) =      47.63

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   631.00  DOWNSTREAM(FEET) =   630.00
  FLOW LENGTH(FEET) =   711.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  36.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.62
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.63
  PIPE TRAVEL TIME(MIN.) =   2.56    Tc(MIN.) =   14.07
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    154.00 =    1963.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.07
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.784
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        0.30      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"      B        5.70      0.30     1.000    72
```

```
  NATURAL FAIR COVER
  "OPEN BROUSH"                B        3.40      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"             B        0.10      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"       B        2.10      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BROUSH"                B        1.60      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   13.20      SUBAREA RUNOFF(CFS) =   29.51
  EFFECTIVE AREA(ACRES) =     31.50   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       31.5       PEAK FLOW RATE(CFS) =      70.43

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.07
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.784
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"             B        0.20      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.45
  EFFECTIVE AREA(ACRES) =     31.70   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       31.7       PEAK FLOW RATE(CFS) =      70.87

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   630.00  DOWNSTREAM(FEET) =   628.00
  FLOW LENGTH(FEET) =   910.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  39.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.02
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      70.87
  PIPE TRAVEL TIME(MIN.) =   2.52    Tc(MIN.) =   16.59
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    155.00 =    2873.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.59
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.499
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```



```
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"        B        1.60      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BROUSH"                B        1.60      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"        B        1.80      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BROUSH"                B        1.50      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    6.50      SUBAREA RUNOFF(CFS) =   12.87
  EFFECTIVE AREA(ACRES) =     38.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       38.2       PEAK FLOW RATE(CFS) =      75.61

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   629.00  DOWNSTREAM(FEET) =   610.00
  FLOW LENGTH(FEET) =   796.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.87
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      75.61
  PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =   17.48
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    156.00 =    3669.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.48
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.422
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"        B        1.90      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"       B        0.40      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BROUSH"                B        1.30      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"        B        4.50      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"       B        1.30      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BROUSH"                B        3.70      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   13.10      SUBAREA RUNOFF(CFS) =   25.02
  EFFECTIVE AREA(ACRES) =     51.30   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
```

```
  TOTAL AREA(ACRES) =       51.3       PEAK FLOW RATE(CFS) =      97.99

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   610.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =  6198.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.09
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      97.99
  PIPE TRAVEL TIME(MIN.) =   5.71    Tc(MIN.) =   23.19
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       97.99   23.19    2.016  0.30( 0.30) 1.00      51.3     150.00
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1001.63   13.49    2.876  0.30( 0.11) 0.37     394.9     120.00
      2     1001.13   13.53    2.870  0.30( 0.11) 0.37     395.5     110.00
      3      835.90   20.54    2.173  0.30( 0.11) 0.36     447.6     100.00
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    9651.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1087.20   13.49    2.876  0.30( 0.13) 0.42     424.8     120.00
      2     1086.73   13.53    2.870  0.30( 0.13) 0.42     425.4     110.00
      3      930.63   20.54    2.173  0.30( 0.12) 0.41     493.0     100.00
      4      870.49   23.19    2.016  0.30( 0.13) 0.42     498.9     150.00
    TOTAL AREA(ACRES) =       498.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     1087.20  Tc(MIN.) =   13.493
  EFFECTIVE AREA(ACRES) =    424.75  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      498.9
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   13.49
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.876
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "FALLOW"                   B        1.60      0.30     1.000    86
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.30      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.60      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        1.90      0.30     1.000    65
  AGRICULTURAL POOR COVER
  "FALLOW"                   B        0.70      0.30     1.000    86
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.80      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.971
  SUBAREA AREA(ACRES) =    8.90      SUBAREA RUNOFF(CFS) =   20.70
  EFFECTIVE AREA(ACRES) =    433.65   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      507.8       PEAK FLOW RATE(CFS) =    1087.20
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.49
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.876
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.40      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.919
  SUBAREA AREA(ACRES) =    2.40      SUBAREA RUNOFF(CFS) =    5.62
  EFFECTIVE AREA(ACRES) =    436.05   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      510.2       PEAK FLOW RATE(CFS) =    1087.20
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      510.2  TC(MIN.) =     13.49
  EFFECTIVE AREA(ACRES) =    436.05  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.432
  PEAK FLOW RATE(CFS)   =    1087.20
```

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1087.20	13.49	2.876	0.30(0.13)	0.43	436.1	120.00
2	1086.73	13.53	2.870	0.30(0.13)	0.43	436.7	110.00
3	930.63	20.54	2.173	0.30(0.13)	0.43	504.3	100.00
4	870.49	23.19	2.016	0.30(0.13)	0.43	510.2	150.00

END OF RATIONAL METHOD ANALYSIS

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                         Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA A                                                    *
* RATIONAL METHOD - REGIONAL RAINFALL                                   *
* 100-YR EV AUGUST 2018 CCHIU                                           *
 ************************************************************************

  FILE NAME: 3A00EVRL.DAT
  TIME/DATE OF STUDY: 15:34 08/16/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  5.875
   2)   10.00;  3.789
   3)   15.00;  2.933
   4)   20.00;  2.419
   5)   25.00;  2.096
   6)   30.00;  1.872
   7)   40.00;  1.617
   8)   50.00;  1.400
   9)   60.00;  1.290
  10)   90.00;  1.088
  11)  120.00;  0.951
  12)  180.00;  0.795
  13)  360.00;  0.588
  14) 1200.00;  0.256
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   327.00
  ELEVATION DATA: UPSTREAM(FEET) =    725.00  DOWNSTREAM(FEET) =    642.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.413
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.034
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.10      0.30     1.000    66    9.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.70
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      3.70

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    642.00  DOWNSTREAM(FEET) =    605.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   385.00   CHANNEL SLOPE =  0.0961
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.702
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.90      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.60      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.983
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.14
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.85
  AVERAGE FLOW DEPTH(FEET) =   0.76   TRAVEL TIME(MIN.) =   1.10
  Tc(MIN.) =   10.51
  SUBAREA AREA(ACRES) =     4.20       SUBAREA RUNOFF(CFS) =   12.88
  EFFECTIVE AREA(ACRES) =      5.30     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.99
```

```
  TOTAL AREA(ACRES) =        5.3         PEAK FLOW RATE(CFS) =      16.25

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.91   FLOW VELOCITY(FEET/SEC.) =   6.53
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     712.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  605.00  DOWNSTREAM ELEVATION(FEET) =  584.00
  STREET LENGTH(FEET) =   264.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      19.49
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.52
  STREET FLOW TRAVEL TIME(MIN.) =   0.65   Tc(MIN.) =   11.16
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.590
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  COMMERCIAL                 B        1.00      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.519
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    6.49
  EFFECTIVE AREA(ACRES) =      7.40    AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        7.4         PEAK FLOW RATE(CFS) =      22.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.54
  FLOW VELOCITY(FEET/SEC.) =  6.95   DEPTH*VELOCITY(FT*FT/SEC.) =   2.69
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     976.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  584.00  DOWNSTREAM ELEVATION(FEET) =  564.00
```



```
  STREET LENGTH(FEET) =   494.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      36.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.48
    HALFSTREET FLOOD WIDTH(FEET) =   17.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.90
  STREET FLOW TRAVEL TIME(MIN.) =   1.37   Tc(MIN.) =   12.53
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.356
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  COMMERCIAL                 B        6.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.80      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.271
  SUBAREA AREA(ACRES) =    9.80      SUBAREA RUNOFF(CFS) =   28.88
  EFFECTIVE AREA(ACRES) =     17.20    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       17.2        PEAK FLOW RATE(CFS) =      49.53

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  20.20
  FLOW VELOCITY(FEET/SEC.) =  6.46   DEPTH*VELOCITY(FT*FT/SEC.) =   3.38
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   564.00  DOWNSTREAM(FEET) =   520.00
  FLOW LENGTH(FEET) =  1456.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.64
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.53
  PIPE TRAVEL TIME(MIN.) =   1.66    Tc(MIN.) =   14.19
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    2926.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
```

```
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.19
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.072
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  COMMERCIAL                 B        3.90      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.255
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   15.10
  EFFECTIVE AREA(ACRES) =     22.80   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       22.8       PEAK FLOW RATE(CFS) =      60.24

******************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.19
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.072
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  COMMERCIAL                 B        5.00      0.30     0.100    56
  PUBLIC PARK                B        2.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.80      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    9.20      SUBAREA RUNOFF(CFS) =   24.45
  EFFECTIVE AREA(ACRES) =     32.00   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =       32.0       PEAK FLOW RATE(CFS) =      84.68

******************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.19
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.072
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.80      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```



```
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    4.93
  EFFECTIVE AREA(ACRES) =     33.80   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       33.8       PEAK FLOW RATE(CFS) =      89.61

******************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   520.00  DOWNSTREAM(FEET) =   503.00
  FLOW LENGTH(FEET) =   804.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.83
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      89.61
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =   15.09
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    3730.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.09
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.924
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.80      0.30     0.100    56
  COMMERCIAL                 B        7.60      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  COMMERCIAL                 B       10.50      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.125
  SUBAREA AREA(ACRES) =   21.60      SUBAREA RUNOFF(CFS) =   56.11
  EFFECTIVE AREA(ACRES) =     55.40   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       55.4       PEAK FLOW RATE(CFS) =     141.20

******************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.09
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.924
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        6.80      0.30     0.100    56
  COMMERCIAL                 B       12.10      0.30     0.100    56
  PUBLIC PARK                B        1.00      0.30     0.850    56
  COMMERCIAL                 B        4.50      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.131
  SUBAREA AREA(ACRES) =   24.40      SUBAREA RUNOFF(CFS) =   63.35
  EFFECTIVE AREA(ACRES) =     79.80   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.25
  TOTAL AREA(ACRES) =       79.8       PEAK FLOW RATE(CFS) =     204.55

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   503.00  DOWNSTREAM(FEET) =   485.00
  FLOW LENGTH(FEET) =   808.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  36.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.94
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     204.55
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   15.80
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =    4538.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.80
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.851
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.40      0.30     0.100    56
  COMMERCIAL                 B        6.70      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  COMMERCIAL                 B        2.50      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.106
  SUBAREA AREA(ACRES) =   12.70      SUBAREA RUNOFF(CFS) =   32.22
  EFFECTIVE AREA(ACRES) =     92.50   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.23
  TOTAL AREA(ACRES) =       92.5       PEAK FLOW RATE(CFS) =     231.52

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.80
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.851
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        7.20      0.30     0.100    56
  PUBLIC PARK                B        0.70      0.30     0.850    56
  COMMERCIAL                 B        7.60      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  COMMERCIAL                 B        4.70      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
```



```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.150
  SUBAREA AREA(ACRES) =   20.90      SUBAREA RUNOFF(CFS) =   52.78
  EFFECTIVE AREA(ACRES) =    113.40   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =      113.4       PEAK FLOW RATE(CFS) =     284.30

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   933.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  72.0 INCH PIPE IS  57.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.85
  ESTIMATED PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     284.30
  PIPE TRAVEL TIME(MIN.) =   1.31    Tc(MIN.) =   17.11
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    5471.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.11
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.716
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.50      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  COMMERCIAL                 B        2.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.80      0.30     0.900    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.235
  SUBAREA AREA(ACRES) =    8.30      SUBAREA RUNOFF(CFS) =   19.76
  EFFECTIVE AREA(ACRES) =    121.70   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =      121.7       PEAK FLOW RATE(CFS) =     290.29

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.11
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.716
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.40      0.30     0.200    56
  APARTMENTS                 B        5.50      0.30     0.200    56
```

```
  APARTMENTS                  B        3.20      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   21.75
  EFFECTIVE AREA(ACRES) =    130.80   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =      130.8       PEAK FLOW RATE(CFS) =     312.04

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =   17.11
  RAINFALL INTENSITY(INCH/HR) =   2.72
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.22
  EFFECTIVE STREAM AREA(ACRES) =     130.80
  TOTAL STREAM AREA(ACRES) =     130.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     312.04

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    645.00  DOWNSTREAM(FEET) =    625.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.417
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.701
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56    8.68
  COMMERCIAL                 B        0.30      0.30     0.100    56    5.42
  PUBLIC PARK                B        1.30      0.30     0.850    56    8.61
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.00      0.30     0.900    56    8.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.798
  SUBAREA RUNOFF(CFS) =     14.75
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =     14.75

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  625.00  DOWNSTREAM ELEVATION(FEET) =  595.00
  STREET LENGTH(FEET) =   517.00   CURB HEIGHT(INCHES) =  8.0
```



```
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      23.62
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.55
  STREET FLOW TRAVEL TIME(MIN.) =   1.38   Tc(MIN.) =    6.80
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.125
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  COMMERCIAL                 B        1.00      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.223
  SUBAREA AREA(ACRES) =    3.90      SUBAREA RUNOFF(CFS) =   17.75
  EFFECTIVE AREA(ACRES) =      6.90    AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        6.9        PEAK FLOW RATE(CFS) =      30.95

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.51
  FLOW VELOCITY(FEET/SEC.) =  6.61   DEPTH*VELOCITY(FT*FT/SEC.) =   2.90
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     847.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  595.00  DOWNSTREAM ELEVATION(FEET) =  585.00
  STREET LENGTH(FEET) =   389.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      48.27
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.55
  HALFSTREET FLOOD WIDTH(FEET) =   21.84
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.42
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.00
 STREET FLOW TRAVEL TIME(MIN.) =   1.20   Tc(MIN.) =    7.99
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.626
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        5.00      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
 COMMERCIAL                 B        1.00      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.335
 SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =   34.62
 EFFECTIVE AREA(ACRES) =     15.40    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
 TOTAL AREA(ACRES) =       15.4        PEAK FLOW RATE(CFS) =      62.47

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.59   HALFSTREET FLOOD WIDTH(FEET) =  24.18
 FLOW VELOCITY(FEET/SEC.) =  5.77   DEPTH*VELOCITY(FT*FT/SEC.) =   3.43
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    113.00 =    1236.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 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) =   565.00
 FLOW LENGTH(FEET) =   702.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.23
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      62.47
 PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =    8.76
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    114.00 =    1938.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.76
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.306
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.60      0.30     0.100    56
 PUBLIC PARK                B        0.20      0.30     0.850    56
 RESIDENTIAL
```



```
 ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
 SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =   10.88
 EFFECTIVE AREA(ACRES) =     18.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =       18.3       PEAK FLOW RATE(CFS) =      68.91

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.76
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.306
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        9.00      0.30     0.100    56
 PUBLIC PARK                B        1.90      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.70      0.30     0.900    56
 COMMERCIAL                 B        4.10      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.313
 SUBAREA AREA(ACRES) =   18.00      SUBAREA RUNOFF(CFS) =   68.23
 EFFECTIVE AREA(ACRES) =     36.30   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       36.3       PEAK FLOW RATE(CFS) =     137.14

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.76
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.306
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        4.50      0.30     0.100    56
 PUBLIC PARK                B        1.20      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        3.80      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.515
 SUBAREA AREA(ACRES) =    9.50      SUBAREA RUNOFF(CFS) =   35.49
 EFFECTIVE AREA(ACRES) =     45.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
 TOTAL AREA(ACRES) =       45.8       PEAK FLOW RATE(CFS) =     172.63

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =    8.76
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.306
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.30      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.30      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   20.19
  EFFECTIVE AREA(ACRES) =     51.40   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       51.4       PEAK FLOW RATE(CFS) =     192.82

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 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) =   535.00
  FLOW LENGTH(FEET) =  1017.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.33
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     192.82
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =    9.60
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    115.00 =    2955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.60
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.958
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.40      0.30     0.100    56
  COMMERCIAL                 B       11.00      0.30     0.100    56
  PUBLIC PARK                B        1.80      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
  COMMERCIAL                 B        3.20      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.222
  SUBAREA AREA(ACRES) =   20.90      SUBAREA RUNOFF(CFS) =   73.20
  EFFECTIVE AREA(ACRES) =     72.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       72.3       PEAK FLOW RATE(CFS) =     249.93

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```



```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   535.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =  1110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.35
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     249.93
  PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =   10.30
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =    4065.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.738
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.10      0.30     0.100    56
  PUBLIC PARK                B        1.40      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  COMMERCIAL                 B        5.10      0.30     0.100    56
  PUBLIC PARK                B        1.90      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.60      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.485
  SUBAREA AREA(ACRES) =   16.20      SUBAREA RUNOFF(CFS) =   52.38
  EFFECTIVE AREA(ACRES) =     88.50   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       88.5       PEAK FLOW RATE(CFS) =     288.01

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.738
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.70      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.244
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =   10.88
  EFFECTIVE AREA(ACRES) =     91.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       91.8       PEAK FLOW RATE(CFS) =     298.90

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

```
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =   10.30
  RAINFALL INTENSITY(INCH/HR) =   3.74
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =      91.80
  TOTAL STREAM AREA(ACRES) =      91.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     298.90

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      312.04   17.11    2.716  0.30( 0.07) 0.22     130.8     100.00
      2      298.90   10.30    3.738  0.30( 0.12) 0.40      91.8     110.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      559.08   10.30    3.738  0.30( 0.09) 0.32     170.5     110.00
      2      526.48   17.11    2.716  0.30( 0.09) 0.29     222.6     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     559.08    Tc(MIN.) =    10.30
  EFFECTIVE AREA(ACRES) =     170.51   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =      222.6
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    5471.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    128.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   473.00
  FLOW LENGTH(FEET) =   900.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  87.0 INCH PIPE IS  67.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.18
  ESTIMATED PIPE DIAMETER(INCH) =  87.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     559.08
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =   11.22
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    128.00 =    6371.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   11.22
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.579
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.10      0.30      0.100    56
  COMMERCIAL                 B        3.60      0.30      0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     4.70      SUBAREA RUNOFF(CFS) =   15.01
  EFFECTIVE AREA(ACRES) =    175.21   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =      227.3       PEAK FLOW RATE(CFS) =     559.08
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 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.) =   11.22
  RAINFALL INTENSITY(INCH/HR) =   3.58
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.31
  EFFECTIVE STREAM AREA(ACRES) =     175.21
  TOTAL STREAM AREA(ACRES) =     227.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     559.08

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =    640.00  DOWNSTREAM(FEET) =    634.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.880
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.091
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.50      0.30      0.100    56    6.88
  PUBLIC PARK                B        0.20      0.30      0.850    56   10.93
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.70      0.30      0.200    56    7.33
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.40      0.30      0.900    56   11.02
  PUBLIC PARK                B        0.10      0.30      0.850    56   10.93
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.30      0.30      0.200    56    7.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.381
  SUBAREA RUNOFF(CFS) =     27.77
```

```
  TOTAL AREA(ACRES) =      6.20   PEAK FLOW RATE(CFS) =     27.77

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    121.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.88
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.091
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.87
  EFFECTIVE AREA(ACRES) =      6.40   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        6.4       PEAK FLOW RATE(CFS) =      28.64

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   634.00  DOWNSTREAM(FEET) =   626.00
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.68
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.64
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =    7.54
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     754.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.54
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.814
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.40      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.423
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   38.39
  EFFECTIVE AREA(ACRES) =     15.50   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
```



```
  TOTAL AREA(ACRES) =       15.5       PEAK FLOW RATE(CFS) =      65.43

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   626.00  DOWNSTREAM(FEET) =   606.00
  FLOW LENGTH(FEET) =  1030.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.38
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      65.43
  PIPE TRAVEL TIME(MIN.) =   1.28    Tc(MIN.) =    8.83
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =    1784.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.83
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.279
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        7.60      0.30     0.200    56
  COMMERCIAL                 B        1.40      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        6.50      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        8.40      0.30     0.600    56
  APARTMENTS                 B        0.50      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.491
  SUBAREA AREA(ACRES) =   26.70      SUBAREA RUNOFF(CFS) =   99.28
  EFFECTIVE AREA(ACRES) =     42.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       42.2       PEAK FLOW RATE(CFS) =     157.24

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.83
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.279
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.30      0.30     0.100    56
  PUBLIC PARK                B        1.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.00      0.30     0.200    56
  RESIDENTIAL
```

```
  ".4 DWELLING/ACRE"         B        3.80      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.80      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.642
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =   40.45
  EFFECTIVE AREA(ACRES) =     53.20   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       53.2       PEAK FLOW RATE(CFS) =     197.70

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   606.00  DOWNSTREAM(FEET) =   604.00
  FLOW LENGTH(FEET) =   222.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  45.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.15
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     197.70
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    9.11
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =    2006.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.11
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.161
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        1.60      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  APARTMENTS                 B        0.30      0.30     0.200    56
  COMMERCIAL                 B        2.10      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.231
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =   18.05
  EFFECTIVE AREA(ACRES) =     58.10   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       58.1       PEAK FLOW RATE(CFS) =     210.12

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.11
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.161
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.74
  EFFECTIVE AREA(ACRES) =     58.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       58.3       PEAK FLOW RATE(CFS) =     210.86

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   604.00  DOWNSTREAM(FEET) =   546.00
  FLOW LENGTH(FEET) =  1271.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.95
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     210.86
  PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =    9.96
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    125.00 =    3277.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.96
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.807
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.50      0.30     0.200    56
  COMMERCIAL                 B        1.20      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        1.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.00      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.550
  SUBAREA AREA(ACRES) =    7.60      SUBAREA RUNOFF(CFS) =   24.91
  EFFECTIVE AREA(ACRES) =     65.90   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       65.9       PEAK FLOW RATE(CFS) =     217.19

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.96
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.807
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
      LAND USE            GROUP   (ACRES)   (INCH/HR)   (DECIMAL)  CN
  APARTMENTS                B        1.90      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.60      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        0.30      0.30     0.600    56
  APARTMENTS                B        5.00      0.30     0.200    56
  PUBLIC PARK               B        2.30      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        3.50      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.530
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   44.66
  EFFECTIVE AREA(ACRES) =     79.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       79.5       PEAK FLOW RATE(CFS) =     261.85

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.96
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.807
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)   (INCH/HR)   (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B       10.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =   33.30
  EFFECTIVE AREA(ACRES) =     89.70   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       89.7       PEAK FLOW RATE(CFS) =     295.15

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   546.00  DOWNSTREAM(FEET) =   525.00
  FLOW LENGTH(FEET) =   562.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  39.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.84
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     295.15
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   10.33
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    126.00 =    3839.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.33
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.732
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)   (INCH/HR)   (DECIMAL)  CN
  APARTMENTS                B        5.90      0.30     0.200    56
  COMMERCIAL                B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.60      0.30     0.900    56
  APARTMENTS                B        6.00      0.30     0.200    56
  COMMERCIAL                B        1.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        4.70      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.395
  SUBAREA AREA(ACRES) =   18.40      SUBAREA RUNOFF(CFS) =   59.84
  EFFECTIVE AREA(ACRES) =    108.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      108.1       PEAK FLOW RATE(CFS) =     348.90

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    127.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   525.00  DOWNSTREAM(FEET) =   514.00
  FLOW LENGTH(FEET) =   607.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  47.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.86
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     348.90
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   10.84
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    127.00 =    4446.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.84
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.645
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)   (INCH/HR)   (DECIMAL)  CN
  COMMERCIAL                B        1.50      0.30     0.100    56
  PUBLIC PARK               B        0.20      0.30     0.850    56
  APARTMENTS                B        1.10      0.30     0.200    56
  COMMERCIAL                B       12.70      0.30     0.100    56
  PUBLIC PARK               B        0.80      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        4.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.303
  SUBAREA AREA(ACRES) =   20.40      SUBAREA RUNOFF(CFS) =   65.25
  EFFECTIVE AREA(ACRES) =    128.50   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      128.5       PEAK FLOW RATE(CFS) =     405.67

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

```
 FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.84
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.645
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.20      0.30     0.100    56
 PUBLIC PARK                B        1.50      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.530
 SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    8.78
 EFFECTIVE AREA(ACRES) =    131.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
 TOTAL AREA(ACRES) =      131.3       PEAK FLOW RATE(CFS) =     414.45

****************************************************************************
 FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.84
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.645
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.00      0.30     0.100    56
 COMMERCIAL                 B        1.30      0.30     0.100    56
 COMMERCIAL                 B       12.60      0.30     0.100    56
 PUBLIC PARK                B        1.10      0.30     0.850    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.238
 SUBAREA AREA(ACRES) =   18.20      SUBAREA RUNOFF(CFS) =   58.53
 EFFECTIVE AREA(ACRES) =    149.50   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =      149.5       PEAK FLOW RATE(CFS) =     472.98

****************************************************************************
 FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.00  DOWNSTREAM(FEET) =   473.00
 FLOW LENGTH(FEET) =   741.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  57.0 INCH PIPE IS  43.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  32.50
 ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     472.98
 PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   11.22
```



```
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    128.00 =    5187.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.22
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.580
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        2.20      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.223
 SUBAREA AREA(ACRES) =    2.60      SUBAREA RUNOFF(CFS) =    8.22
 EFFECTIVE AREA(ACRES) =    152.10   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =      152.1       PEAK FLOW RATE(CFS) =     472.98
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 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.) =   11.22
 RAINFALL INTENSITY(INCH/HR) =   3.58
 AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.43
 EFFECTIVE STREAM AREA(ACRES) =     152.10
 TOTAL STREAM AREA(ACRES) =     152.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     472.98

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      559.08   11.22    3.579  0.30( 0.09) 0.31     175.2     110.00
     1      526.48   18.06    2.618  0.30( 0.09) 0.29     227.3     100.00
     2      472.98   11.22    3.580  0.30( 0.13) 0.43     152.1     120.00

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1     1032.03   11.22    3.580  0.30( 0.11) 0.37     327.3     120.00
     2     1032.03   11.22    3.579  0.30( 0.11) 0.37     327.3     110.00
     3      867.73   18.06    2.618  0.30( 0.10) 0.34     379.4     100.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =    1032.03    Tc(MIN.) =    11.22
  EFFECTIVE AREA(ACRES) =     327.29   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      379.4
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    128.00 =    6371.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    129.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   473.00  DOWNSTREAM(FEET) =   455.00
  FLOW LENGTH(FEET) =  1494.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN 102.0 INCH PIPE IS  77.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.33
  ESTIMATED PIPE DIAMETER(INCH) = 102.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    1032.03
  PIPE TRAVEL TIME(MIN.) =   1.11    Tc(MIN.) =   12.34
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    129.00 =    7865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.34
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.389
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  COMMERCIAL                 B        1.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.40      0.30     0.900    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.60      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.524
  SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =   19.78
  EFFECTIVE AREA(ACRES) =    334.09   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      386.2       PEAK FLOW RATE(CFS) =    1032.03
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.34
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.389
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  COMMERCIAL                 B        2.50      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.50      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.20      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.344
  SUBAREA AREA(ACRES) =    4.70      SUBAREA RUNOFF(CFS) =   13.90
  EFFECTIVE AREA(ACRES) =    338.79   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      390.9       PEAK FLOW RATE(CFS) =    1032.03
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.34
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.389
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.90      0.30     0.400    56
  COMMERCIAL                 B        4.70      0.30     0.100    56
  PUBLIC PARK                B        1.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.90      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.80      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.386
  SUBAREA AREA(ACRES) =   13.70      SUBAREA RUNOFF(CFS) =   40.36
  EFFECTIVE AREA(ACRES) =    352.49   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      404.6       PEAK FLOW RATE(CFS) =    1039.96

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.34
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.389
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.40      0.30     0.500    56
  RESIDENTIAL
```

```
  "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
  COMMERCIAL                 B        5.00      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       10.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
  SUBAREA AREA(ACRES) =   20.60      SUBAREA RUNOFF(CFS) =   61.42
  EFFECTIVE AREA(ACRES) =    373.09   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =      425.2       PEAK FLOW RATE(CFS) =    1101.39

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.34
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.389
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.30      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.90      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.487
  SUBAREA AREA(ACRES) =    7.50      SUBAREA RUNOFF(CFS) =   21.89
  EFFECTIVE AREA(ACRES) =    380.59   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =      432.7       PEAK FLOW RATE(CFS) =    1123.27

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =  1786.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  90.0 INCH PIPE IS  71.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.82
  ESTIMATED PIPE DIAMETER(INCH) =  90.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    1123.27
  PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =   13.34
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    9651.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.34
```



```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.218
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.00      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.598
  SUBAREA AREA(ACRES) =    7.00      SUBAREA RUNOFF(CFS) =   19.14
  EFFECTIVE AREA(ACRES) =    387.59   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      439.7       PEAK FLOW RATE(CFS) =    1123.27
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.34
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.218
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.50      0.30     0.600    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.599
  SUBAREA AREA(ACRES) =    7.90      SUBAREA RUNOFF(CFS) =   21.60
  EFFECTIVE AREA(ACRES) =    395.49   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      447.6       PEAK FLOW RATE(CFS) =    1123.27
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    765.00  DOWNSTREAM(FEET) =    675.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.312
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.076
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        1.50      0.30     1.000    66    9.31
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        0.40      0.30     1.000    65    9.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      6.46
  TOTAL AREA(ACRES) =      1.90   PEAK FLOW RATE(CFS) =      6.46

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    152.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    635.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   421.00   CHANNEL SLOPE =  0.0950
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.727
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        4.90      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        2.40      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.72
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.67
  AVERAGE FLOW DEPTH(FEET) =   0.94   TRAVEL TIME(MIN.) =   1.05
  Tc(MIN.) =   10.36
  SUBAREA AREA(ACRES) =     7.30       SUBAREA RUNOFF(CFS) =   22.51
  EFFECTIVE AREA(ACRES) =      9.20     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        9.2         PEAK FLOW RATE(CFS) =      28.37

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.12   FLOW VELOCITY(FEET/SEC.) =   7.48
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    152.00 =     751.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    153.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   635.00  DOWNSTREAM(FEET) =   631.00
```



```
  FLOW LENGTH(FEET) =   501.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.90
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.37
  PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =   11.42
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    153.00 =    1252.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    153.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.42
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.546
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        5.10      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        4.00      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =     9.10      SUBAREA RUNOFF(CFS) =   26.58
  EFFECTIVE AREA(ACRES) =     18.30   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       18.3       PEAK FLOW RATE(CFS) =      53.45

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   631.00  DOWNSTREAM(FEET) =   630.00
  FLOW LENGTH(FEET) =   711.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.79
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.45
  PIPE TRAVEL TIME(MIN.) =   2.48    Tc(MIN.) =   13.90
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    154.00 =    1963.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.90
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.122
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        0.30      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"      B        5.70      0.30     1.000    72
```

```
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.40      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        2.10      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.60      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   13.20      SUBAREA RUNOFF(CFS) =   33.52
  EFFECTIVE AREA(ACRES) =     31.50   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       31.5       PEAK FLOW RATE(CFS) =      79.99

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.90
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.122
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.20      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.51
  EFFECTIVE AREA(ACRES) =     31.70   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       31.7       PEAK FLOW RATE(CFS) =      80.50

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   630.00  DOWNSTREAM(FEET) =   628.00
  FLOW LENGTH(FEET) =   910.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.24
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      80.50
  PIPE TRAVEL TIME(MIN.) =   2.43    Tc(MIN.) =   16.33
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    155.00 =    2873.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.33
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.796
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```



```
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.60      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.60      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.80      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.50      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    6.50      SUBAREA RUNOFF(CFS) =   14.60
  EFFECTIVE AREA(ACRES) =     38.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       38.2       PEAK FLOW RATE(CFS) =      85.82

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   629.00  DOWNSTREAM(FEET) =   610.00
  FLOW LENGTH(FEET) =   796.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.60
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      85.82
  PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =   17.18
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    156.00 =    3669.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.18
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.709
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.90      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.40      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.30      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.50      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        1.30      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.70      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   13.10      SUBAREA RUNOFF(CFS) =   28.40
  EFFECTIVE AREA(ACRES) =     51.30   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
```

```
  TOTAL AREA(ACRES) =       51.3       PEAK FLOW RATE(CFS) =     111.22

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   610.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =  6198.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.33
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     111.22
  PIPE TRAVEL TIME(MIN.) =   5.64    Tc(MIN.) =   22.82
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      111.22   22.82    2.237  0.30( 0.30) 1.00      51.3     150.00
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1123.27   13.34    3.218  0.30( 0.11) 0.37     395.5     120.00
      2     1123.26   13.34    3.218  0.30( 0.11) 0.37     395.5     110.00
      3      931.90   20.29    2.401  0.30( 0.11) 0.36     447.6     100.00
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    9651.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1221.20   13.34    3.218  0.30( 0.13) 0.42     425.5     120.00
      2     1221.18   13.34    3.218  0.30( 0.13) 0.42     425.5     110.00
      3     1039.13   20.29    2.401  0.30( 0.12) 0.41     493.2     100.00
      4      976.70   22.82    2.237  0.30( 0.13) 0.42     498.9     150.00
    TOTAL AREA(ACRES) =       498.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     1221.20  Tc(MIN.) =   13.336
  EFFECTIVE AREA(ACRES) =    425.47  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      498.9
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    9867.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   13.34
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.218
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL POOR COVER
  "FALLOW"                   B        1.60      0.30     1.000    86
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.30      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.60      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        1.90      0.30     1.000    65
  AGRICULTURAL POOR COVER
  "FALLOW"                   B        0.70      0.30     1.000    86
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.80      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.971
  SUBAREA AREA(ACRES) =    8.90      SUBAREA RUNOFF(CFS) =   23.44
  EFFECTIVE AREA(ACRES) =    434.37   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      507.8       PEAK FLOW RATE(CFS) =    1221.20
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.34
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.218
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.40      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.919
  SUBAREA AREA(ACRES) =    2.40      SUBAREA RUNOFF(CFS) =    6.36
  EFFECTIVE AREA(ACRES) =    436.77   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      510.2       PEAK FLOW RATE(CFS) =    1221.20
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      510.2  TC(MIN.) =     13.34
  EFFECTIVE AREA(ACRES) =    436.77  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.432
  PEAK FLOW RATE(CFS)   =    1221.20
```

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1221.20	13.34	3.218	0.30(0.13)	0.43	436.8	120.00
2	1221.18	13.34	3.218	0.30(0.13)	0.43	436.8	110.00
3	1039.13	20.29	2.401	0.30(0.13)	0.43	504.5	100.00
4	976.70	22.82	2.237	0.30(0.13)	0.43	510.2	150.00

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                        Analysis prepared by:

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                            Santa Ana, CA
                                92707

 ************************ DESCRIPTION OF STUDY ************************
* RMV PA-3 SUBAREA B                                                  *
* RATIONAL METHOD - REGIONAL RAINFALL                                 *
* 2-YR EV JUNE 2018 ROKAMOTO                                         *
 **********************************************************************

  FILE NAME: 3B02EVRL.DAT
  TIME/DATE OF STUDY: 08:18 06/26/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  1.853
   2)   10.00;  1.236
   3)   15.00;  0.943
   4)   20.00;  0.773
   5)   25.00;  0.666
   6)   30.00;  0.591
   7)   40.00;  0.509
   8)   50.00;  0.452
   9)   60.00;  0.396
  10)   90.00;  0.342
  11)  120.00;  0.286
  12)  180.00;  0.226
  13)  360.00;  0.166
  14) 1200.00;  0.082
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   305.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    402.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.935
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.738
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 -        0.30      0.60      0.100    56    5.94
  RESIDENTIAL
  ".4 DWELLING/ACRE"         -        0.10      0.60      0.900    56    9.51
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       -        0.10      0.60      0.600    56    8.04
  COMMERCIAL                 -        0.30      0.60      0.100    56    5.94
  RESIDENTIAL
  ".4 DWELLING/ACRE"         -        0.70      0.60      0.900    56    9.51
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       -        1.50      0.60      0.600    56    8.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.580
  SUBAREA RUNOFF(CFS) =      3.75
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =      3.75

**************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  402.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   520.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       5.59
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.03
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   2.39   Tc(MIN.) =    8.32
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.443
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.60      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  USER-DEFINED               -        0.40      0.60     0.600     -
  USER-DEFINED               -        0.50      0.60     0.100     -
  USER-DEFINED               -        0.50      0.60     0.200     -
  USER-DEFINED               -        1.50      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.525
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    3.65
  EFFECTIVE AREA(ACRES) =      6.60    AREA-AVERAGED Fm(INCH/HR) =  0.33
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        6.6        PEAK FLOW RATE(CFS) =       6.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.78
  FLOW VELOCITY(FEET/SEC.) =  3.75   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     825.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.32
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.443
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.40      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.40      SUBAREA RUNOFF(CFS) =    3.31
  EFFECTIVE AREA(ACRES) =     10.00   AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       10.0       PEAK FLOW RATE(CFS) =       9.92

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  385.00  DOWNSTREAM ELEVATION(FEET) =  375.00
  STREET LENGTH(FEET) =   430.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```



```
  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) =      14.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.55
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.87
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.57
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   10.17
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.226
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.60      0.60     0.100     -
  USER-DEFINED               -        2.70      0.60     0.200     -
  USER-DEFINED               -        0.90      0.60     0.900     -
  USER-DEFINED               -        0.40      0.60     0.100     -
  USER-DEFINED               -        3.60      0.60     0.200     -
  USER-DEFINED               -        1.10      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.340
  SUBAREA AREA(ACRES) =    9.30      SUBAREA RUNOFF(CFS) =    8.55
  EFFECTIVE AREA(ACRES) =     19.30    AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       19.3        PEAK FLOW RATE(CFS) =      16.52

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.41
  FLOW VELOCITY(FEET/SEC.) =  4.03   DEPTH*VELOCITY(FT*FT/SEC.) =   1.69
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =    1255.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.17
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.226
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.00      0.60     0.100     -
  USER-DEFINED               -        1.10      0.60     0.900     -
  USER-DEFINED               -        2.10      0.60     0.100     -
  USER-DEFINED               -        0.20      0.60     0.200     -
  USER-DEFINED               -        4.40      0.60     0.900     -
  USER-DEFINED               -        0.30      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.586
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =    7.16
  EFFECTIVE AREA(ACRES) =     28.40   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       28.4       PEAK FLOW RATE(CFS) =      23.69
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.17
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.226
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.80      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    1.11
  EFFECTIVE AREA(ACRES) =     30.20   AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       30.2       PEAK FLOW RATE(CFS) =      24.80

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   375.00  DOWNSTREAM(FEET) =   360.00
  FLOW LENGTH(FEET) =  1242.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.95
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.80
  PIPE TRAVEL TIME(MIN.) =   2.31    Tc(MIN.) =   12.49
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =    2497.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.49
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.090
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.90      0.60     0.100     -
  USER-DEFINED               -        1.60      0.60     0.900     -
  USER-DEFINED               -        0.10      0.60     0.100     -
  USER-DEFINED               -        0.20      0.60     0.900     -
  USER-DEFINED               -        0.20      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.609
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    2.15
  EFFECTIVE AREA(ACRES) =     33.50   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       33.5       PEAK FLOW RATE(CFS) =      24.80
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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



```
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   360.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =   937.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.51
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.80
  PIPE TRAVEL TIME(MIN.) =   1.83    Tc(MIN.) =   14.32
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =    3434.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.32
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.983
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.40      0.60     0.100     -
  USER-DEFINED               -        1.00      0.60     0.900     -
  USER-DEFINED               -        0.50      0.60     0.100     -
  USER-DEFINED               -        1.10      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.660
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    1.58
  EFFECTIVE AREA(ACRES) =     36.50   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       36.5       PEAK FLOW RATE(CFS) =      24.80
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =   587.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.73
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.80
  PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =   15.59
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =    4021.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.59
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.923
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.30      0.60     0.100     -
  USER-DEFINED               -        0.20      0.60     0.400     -
  USER-DEFINED               -        0.40      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  USER-DEFINED               -        0.30      0.60     0.400     -
  USER-DEFINED               -        0.20      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    1.04
  EFFECTIVE AREA(ACRES) =     38.00   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       38.0       PEAK FLOW RATE(CFS) =      24.80
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.59
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.923
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.06
  EFFECTIVE AREA(ACRES) =     38.10   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       38.1       PEAK FLOW RATE(CFS) =      24.80
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    221.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   345.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1217.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.03
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.80
  PIPE TRAVEL TIME(MIN.) =   2.25    Tc(MIN.) =   17.83
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    221.00 =    5238.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.83
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.847
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        7.70      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.200     -
  USER-DEFINED               -        0.40      0.60     0.900     -
  USER-DEFINED               -        0.20      0.60     0.400     -
  USER-DEFINED               -        3.80      0.60     0.100     -
  USER-DEFINED               -        0.40      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.135
  SUBAREA AREA(ACRES) =   12.80      SUBAREA RUNOFF(CFS) =    8.82
  EFFECTIVE AREA(ACRES) =     50.90   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       50.9       PEAK FLOW RATE(CFS) =      26.95

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.83
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.847
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.60     0.900     -
  USER-DEFINED               -        0.10      0.60     0.500     -
  USER-DEFINED               -        0.20      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.620
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    0.21
  EFFECTIVE AREA(ACRES) =     51.40   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       51.4       PEAK FLOW RATE(CFS) =      27.17

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.83
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.847
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        6.20      0.60     0.100     -
  USER-DEFINED               -        1.30      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  USER-DEFINED               -        0.50      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.120
  SUBAREA AREA(ACRES) =    8.20      SUBAREA RUNOFF(CFS) =    5.72
  EFFECTIVE AREA(ACRES) =     59.60   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       59.6       PEAK FLOW RATE(CFS) =      32.89
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 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.) =   17.83
  RAINFALL INTENSITY(INCH/HR) =   0.85
  AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.39
  EFFECTIVE STREAM AREA(ACRES) =      59.60
  TOTAL STREAM AREA(ACRES) =      59.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.89

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    467.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.740
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.268
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                -        0.80      0.60     0.850    56   12.58
  RESIDENTIAL
  ".4 DWELLING/ACRE"         -        0.10      0.60     0.900    56   12.68
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       -        1.50      0.60     0.500    56   10.13
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      -        0.20      0.60     0.400    56    9.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.615
  SUBAREA RUNOFF(CFS) =      2.10
  TOTAL AREA(ACRES) =      2.60   PEAK FLOW RATE(CFS) =      2.10

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  467.00  DOWNSTREAM ELEVATION(FEET) =  466.00
  STREET LENGTH(FEET) =   193.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       4.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   1.96   Tc(MIN.) =   11.70
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.136
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.60     0.400     -
  USER-DEFINED               -        0.50      0.60     0.850     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  USER-DEFINED               -        2.20      0.60     0.500     -
  USER-DEFINED               -        2.00      0.60     0.400     -
  USER-DEFINED               -        0.10      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.501
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =    3.84
  EFFECTIVE AREA(ACRES) =      7.70    AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        7.7        PEAK FLOW RATE(CFS) =       5.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.54
  FLOW VELOCITY(FEET/SEC.) =  1.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.68
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     523.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.70
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.136
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.70      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    0.56
  EFFECTIVE AREA(ACRES) =      8.40   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        8.4        PEAK FLOW RATE(CFS) =       6.20

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  466.00  DOWNSTREAM ELEVATION(FEET) =  460.00
```

```
  STREET LENGTH(FEET) =   324.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       8.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.45
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.18
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
  STREET FLOW TRAVEL TIME(MIN.) =   1.70   Tc(MIN.) =   13.40
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.037
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.90      0.60     0.100     -
  USER-DEFINED               -        0.40      0.60     0.850     -
  USER-DEFINED               -        0.20      0.60     0.900     -
  USER-DEFINED               -        4.00      0.60     0.500     -
  USER-DEFINED               -        1.70      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.457
  SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =    4.94
  EFFECTIVE AREA(ACRES) =     15.60    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       15.6        PEAK FLOW RATE(CFS) =      10.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.38
  FLOW VELOCITY(FEET/SEC.) =  3.32   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =     847.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   405.00
  FLOW LENGTH(FEET) =   508.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.47
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.39
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   13.91
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.91
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.007
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     0.200     -
  USER-DEFINED               -        0.10      0.60     0.500     -
  USER-DEFINED               -        3.10      0.60     0.400     -
  USER-DEFINED               -        1.60      0.60     0.100     -
  USER-DEFINED               -        0.60      0.60     0.850     -
  USER-DEFINED               -        2.40      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.524
  SUBAREA AREA(ACRES) =    7.90      SUBAREA RUNOFF(CFS) =    4.92
  EFFECTIVE AREA(ACRES) =     23.50   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       23.5       PEAK FLOW RATE(CFS) =      14.89

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.91
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.007
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     0.500     -
  USER-DEFINED               -        4.80      0.60     0.400     -
  USER-DEFINED               -        0.30      0.60     0.900     -
  USER-DEFINED               -        0.80      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.427
  SUBAREA AREA(ACRES) =    6.00      SUBAREA RUNOFF(CFS) =    4.05
  EFFECTIVE AREA(ACRES) =     29.50   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       29.5       PEAK FLOW RATE(CFS) =      18.94

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   376.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.68
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.94
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   14.63
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =    1731.00 FEET.

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

```
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.63
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.965
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.10      0.60     0.100     -
 USER-DEFINED               -        0.60      0.60     0.850     -
 USER-DEFINED               -        5.00      0.60     0.200     -
 USER-DEFINED               -        0.10      0.60     0.900     -
 USER-DEFINED               -        2.40      0.60     0.500     -
 USER-DEFINED               -        0.10      0.60     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.349
 SUBAREA AREA(ACRES) =    8.30      SUBAREA RUNOFF(CFS) =    5.64
 EFFECTIVE AREA(ACRES) =     37.80   AREA-AVERAGED Fm(INCH/HR) =  0.27
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.46
 TOTAL AREA(ACRES) =       37.8       PEAK FLOW RATE(CFS) =      23.46

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.63
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.965
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        4.10      0.60     0.500     -
 USER-DEFINED               -        0.10      0.60     0.500     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =    4.20      SUBAREA RUNOFF(CFS) =    2.51
 EFFECTIVE AREA(ACRES) =     42.00   AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.46
 TOTAL AREA(ACRES) =       42.0       PEAK FLOW RATE(CFS) =      25.97

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.63
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.965
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.80      0.60     0.850     -
 USER-DEFINED               -        2.50      0.60     0.200     -
 USER-DEFINED               -        0.40      0.60     0.900     -
 USER-DEFINED               -        1.50      0.60     0.600     -
 USER-DEFINED               -        2.30      0.60     0.400     -
 USER-DEFINED               -        1.20      0.60     0.850     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
```



```
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.503
 SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =    5.19
 EFFECTIVE AREA(ACRES) =     50.70   AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.47
 TOTAL AREA(ACRES) =       50.7       PEAK FLOW RATE(CFS) =      31.16

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.63
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.965
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        3.00      0.60     0.200     -
 USER-DEFINED               -        0.90      0.60     0.900     -
 USER-DEFINED               -        0.50      0.60     0.600     -
 USER-DEFINED               -        0.40      0.60     0.500     -
 USER-DEFINED               -        4.80      0.60     0.400     -
 USER-DEFINED               -        1.80      0.60     0.200     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.368
 SUBAREA AREA(ACRES) =   11.40      SUBAREA RUNOFF(CFS) =    7.63
 EFFECTIVE AREA(ACRES) =     62.10   AREA-AVERAGED Fm(INCH/HR) =  0.27
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =       62.1       PEAK FLOW RATE(CFS) =      38.79

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.63
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.965
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.10      0.60     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.04
 EFFECTIVE AREA(ACRES) =     62.20   AREA-AVERAGED Fm(INCH/HR) =  0.27
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =       62.2       PEAK FLOW RATE(CFS) =      38.83

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   350.00
 FLOW LENGTH(FEET) =  1800.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.66
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      38.83
  PIPE TRAVEL TIME(MIN.) =   2.20    Tc(MIN.) =   16.83
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    216.00 =    3531.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.83
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.881
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.50      0.60     0.100     -
  USER-DEFINED               -        0.50      0.60     0.850     -
  USER-DEFINED               -        1.40      0.60     0.900     -
  USER-DEFINED               -        5.70      0.60     0.400     -
  USER-DEFINED               -        0.50      0.60     0.850     -
  USER-DEFINED               -        0.70      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.508
  SUBAREA AREA(ACRES) =    9.30      SUBAREA RUNOFF(CFS) =    4.82
  EFFECTIVE AREA(ACRES) =     71.50   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       71.5       PEAK FLOW RATE(CFS) =      38.97

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.83
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.881
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.40      0.60     0.850     -
  USER-DEFINED               -        2.30      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.467
  SUBAREA AREA(ACRES) =    2.70      SUBAREA RUNOFF(CFS) =    1.46
  EFFECTIVE AREA(ACRES) =     74.20   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       74.2       PEAK FLOW RATE(CFS) =      40.43

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.83
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.881
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.30      0.60     0.850     -
  USER-DEFINED               -        2.40      0.60     0.900     -
```



```
  USER-DEFINED               -        0.80      0.60     0.500     -
  USER-DEFINED               -        4.70      0.60     0.400     -
  USER-DEFINED               -        2.00      0.60     0.900     -
  USER-DEFINED               -        0.90      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.644
  SUBAREA AREA(ACRES) =   12.10      SUBAREA RUNOFF(CFS) =    5.38
  EFFECTIVE AREA(ACRES) =     86.30   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       86.3       PEAK FLOW RATE(CFS) =      45.82

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.83
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.881
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.10      0.60     0.400     -
  USER-DEFINED               -        1.40      0.60     0.500     -
  USER-DEFINED               -        1.00      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.431
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    2.52
  EFFECTIVE AREA(ACRES) =     90.80   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       90.8       PEAK FLOW RATE(CFS) =      48.34

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   340.00
  FLOW LENGTH(FEET) =   886.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.17
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.34
  PIPE TRAVEL TIME(MIN.) =   1.45    Tc(MIN.) =   18.28
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    217.00 =    4417.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.28
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.831
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.30      0.60     0.850     -
  USER-DEFINED               -        0.40      0.60     0.200     -
```

```
  USER-DEFINED               -        1.80      0.60     0.200     -
  USER-DEFINED               -        0.40      0.60     0.100     -
  USER-DEFINED               -        2.20      0.60     0.850     -
  USER-DEFINED               -        1.00      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.460
  SUBAREA AREA(ACRES) =    6.10      SUBAREA RUNOFF(CFS) =    3.05
  EFFECTIVE AREA(ACRES) =     96.90   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       96.9       PEAK FLOW RATE(CFS) =      48.34
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.28
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.831
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.20      0.60     0.100     -
  USER-DEFINED               -        0.60      0.60     0.850     -
  USER-DEFINED               -        8.60      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.191
  SUBAREA AREA(ACRES) =   14.40      SUBAREA RUNOFF(CFS) =    9.29
  EFFECTIVE AREA(ACRES) =    111.30   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      111.3       PEAK FLOW RATE(CFS) =      56.64

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.28
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.831
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.70      0.60     0.200     -
  USER-DEFINED               -        4.30      0.60     0.100     -
  USER-DEFINED               -        3.00      0.60     0.850     -
  USER-DEFINED               -       10.30      0.60     0.200     -
  USER-DEFINED               -        3.70      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.298
  SUBAREA AREA(ACRES) =   23.00      SUBAREA RUNOFF(CFS) =   13.51
  EFFECTIVE AREA(ACRES) =    134.30   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      134.3       PEAK FLOW RATE(CFS) =      70.15

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    221.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```



```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   340.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1266.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.85
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      70.15
  PIPE TRAVEL TIME(MIN.) =   2.14    Tc(MIN.) =   20.42
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    221.00 =    5683.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 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.) =   20.42
  RAINFALL INTENSITY(INCH/HR) =   0.76
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =     134.30
  TOTAL STREAM AREA(ACRES) =     134.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      70.15

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       32.89   17.83    0.847  0.60( 0.23) 0.39      59.6     200.00
      2       70.15   20.42    0.764  0.60( 0.25) 0.42     134.3     210.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      103.03   17.83    0.847  0.60( 0.25) 0.41     176.9     200.00
      2       98.60   20.42    0.764  0.60( 0.25) 0.41     193.9     210.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     103.03    Tc(MIN.) =    17.83
  EFFECTIVE AREA(ACRES) =     176.87   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =      193.9
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    221.00 =    5683.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   330.00  DOWNSTREAM(FEET) =   280.00
  FLOW LENGTH(FEET) =   278.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  35.02
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     103.03
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   17.97
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    222.00 =    5961.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.97
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.842
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.80      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.900     -
  USER-DEFINED               -        1.90      0.60     0.100     -
  USER-DEFINED               -        1.30      0.60     1.000     -
  USER-DEFINED               -        2.20      0.60     0.900     -
  USER-DEFINED               -        2.50      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.517
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =    4.79
  EFFECTIVE AREA(ACRES) =    186.87   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =      203.9       PEAK FLOW RATE(CFS) =     103.03
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.97
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.842
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     1.000     -
  USER-DEFINED               -        4.70      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     1.000     -
  USER-DEFINED               -        4.00      0.60     0.900     -
  USER-DEFINED               -        0.60      0.60     0.500     -
  USER-DEFINED               -        0.40      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =   10.10      SUBAREA RUNOFF(CFS) =    4.86
  EFFECTIVE AREA(ACRES) =    196.97   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      214.0       PEAK FLOW RATE(CFS) =     104.68

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   17.97
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.842
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.60      0.60     1.000     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.986
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    0.16
  EFFECTIVE AREA(ACRES) =    197.67   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      214.7       PEAK FLOW RATE(CFS) =     104.84
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      214.7  TC(MIN.) =     17.97
  EFFECTIVE AREA(ACRES) =    197.67  AREA-AVERAGED Fm(INCH/HR)=  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap = 0.422
  PEAK FLOW RATE(CFS)   =     104.84

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      104.84   17.97    0.842  0.60( 0.25) 0.42     197.7     200.00
      2       98.60   20.56    0.761  0.60( 0.25) 0.42     214.7     210.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                        Analysis prepared by:

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                            Santa Ana, CA
                                92707

 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA B                                                    *
* RATIONAL METHOD - REGIONAL RAINFALL                                   *
* 5-YR EV JUNE 2018 ROKAMOTO                                           *
 ************************************************************************

  FILE NAME: 3B05EVRL.DAT
  TIME/DATE OF STUDY: 07:09 07/17/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    5.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  2.698
   2)   10.00;  1.793
   3)   15.00;  1.316
   4)   20.00;  1.127
   5)   25.00;  0.982
   6)   30.00;  0.881
   7)   40.00;  0.754
   8)   50.00;  0.671
   9)   60.00;  0.610
  10)   90.00;  0.507
  11)  120.00;  0.449
  12)  180.00;  0.377
  13)  360.00;  0.279
  14) 1200.00;  0.123
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   305.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    402.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.935
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.529
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 -        0.30      0.50      0.100    56    5.94
  RESIDENTIAL
  ".4 DWELLING/ACRE"         -        0.10      0.50      0.900    56    9.51
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       -        0.10      0.50      0.600    56    8.04
  COMMERCIAL                 -        0.30      0.50      0.100    56    5.94
  RESIDENTIAL
  ".4 DWELLING/ACRE"         -        0.70      0.50      0.900    56    9.51
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       -        1.50      0.50      0.600    56    8.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.580
  SUBAREA RUNOFF(CFS) =      6.04
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =      6.04

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  402.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   520.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       9.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.00
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.38
  STREET FLOW TRAVEL TIME(MIN.) =   2.17   Tc(MIN.) =    8.10
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.137
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.60      0.50     0.100     -
  USER-DEFINED               -        0.10      0.50     0.900     -
  USER-DEFINED               -        0.40      0.50     0.600     -
  USER-DEFINED               -        0.50      0.50     0.100     -
  USER-DEFINED               -        0.50      0.50     0.200     -
  USER-DEFINED               -        1.50      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.525
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    6.07
  EFFECTIVE AREA(ACRES) =      6.60    AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        6.6        PEAK FLOW RATE(CFS) =      11.06

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.21
  FLOW VELOCITY(FEET/SEC.) =  4.20   DEPTH*VELOCITY(FT*FT/SEC.) =   1.52
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     825.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.10
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.137
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.40      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.40      SUBAREA RUNOFF(CFS) =    5.62
  EFFECTIVE AREA(ACRES) =     10.00   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       10.0       PEAK FLOW RATE(CFS) =      16.68

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  385.00  DOWNSTREAM ELEVATION(FEET) =  375.00
  STREET LENGTH(FEET) =   430.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```



```
  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) =      23.68
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.02
  STREET FLOW TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =    9.74
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.841
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.60      0.50     0.100     -
  USER-DEFINED               -        2.70      0.50     0.200     -
  USER-DEFINED               -        0.90      0.50     0.900     -
  USER-DEFINED               -        0.40      0.50     0.100     -
  USER-DEFINED               -        3.60      0.50     0.200     -
  USER-DEFINED               -        1.10      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.340
  SUBAREA AREA(ACRES) =    9.30      SUBAREA RUNOFF(CFS) =   13.98
  EFFECTIVE AREA(ACRES) =     19.30    AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       19.3        PEAK FLOW RATE(CFS) =      28.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.93
  FLOW VELOCITY(FEET/SEC.) =  4.57   DEPTH*VELOCITY(FT*FT/SEC.) =   2.21
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =    1255.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.74
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.841
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.00      0.50     0.100     -
  USER-DEFINED               -        1.10      0.50     0.900     -
  USER-DEFINED               -        2.10      0.50     0.100     -
  USER-DEFINED               -        0.20      0.50     0.200     -
  USER-DEFINED               -        4.40      0.50     0.900     -
  USER-DEFINED               -        0.30      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.586
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   12.68
  EFFECTIVE AREA(ACRES) =     28.40   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       28.4       PEAK FLOW RATE(CFS) =      40.67
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.74
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.841
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.80      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    2.25
  EFFECTIVE AREA(ACRES) =     30.20   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       30.2       PEAK FLOW RATE(CFS) =      42.93

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   375.00  DOWNSTREAM(FEET) =   360.00
  FLOW LENGTH(FEET) =  1242.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  21.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.26
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.93
  PIPE TRAVEL TIME(MIN.) =   2.02    Tc(MIN.) =   11.75
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =    2497.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.75
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.626
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.90      0.50     0.100     -
  USER-DEFINED               -        1.60      0.50     0.900     -
  USER-DEFINED               -        0.10      0.50     0.100     -
  USER-DEFINED               -        0.20      0.50     0.900     -
  USER-DEFINED               -        0.20      0.50     0.100     -
  USER-DEFINED               -        0.30      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.609
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    3.92
  EFFECTIVE AREA(ACRES) =     33.50   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       33.5       PEAK FLOW RATE(CFS) =      42.93
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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



```
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   360.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =   937.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.75
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.93
  PIPE TRAVEL TIME(MIN.) =   1.60    Tc(MIN.) =   13.35
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =    3434.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.35
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.473
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.40      0.50     0.100     -
  USER-DEFINED               -        1.00      0.50     0.900     -
  USER-DEFINED               -        0.50      0.50     0.100     -
  USER-DEFINED               -        1.10      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.660
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    3.09
  EFFECTIVE AREA(ACRES) =     36.50   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       36.5       PEAK FLOW RATE(CFS) =      42.93
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =   587.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.85
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.93
  PIPE TRAVEL TIME(MIN.) =   1.11    Tc(MIN.) =   14.46
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =    4021.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.46
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.368
```

```
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.30      0.50     0.100     -
 USER-DEFINED               -        0.20      0.50     0.400     -
 USER-DEFINED               -        0.40      0.50     0.100     -
 USER-DEFINED               -        0.10      0.50     0.900     -
 USER-DEFINED               -        0.30      0.50     0.400     -
 USER-DEFINED               -        0.20      0.50     0.100     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
 SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    1.68
 EFFECTIVE AREA(ACRES) =     38.00   AREA-AVERAGED Fm(INCH/HR) =  0.27
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =       38.0       PEAK FLOW RATE(CFS) =      42.93
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.46
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.368
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.10      0.50     0.400     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
 SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.11
 EFFECTIVE AREA(ACRES) =     38.10   AREA-AVERAGED Fm(INCH/HR) =  0.27
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =       38.1       PEAK FLOW RATE(CFS) =      42.93
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    221.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   345.00  DOWNSTREAM(FEET) =   330.00
 FLOW LENGTH(FEET) =  1217.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.03
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      42.93
 PIPE TRAVEL TIME(MIN.) =   2.02    Tc(MIN.) =   16.48
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    221.00 =    5238.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.48
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.260
```



```
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        7.70      0.50     0.100     -
 USER-DEFINED               -        0.30      0.50     0.200     -
 USER-DEFINED               -        0.40      0.50     0.900     -
 USER-DEFINED               -        0.20      0.50     0.400     -
 USER-DEFINED               -        3.80      0.50     0.100     -
 USER-DEFINED               -        0.40      0.50     0.200     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.135
 SUBAREA AREA(ACRES) =   12.80      SUBAREA RUNOFF(CFS) =   13.74
 EFFECTIVE AREA(ACRES) =     50.90   AREA-AVERAGED Fm(INCH/HR) =  0.22
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =       50.9       PEAK FLOW RATE(CFS) =      47.85

****************************************************************************
 FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.48
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.260
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.20      0.50     0.900     -
 USER-DEFINED               -        0.10      0.50     0.500     -
 USER-DEFINED               -        0.20      0.50     0.400     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.620
 SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    0.43
 EFFECTIVE AREA(ACRES) =     51.40   AREA-AVERAGED Fm(INCH/HR) =  0.22
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =       51.4       PEAK FLOW RATE(CFS) =      48.28

****************************************************************************
 FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.48
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.260
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        6.20      0.50     0.100     -
 USER-DEFINED               -        1.30      0.50     0.100     -
 USER-DEFINED               -        0.10      0.50     0.900     -
 USER-DEFINED               -        0.50      0.50     0.100     -
 USER-DEFINED               -        0.10      0.50     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.120
 SUBAREA AREA(ACRES) =    8.20      SUBAREA RUNOFF(CFS) =    8.86
 EFFECTIVE AREA(ACRES) =     59.60   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.39
 TOTAL AREA(ACRES) =       59.6       PEAK FLOW RATE(CFS) =      57.14
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 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.) =   16.48
  RAINFALL INTENSITY(INCH/HR) =   1.26
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.39
  EFFECTIVE STREAM AREA(ACRES) =      59.60
  TOTAL STREAM AREA(ACRES) =      59.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      57.14

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    467.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.740
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.840
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                -        0.80      0.50     0.850    56   12.58
  RESIDENTIAL
  ".4 DWELLING/ACRE"         -        0.10      0.50     0.900    56   12.68
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       -        1.50      0.50     0.500    56   10.13
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      -        0.20      0.50     0.400    56    9.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.615
  SUBAREA RUNOFF(CFS) =      3.59
  TOTAL AREA(ACRES) =      2.60   PEAK FLOW RATE(CFS) =      3.59

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  467.00  DOWNSTREAM ELEVATION(FEET) =  466.00
  STREET LENGTH(FEET) =   193.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       6.80
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   1.75   Tc(MIN.) =   11.49
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.651
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.50     0.400     -
  USER-DEFINED               -        0.50      0.50     0.850     -
  USER-DEFINED               -        0.10      0.50     0.900     -
  USER-DEFINED               -        2.20      0.50     0.500     -
  USER-DEFINED               -        2.00      0.50     0.400     -
  USER-DEFINED               -        0.10      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.501
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =    6.43
  EFFECTIVE AREA(ACRES) =      7.70    AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        7.7        PEAK FLOW RATE(CFS) =       9.57

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.74
  FLOW VELOCITY(FEET/SEC.) =  1.99   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     523.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.49
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.651
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.70      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    0.91
  EFFECTIVE AREA(ACRES) =      8.40   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        8.4        PEAK FLOW RATE(CFS) =      10.48

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  466.00  DOWNSTREAM ELEVATION(FEET) =  460.00
```

```
  STREET LENGTH(FEET) =   324.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      14.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.51
  STREET FLOW TRAVEL TIME(MIN.) =   1.50   Tc(MIN.) =   12.99
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.508
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.90      0.50     0.100     -
  USER-DEFINED               -        0.40      0.50     0.850     -
  USER-DEFINED               -        0.20      0.50     0.900     -
  USER-DEFINED               -        4.00      0.50     0.500     -
  USER-DEFINED               -        1.70      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.457
  SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =    8.29
  EFFECTIVE AREA(ACRES) =     15.60    AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       15.6        PEAK FLOW RATE(CFS) =      17.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.59
  FLOW VELOCITY(FEET/SEC.) =  3.74   DEPTH*VELOCITY(FT*FT/SEC.) =   1.65
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =     847.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   405.00
  FLOW LENGTH(FEET) =   508.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.69
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   13.44
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.44
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.465
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     0.200     -
  USER-DEFINED               -        0.10      0.50     0.500     -
  USER-DEFINED               -        3.10      0.50     0.400     -
  USER-DEFINED               -        1.60      0.50     0.100     -
  USER-DEFINED               -        0.60      0.50     0.850     -
  USER-DEFINED               -        2.40      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.524
  SUBAREA AREA(ACRES) =    7.90      SUBAREA RUNOFF(CFS) =    8.55
  EFFECTIVE AREA(ACRES) =     23.50   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       23.5       PEAK FLOW RATE(CFS) =      25.64

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.44
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.465
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     0.500     -
  USER-DEFINED               -        4.80      0.50     0.400     -
  USER-DEFINED               -        0.30      0.50     0.900     -
  USER-DEFINED               -        0.80      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.427
  SUBAREA AREA(ACRES) =    6.00      SUBAREA RUNOFF(CFS) =    6.76
  EFFECTIVE AREA(ACRES) =     29.50   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       29.5       PEAK FLOW RATE(CFS) =      32.40

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   376.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.70
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.40
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   14.08
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =    1731.00 FEET.

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

```
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.08
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.403
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.10      0.50     0.100     -
 USER-DEFINED               -        0.60      0.50     0.850     -
 USER-DEFINED               -        5.00      0.50     0.200     -
 USER-DEFINED               -        0.10      0.50     0.900     -
 USER-DEFINED               -        2.40      0.50     0.500     -
 USER-DEFINED               -        0.10      0.50     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.349
 SUBAREA AREA(ACRES) =    8.30      SUBAREA RUNOFF(CFS) =    9.18
 EFFECTIVE AREA(ACRES) =     37.80   AREA-AVERAGED Fm(INCH/HR) =  0.23
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.46
 TOTAL AREA(ACRES) =       37.8       PEAK FLOW RATE(CFS) =      39.94

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.08
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.403
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        4.10      0.50     0.500     -
 USER-DEFINED               -        0.10      0.50     0.500     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =    4.20      SUBAREA RUNOFF(CFS) =    4.36
 EFFECTIVE AREA(ACRES) =     42.00   AREA-AVERAGED Fm(INCH/HR) =  0.23
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.46
 TOTAL AREA(ACRES) =       42.0       PEAK FLOW RATE(CFS) =      44.30

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.08
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.403
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.80      0.50     0.850     -
 USER-DEFINED               -        2.50      0.50     0.200     -
 USER-DEFINED               -        0.40      0.50     0.900     -
 USER-DEFINED               -        1.50      0.50     0.600     -
 USER-DEFINED               -        2.30      0.50     0.400     -
 USER-DEFINED               -        1.20      0.50     0.850     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
```



```
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.503
 SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =    9.02
 EFFECTIVE AREA(ACRES) =     50.70   AREA-AVERAGED Fm(INCH/HR) =  0.23
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.47
 TOTAL AREA(ACRES) =       50.7       PEAK FLOW RATE(CFS) =      53.32

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.08
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.403
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        3.00      0.50     0.200     -
 USER-DEFINED               -        0.90      0.50     0.900     -
 USER-DEFINED               -        0.50      0.50     0.600     -
 USER-DEFINED               -        0.40      0.50     0.500     -
 USER-DEFINED               -        4.80      0.50     0.400     -
 USER-DEFINED               -        1.80      0.50     0.200     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.368
 SUBAREA AREA(ACRES) =   11.40      SUBAREA RUNOFF(CFS) =   12.51
 EFFECTIVE AREA(ACRES) =     62.10   AREA-AVERAGED Fm(INCH/HR) =  0.23
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =       62.1       PEAK FLOW RATE(CFS) =      65.83

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.08
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.403
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.10      0.50     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.09
 EFFECTIVE AREA(ACRES) =     62.20   AREA-AVERAGED Fm(INCH/HR) =  0.23
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =       62.2       PEAK FLOW RATE(CFS) =      65.92

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   350.00
 FLOW LENGTH(FEET) =  1800.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.60
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      65.92
  PIPE TRAVEL TIME(MIN.) =   1.92    Tc(MIN.) =   16.01
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    216.00 =    3531.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.01
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.278
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.50      0.50     0.100     -
  USER-DEFINED               -        0.50      0.50     0.850     -
  USER-DEFINED               -        1.40      0.50     0.900     -
  USER-DEFINED               -        5.70      0.50     0.400     -
  USER-DEFINED               -        0.50      0.50     0.850     -
  USER-DEFINED               -        0.70      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.508
  SUBAREA AREA(ACRES) =    9.30      SUBAREA RUNOFF(CFS) =    8.57
  EFFECTIVE AREA(ACRES) =     71.50   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       71.5       PEAK FLOW RATE(CFS) =      67.47

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.01
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.278
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.40      0.50     0.850     -
  USER-DEFINED               -        2.30      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.467
  SUBAREA AREA(ACRES) =    2.70      SUBAREA RUNOFF(CFS) =    2.54
  EFFECTIVE AREA(ACRES) =     74.20   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       74.2       PEAK FLOW RATE(CFS) =      70.00

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.01
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.278
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.30      0.50     0.850     -
  USER-DEFINED               -        2.40      0.50     0.900     -
```



```
  USER-DEFINED               -        0.80      0.50     0.500     -
  USER-DEFINED               -        4.70      0.50     0.400     -
  USER-DEFINED               -        2.00      0.50     0.900     -
  USER-DEFINED               -        0.90      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.644
  SUBAREA AREA(ACRES) =   12.10      SUBAREA RUNOFF(CFS) =   10.41
  EFFECTIVE AREA(ACRES) =     86.30   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       86.3       PEAK FLOW RATE(CFS) =      80.41

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.01
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.278
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.10      0.50     0.400     -
  USER-DEFINED               -        1.40      0.50     0.500     -
  USER-DEFINED               -        1.00      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.431
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    4.30
  EFFECTIVE AREA(ACRES) =     90.80   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       90.8       PEAK FLOW RATE(CFS) =      84.71

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   340.00
  FLOW LENGTH(FEET) =   886.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.80
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      84.71
  PIPE TRAVEL TIME(MIN.) =   1.25    Tc(MIN.) =   17.26
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    217.00 =    4417.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.26
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.231
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.30      0.50     0.850     -
  USER-DEFINED               -        0.40      0.50     0.200     -
```

```
  USER-DEFINED                -        1.80      0.50     0.200     -
  USER-DEFINED                -        0.40      0.50     0.100     -
  USER-DEFINED                -        2.20      0.50     0.850     -
  USER-DEFINED                -        1.00      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.460
  SUBAREA AREA(ACRES) =     6.10      SUBAREA RUNOFF(CFS) =     5.49
  EFFECTIVE AREA(ACRES) =     96.90   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       96.9       PEAK FLOW RATE(CFS) =      86.34

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.26
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.231
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        5.20      0.50     0.100     -
  USER-DEFINED                -        0.60      0.50     0.850     -
  USER-DEFINED                -        8.60      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.191
  SUBAREA AREA(ACRES) =   14.40      SUBAREA RUNOFF(CFS) =   14.71
  EFFECTIVE AREA(ACRES) =    111.30   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      111.3       PEAK FLOW RATE(CFS) =     101.05

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.26
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.231
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        1.70      0.50     0.200     -
  USER-DEFINED                -        4.30      0.50     0.100     -
  USER-DEFINED                -        3.00      0.50     0.850     -
  USER-DEFINED                -       10.30      0.50     0.200     -
  USER-DEFINED                -        3.70      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.298
  SUBAREA AREA(ACRES) =   23.00      SUBAREA RUNOFF(CFS) =   22.39
  EFFECTIVE AREA(ACRES) =    134.30   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      134.3       PEAK FLOW RATE(CFS) =     123.44

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    221.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```



```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   340.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1266.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  36.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.30
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     123.44
  PIPE TRAVEL TIME(MIN.) =   1.87    Tc(MIN.) =   19.13
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    221.00 =    5683.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 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.) =   19.13
  RAINFALL INTENSITY(INCH/HR) =   1.16
  AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =     134.30
  TOTAL STREAM AREA(ACRES) =     134.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     123.44

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       57.14   16.48    1.260  0.50( 0.19) 0.39      59.6     200.00
      2      123.44   19.13    1.160  0.50( 0.21) 0.42     134.3     210.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      174.69   16.48    1.260  0.50( 0.20) 0.41     175.3     200.00
      2      175.21   19.13    1.160  0.50( 0.20) 0.41     193.9     210.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     175.21    Tc(MIN.) =    19.13
  EFFECTIVE AREA(ACRES) =     193.90   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =      193.9
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    221.00 =    5683.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   330.00  DOWNSTREAM(FEET) =   280.00
  FLOW LENGTH(FEET) =   278.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.8 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  40.00
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     175.21
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   19.24
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    222.00 =    5961.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.24
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.156
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.80      0.50     0.100     -
  USER-DEFINED               -        0.30      0.50     0.900     -
  USER-DEFINED               -        1.90      0.50     0.100     -
  USER-DEFINED               -        1.30      0.50     1.000     -
  USER-DEFINED               -        2.20      0.50     0.900     -
  USER-DEFINED               -        2.50      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.517
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =    8.07
  EFFECTIVE AREA(ACRES) =    203.90   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =      203.9       PEAK FLOW RATE(CFS) =     175.21
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.24
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.156
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     1.000     -
  USER-DEFINED               -        4.70      0.50     0.100     -
  USER-DEFINED               -        0.30      0.50     1.000     -
  USER-DEFINED               -        4.00      0.50     0.900     -
  USER-DEFINED               -        0.60      0.50     0.500     -
  USER-DEFINED               -        0.40      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =   10.10      SUBAREA RUNOFF(CFS) =    8.18
  EFFECTIVE AREA(ACRES) =    214.00   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      214.0       PEAK FLOW RATE(CFS) =     182.16

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      183.93   16.60    1.256  0.50( 0.21) 0.42     195.4     200.00
      2      182.16   19.24    1.156  0.50( 0.21) 0.42     214.0     210.00
```



```
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     183.93  Tc(MIN.) =   16.60
  AREA-AVERAGED Fm(INCH/HR) =  0.21  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.42  EFFECTIVE AREA(ACRES) =     195.42

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.60
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.256
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.60      0.50     1.000     -
  USER-DEFINED               -        0.10      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.986
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    0.48
  EFFECTIVE AREA(ACRES) =    196.12   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      214.7       PEAK FLOW RATE(CFS) =     184.41
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      214.7  TC(MIN.) =     16.60
  EFFECTIVE AREA(ACRES) =    196.12  AREA-AVERAGED Fm(INCH/HR)=  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap = 0.422
  PEAK FLOW RATE(CFS)   =     184.41

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      184.41   16.60    1.256  0.50( 0.21) 0.42     196.1     200.00
      2      182.58   19.24    1.156  0.50( 0.21) 0.42     214.7     210.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                        Analysis prepared by:

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                            Santa Ana, CA
                                92707

 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA B                                                    *
* RATIONAL METHOD - REGIONAL RAINFALL                                   *
* 10-YR EV JUNE 2018 ROKAMOTO                                          *
 ************************************************************************

  FILE NAME: 3B10EVRL.DAT
  TIME/DATE OF STUDY: 07:08 07/17/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  3.584
   2)   10.00;  2.561
   3)   15.00;  1.881
   4)   20.00;  1.609
   5)   25.00;  1.403
   6)   30.00;  1.259
   7)   40.00;  1.077
   8)   50.00;  0.959
   9)   60.00;  0.872
  10)   90.00;  0.725
  11)  120.00;  0.642
  12)  180.00;  0.539
  13)  360.00;  0.399
  14) 1200.00;  0.175
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   305.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    402.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.935
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.393
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.30      0.30      0.100    56    5.94
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30      0.900    56    9.51
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30      0.600    56    8.04
  COMMERCIAL                 B        0.30      0.30      0.100    56    5.94
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30      0.900    56    9.51
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.50      0.30      0.600    56    8.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.580
  SUBAREA RUNOFF(CFS) =      8.69
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =      8.69

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  402.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   520.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      13.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.39
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.67
  STREET FLOW TRAVEL TIME(MIN.) =   1.97   Tc(MIN.) =    7.91
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.989
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.40      0.30     0.600    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.50      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.525
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    9.17
  EFFECTIVE AREA(ACRES) =      6.60    AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        6.6        PEAK FLOW RATE(CFS) =      16.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.48
  FLOW VELOCITY(FEET/SEC.) =  4.62   DEPTH*VELOCITY(FT*FT/SEC.) =   1.86
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     825.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.91
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.989
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.40      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.40      SUBAREA RUNOFF(CFS) =    8.60
  EFFECTIVE AREA(ACRES) =     10.00   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       10.0       PEAK FLOW RATE(CFS) =      25.37

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  385.00  DOWNSTREAM ELEVATION(FEET) =  375.00
  STREET LENGTH(FEET) =   430.00   CURB HEIGHT(INCHES) =  8.0
```



```
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      36.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   19.88
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.86
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.52
  STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    9.38
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.687
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.60      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.340
  SUBAREA AREA(ACRES) =    9.30      SUBAREA RUNOFF(CFS) =   21.64
  EFFECTIVE AREA(ACRES) =     19.30    AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       19.3        PEAK FLOW RATE(CFS) =      44.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.52
  FLOW VELOCITY(FEET/SEC.) =  5.11   DEPTH*VELOCITY(FT*FT/SEC.) =   2.80
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =    1255.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.38
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.687
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.00      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  COMMERCIAL                 B        2.10      0.30     0.100    56
```

```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.40      0.30     0.900    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.586
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   20.57
  EFFECTIVE AREA(ACRES) =     28.40   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       28.4       PEAK FLOW RATE(CFS) =      64.86

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.38
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.687
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.80      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    3.92
  EFFECTIVE AREA(ACRES) =     30.20   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       30.2       PEAK FLOW RATE(CFS) =      68.77

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   375.00  DOWNSTREAM(FEET) =   360.00
  FLOW LENGTH(FEET) =  1242.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.21
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.77
  PIPE TRAVEL TIME(MIN.) =   1.85    Tc(MIN.) =   11.23
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =    2497.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.23
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.394
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.90      0.30     0.100    56
  RESIDENTIAL
```



```
  ".4 DWELLING/ACRE"         B        1.60      0.30     0.900    56
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.609
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    6.57
  EFFECTIVE AREA(ACRES) =     33.50   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       33.5       PEAK FLOW RATE(CFS) =      68.77
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   360.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =   937.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.95
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.77
  PIPE TRAVEL TIME(MIN.) =   1.43    Tc(MIN.) =   12.66
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =    3434.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.66
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.200
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.00      0.30     0.900    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.660
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    5.40
  EFFECTIVE AREA(ACRES) =     36.50   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       36.5       PEAK FLOW RATE(CFS) =      68.77
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =   587.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.92
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.77
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =   13.64
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =    4021.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.64
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.066
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.30      0.30     0.100    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.30      0.30     0.400    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    2.69
  EFFECTIVE AREA(ACRES) =     38.00   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       38.0       PEAK FLOW RATE(CFS) =      68.77
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.64
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.066
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.10      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.18
  EFFECTIVE AREA(ACRES) =     38.10   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       38.1       PEAK FLOW RATE(CFS) =      68.77
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    221.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   345.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1217.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.33
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.77
  PIPE TRAVEL TIME(MIN.) =   1.79    Tc(MIN.) =   15.43
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    221.00 =    5238.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        7.70      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  COMMERCIAL                 B        3.80      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.40      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.135
  SUBAREA AREA(ACRES) =   12.80      SUBAREA RUNOFF(CFS) =   20.93
  EFFECTIVE AREA(ACRES) =     50.90   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       50.9       PEAK FLOW RATE(CFS) =      79.17

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.620
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    0.75
  EFFECTIVE AREA(ACRES) =     51.40   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       51.4       PEAK FLOW RATE(CFS) =      79.92

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        6.20      0.30     0.100    56
  COMMERCIAL                  B        1.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.10      0.30     0.900    56
  COMMERCIAL                  B        0.50      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.120
  SUBAREA AREA(ACRES) =    8.20      SUBAREA RUNOFF(CFS) =   13.44
  EFFECTIVE AREA(ACRES) =     59.60   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       59.6       PEAK FLOW RATE(CFS) =      93.37

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 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.) =   15.43
  RAINFALL INTENSITY(INCH/HR) =   1.86
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.39
  EFFECTIVE STREAM AREA(ACRES) =      59.60
  TOTAL STREAM AREA(ACRES) =      59.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      93.37

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    467.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.740
```



```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.614
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                 B        0.80      0.30     0.850    56   12.58
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.10      0.30     0.900    56   12.68
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B        1.50      0.30     0.500    56   10.13
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        0.20      0.30     0.400    56    9.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.615
  SUBAREA RUNOFF(CFS) =      5.69
  TOTAL AREA(ACRES) =      2.60   PEAK FLOW RATE(CFS) =      5.69

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  467.00  DOWNSTREAM ELEVATION(FEET) =  466.00
  STREET LENGTH(FEET) =   193.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      10.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.05
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
  STREET FLOW TRAVEL TIME(MIN.) =   1.57   Tc(MIN.) =   11.31
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.383
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        0.20      0.30     0.400    56
  PUBLIC PARK                 B        0.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.10      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B        2.20      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        2.00      0.30     0.400    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        0.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.501
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =   10.25
  EFFECTIVE AREA(ACRES) =      7.70    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        7.7        PEAK FLOW RATE(CFS) =      15.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  19.10
  FLOW VELOCITY(FEET/SEC.) =  2.23   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     523.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.31
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.383
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    1.43
  EFFECTIVE AREA(ACRES) =      8.40   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        8.4       PEAK FLOW RATE(CFS) =      16.82

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  466.00  DOWNSTREAM ELEVATION(FEET) =  460.00
  STREET LENGTH(FEET) =   324.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      23.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   17.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.91
  STREET FLOW TRAVEL TIME(MIN.) =   1.34   Tc(MIN.) =   12.65
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.201
  SUBAREA LOSS RATE DATA(AMC  II):
```



```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.00      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.457
  SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =   13.38
  EFFECTIVE AREA(ACRES) =     15.60    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       15.6        PEAK FLOW RATE(CFS) =      28.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  19.02
  FLOW VELOCITY(FEET/SEC.) =  4.21   DEPTH*VELOCITY(FT*FT/SEC.) =   2.11
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =     847.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   405.00
  FLOW LENGTH(FEET) =   508.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.93
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.82
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   13.05
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.05
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.146
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.10      0.30     0.400    56
  COMMERCIAL                 B        1.60      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.524
  SUBAREA AREA(ACRES) =    7.90      SUBAREA RUNOFF(CFS) =   14.14
  EFFECTIVE AREA(ACRES) =     23.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       23.5       PEAK FLOW RATE(CFS) =      42.19

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.05
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.146
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.80      0.30     0.400    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.80      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.427
  SUBAREA AREA(ACRES) =    6.00      SUBAREA RUNOFF(CFS) =   10.90
  EFFECTIVE AREA(ACRES) =     29.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       29.5       PEAK FLOW RATE(CFS) =      53.09

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   376.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.05
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.09
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   13.62
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =    1731.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.62
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.069
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
```



```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.40      0.30     0.500    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.349
  SUBAREA AREA(ACRES) =    8.30      SUBAREA RUNOFF(CFS) =   14.67
  EFFECTIVE AREA(ACRES) =     37.80   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       37.8       PEAK FLOW RATE(CFS) =      65.71

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.62
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.069
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.10      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    4.20      SUBAREA RUNOFF(CFS) =    7.25
  EFFECTIVE AREA(ACRES) =     42.00   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       42.0       PEAK FLOW RATE(CFS) =      72.97

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.62
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.069
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.80      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.50      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.50      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.30      0.30     0.400    56
  PUBLIC PARK                B        1.20      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.503
```

```
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =   15.02
  EFFECTIVE AREA(ACRES) =     50.70   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       50.7       PEAK FLOW RATE(CFS) =      87.98

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.62
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.069
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.50      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.80      0.30     0.400    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.80      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.368
  SUBAREA AREA(ACRES) =   11.40      SUBAREA RUNOFF(CFS) =   20.10
  EFFECTIVE AREA(ACRES) =     62.10   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       62.1       PEAK FLOW RATE(CFS) =     108.08

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.62
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.069
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.16
  EFFECTIVE AREA(ACRES) =     62.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       62.2       PEAK FLOW RATE(CFS) =     108.24

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```



```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =  1800.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.59
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     108.24
  PIPE TRAVEL TIME(MIN.) =   1.71    Tc(MIN.) =   15.32
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    216.00 =    3531.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.32
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.863
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      0.30     0.100    56
  PUBLIC PARK                B        0.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.40      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        5.70      0.30     0.400    56
  PUBLIC PARK                B        0.50      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.508
  SUBAREA AREA(ACRES) =    9.30      SUBAREA RUNOFF(CFS) =   14.32
  EFFECTIVE AREA(ACRES) =     71.50   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       71.5       PEAK FLOW RATE(CFS) =     111.06

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.32
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.863
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.467
  SUBAREA AREA(ACRES) =    2.70      SUBAREA RUNOFF(CFS) =    4.19
  EFFECTIVE AREA(ACRES) =     74.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       74.2       PEAK FLOW RATE(CFS) =     115.24

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
```

```
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.32
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.863
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.30      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.80      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.70      0.30     0.400    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.00      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.90      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.644
  SUBAREA AREA(ACRES) =   12.10      SUBAREA RUNOFF(CFS) =   18.19
  EFFECTIVE AREA(ACRES) =     86.30   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       86.3       PEAK FLOW RATE(CFS) =     133.43

******************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.32
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.863
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.10      0.30     0.400    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.40      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.00      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.431
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    7.02
  EFFECTIVE AREA(ACRES) =     90.80   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       90.8       PEAK FLOW RATE(CFS) =     140.46

******************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   340.00
  FLOW LENGTH(FEET) =   886.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  38.1 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.13
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     140.46
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =   16.45
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    217.00 =    4417.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   16.45
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.802
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.40      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.80      0.30     0.200    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  PUBLIC PARK                B        2.20      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.00      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.460
  SUBAREA AREA(ACRES) =    6.10      SUBAREA RUNOFF(CFS) =    9.14
  EFFECTIVE AREA(ACRES) =     96.90   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       96.9       PEAK FLOW RATE(CFS) =     144.59

******************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   16.45
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.802
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        5.20      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        8.60      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.191
  SUBAREA AREA(ACRES) =   14.40      SUBAREA RUNOFF(CFS) =   22.61
  EFFECTIVE AREA(ACRES) =    111.30   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      111.3       PEAK FLOW RATE(CFS) =     167.21

******************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
```

```
  MAINLINE Tc(MIN.) =   16.45
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.802
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.70      0.30     0.200    56
  COMMERCIAL                 B        4.30      0.30     0.100    56
  PUBLIC PARK                B        3.00      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       10.30      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.298
  SUBAREA AREA(ACRES) =   23.00      SUBAREA RUNOFF(CFS) =   35.45
  EFFECTIVE AREA(ACRES) =    134.30   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      134.3       PEAK FLOW RATE(CFS) =     202.66

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    221.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   340.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1266.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  45.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.69
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     202.66
  PIPE TRAVEL TIME(MIN.) =   1.66    Tc(MIN.) =   18.11
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    221.00 =    5683.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 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.) =   18.11
  RAINFALL INTENSITY(INCH/HR) =   1.71
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =     134.30
  TOTAL STREAM AREA(ACRES) =     134.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     202.66

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       93.37   15.43    1.857  0.30( 0.12) 0.39      59.6     200.00
      2      202.66   18.11    1.712  0.30( 0.13) 0.42     134.3     210.00
```



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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      281.93   15.43    1.857  0.30( 0.12) 0.41     174.1     200.00
      2      288.22   18.11    1.712  0.30( 0.12) 0.41     193.9     210.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     288.22    Tc(MIN.) =    18.11
  EFFECTIVE AREA(ACRES) =     193.90   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =      193.9
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    221.00 =    5683.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   330.00  DOWNSTREAM(FEET) =   280.00
  FLOW LENGTH(FEET) =   278.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  45.09
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     288.22
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   18.21
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    222.00 =    5961.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.706
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  COMMERCIAL                 B        1.90      0.30     0.100    56
  AGRICULTURAL FAIR COVER
  "ORCHARDS"                 B        1.30      0.30     1.000    65
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.50      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.517
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   13.96
  EFFECTIVE AREA(ACRES) =    203.90   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =      203.9       PEAK FLOW RATE(CFS) =     290.27
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.706
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  COMMERCIAL                 B        4.70      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.00      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.60      0.30     0.500    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.40      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =   10.10      SUBAREA RUNOFF(CFS) =   14.11
  EFFECTIVE AREA(ACRES) =    214.00   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      214.0       PEAK FLOW RATE(CFS) =     304.39

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.706
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL FAIR COVER
  "ORCHARDS"                 B        0.60      0.30     1.000    65
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.986
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    0.89
  EFFECTIVE AREA(ACRES) =    214.70   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      214.7       PEAK FLOW RATE(CFS) =     305.28
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      214.7  TC(MIN.) =     18.21
  EFFECTIVE AREA(ACRES) =    214.70  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.421
  PEAK FLOW RATE(CFS)   =     305.28

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```



```
      1      302.57   15.54    1.852  0.30( 0.13) 0.42     194.9     200.00
      2      305.28   18.21    1.706  0.30( 0.13) 0.42     214.7     210.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                          Analysis prepared by:

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                              Santa Ana, CA
                                  92707

 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA B                                                    *
* RATIONAL METHOD - REGIONAL RAINFALL                                   *
* 25-YR EV JUNE 2018 ROKAMOTO                                          *
 ************************************************************************

  FILE NAME: 3B25EVRL.DAT
  TIME/DATE OF STUDY: 07:07 07/17/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  4.919
   2)   10.00;  3.206
   3)   15.00;  2.446
   4)   20.00;  2.020
   5)   25.00;  1.761
   6)   30.00;  1.545
   7)   40.00;  1.345
   8)   50.00;  1.192
   9)   60.00;  1.068
  10)   90.00;  0.899
  11)  120.00;  0.789
  12)  180.00;  0.660
  13)  360.00;  0.488
  14) 1200.00;  0.215
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   305.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    402.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.935
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.599
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.30      0.30      0.100    56    5.94
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30      0.900    56    9.51
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30      0.600    56    8.04
  COMMERCIAL                 B        0.30      0.30      0.100    56    5.94
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30      0.900    56    9.51
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.50      0.30      0.600    56    8.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.580
  SUBAREA RUNOFF(CFS) =     11.95
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =     11.95

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  402.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   520.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      18.13
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.93
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =    7.78
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.966
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.40      0.30     0.600    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.50      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.525
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =   12.34
  EFFECTIVE AREA(ACRES) =      6.60    AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        6.6        PEAK FLOW RATE(CFS) =      22.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.27
  FLOW VELOCITY(FEET/SEC.) =  4.96   DEPTH*VELOCITY(FT*FT/SEC.) =   2.16
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     825.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.78
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.966
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.40      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.40      SUBAREA RUNOFF(CFS) =   11.59
  EFFECTIVE AREA(ACRES) =     10.00   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       10.0       PEAK FLOW RATE(CFS) =      34.16

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  385.00  DOWNSTREAM ELEVATION(FEET) =  375.00
  STREET LENGTH(FEET) =   430.00   CURB HEIGHT(INCHES) =  8.0
```



```
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      48.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.56
    HALFSTREET FLOOD WIDTH(FEET) =   22.30
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.93
  STREET FLOW TRAVEL TIME(MIN.) =   1.37   Tc(MIN.) =    9.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.496
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.60      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.340
  SUBAREA AREA(ACRES) =    9.30      SUBAREA RUNOFF(CFS) =   28.40
  EFFECTIVE AREA(ACRES) =     19.30    AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       19.3        PEAK FLOW RATE(CFS) =      58.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.59   HALFSTREET FLOOD WIDTH(FEET) =  24.02
  FLOW VELOCITY(FEET/SEC.) =  5.45   DEPTH*VELOCITY(FT*FT/SEC.) =   3.23
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =    1255.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.496
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.00      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  COMMERCIAL                 B        2.10      0.30     0.100    56
```

```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.40      0.30     0.900    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.586
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   27.19
  EFFECTIVE AREA(ACRES) =     28.40   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       28.4       PEAK FLOW RATE(CFS) =      85.52

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.496
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.80      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    5.23
  EFFECTIVE AREA(ACRES) =     30.20   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       30.2       PEAK FLOW RATE(CFS) =      90.75

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   375.00  DOWNSTREAM(FEET) =   360.00
  FLOW LENGTH(FEET) =  1242.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.27
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.75
  PIPE TRAVEL TIME(MIN.) =   1.69    Tc(MIN.) =   10.84
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =    2497.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.84
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.078
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.90      0.30     0.100    56
  RESIDENTIAL
```



```
  ".4 DWELLING/ACRE"         B        1.60      0.30     0.900    56
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.609
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    8.60
  EFFECTIVE AREA(ACRES) =     33.50   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       33.5       PEAK FLOW RATE(CFS) =      90.75
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   360.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =   937.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.63
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.75
  PIPE TRAVEL TIME(MIN.) =   1.34    Tc(MIN.) =   12.18
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =    3434.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.18
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.874
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.00      0.30     0.900    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.660
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    7.23
  EFFECTIVE AREA(ACRES) =     36.50   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       36.5       PEAK FLOW RATE(CFS) =      90.75
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =   587.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.78
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.75
  PIPE TRAVEL TIME(MIN.) =   0.91    Tc(MIN.) =   13.09
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =    4021.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.09
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.736
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.30      0.30     0.100    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.30      0.30     0.400    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    3.59
  EFFECTIVE AREA(ACRES) =     38.00   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       38.0       PEAK FLOW RATE(CFS) =      90.75
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.09
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.736
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.10      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.24
  EFFECTIVE AREA(ACRES) =     38.10   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       38.1       PEAK FLOW RATE(CFS) =      90.75
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    221.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   345.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1217.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.38
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.75
  PIPE TRAVEL TIME(MIN.) =   1.64    Tc(MIN.) =   14.73
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    221.00 =    5238.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.73
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.487
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        7.70      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  COMMERCIAL                 B        3.80      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.40      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.135
  SUBAREA AREA(ACRES) =   12.80      SUBAREA RUNOFF(CFS) =   28.18
  EFFECTIVE AREA(ACRES) =     50.90   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       50.9       PEAK FLOW RATE(CFS) =     108.00

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.73
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.487
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
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```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.620
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.04
  EFFECTIVE AREA(ACRES) =     51.40   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       51.4       PEAK FLOW RATE(CFS) =     109.04

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.73
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.487
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        6.20      0.30     0.100    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.120
  SUBAREA AREA(ACRES) =    8.20      SUBAREA RUNOFF(CFS) =   18.09
  EFFECTIVE AREA(ACRES) =     59.60   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       59.6       PEAK FLOW RATE(CFS) =     127.13

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 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.) =   14.73
  RAINFALL INTENSITY(INCH/HR) =   2.49
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.39
  EFFECTIVE STREAM AREA(ACRES) =      59.60
  TOTAL STREAM AREA(ACRES) =      59.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     127.13

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    467.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.740
```



```
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.295
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.80      0.30     0.850    56   12.58
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56   12.68
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.50      0.30     0.500    56   10.13
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56    9.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.615
  SUBAREA RUNOFF(CFS) =      7.28
  TOTAL AREA(ACRES) =      2.60   PEAK FLOW RATE(CFS) =      7.28

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  467.00  DOWNSTREAM ELEVATION(FEET) =  466.00
  STREET LENGTH(FEET) =   193.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      13.87
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.49
    HALFSTREET FLOOD WIDTH(FEET) =   18.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.06
  STREET FLOW TRAVEL TIME(MIN.) =   1.48   Tc(MIN.) =   11.22
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.021
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  PUBLIC PARK                B        0.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.20      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.00      0.30     0.400    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.501
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =   13.17
  EFFECTIVE AREA(ACRES) =      7.70    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        7.7        PEAK FLOW RATE(CFS) =      19.81

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.54   HALFSTREET FLOOD WIDTH(FEET) =  21.13
  FLOW VELOCITY(FEET/SEC.) =  2.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     523.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.22
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.021
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    1.83
  EFFECTIVE AREA(ACRES) =      8.40   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        8.4       PEAK FLOW RATE(CFS) =      21.64

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  466.00  DOWNSTREAM ELEVATION(FEET) =  460.00
  STREET LENGTH(FEET) =   324.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      30.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.41
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.26
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.17
  STREET FLOW TRAVEL TIME(MIN.) =   1.27   Tc(MIN.) =   12.49
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.828
  SUBAREA LOSS RATE DATA(AMC  II):
```



```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.00      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.457
  SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =   17.44
  EFFECTIVE AREA(ACRES) =     15.60    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       15.6        PEAK FLOW RATE(CFS) =      37.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.54   HALFSTREET FLOOD WIDTH(FEET) =  21.13
  FLOW VELOCITY(FEET/SEC.) =  4.50   DEPTH*VELOCITY(FT*FT/SEC.) =   2.43
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =     847.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   405.00
  FLOW LENGTH(FEET) =   508.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.63
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.62
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   12.86
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.86
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.771
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.10      0.30     0.400    56
  COMMERCIAL                 B        1.60      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.524
  SUBAREA AREA(ACRES) =    7.90      SUBAREA RUNOFF(CFS) =   18.59
  EFFECTIVE AREA(ACRES) =     23.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       23.5       PEAK FLOW RATE(CFS) =      55.41

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.86
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.771
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.80      0.30     0.400    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.80      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.427
  SUBAREA AREA(ACRES) =    6.00      SUBAREA RUNOFF(CFS) =   14.27
  EFFECTIVE AREA(ACRES) =     29.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       29.5       PEAK FLOW RATE(CFS) =      69.68

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   376.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.75
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      69.68
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   13.39
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =    1731.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.39
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.690
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
```



```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.40      0.30     0.500    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.349
  SUBAREA AREA(ACRES) =    8.30      SUBAREA RUNOFF(CFS) =   19.31
  EFFECTIVE AREA(ACRES) =     37.80   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       37.8       PEAK FLOW RATE(CFS) =      86.84

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.39
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.690
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.10      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    4.20      SUBAREA RUNOFF(CFS) =    9.60
  EFFECTIVE AREA(ACRES) =     42.00   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       42.0       PEAK FLOW RATE(CFS) =      96.45

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.39
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.690
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.80      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.50      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.50      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.30      0.30     0.400    56
  PUBLIC PARK                B        1.20      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.503
```

```
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =   19.88
  EFFECTIVE AREA(ACRES) =     50.70   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       50.7       PEAK FLOW RATE(CFS) =     116.33

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.39
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.690
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.50      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.80      0.30     0.400    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.80      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.368
  SUBAREA AREA(ACRES) =   11.40      SUBAREA RUNOFF(CFS) =   26.47
  EFFECTIVE AREA(ACRES) =     62.10   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       62.1       PEAK FLOW RATE(CFS) =     142.80

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.39
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.690
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.22
  EFFECTIVE AREA(ACRES) =     62.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       62.2       PEAK FLOW RATE(CFS) =     143.02

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```



```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =  1800.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.71
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     143.02
  PIPE TRAVEL TIME(MIN.) =   1.60    Tc(MIN.) =   15.00
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    216.00 =    3531.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.446
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      0.30     0.100    56
  PUBLIC PARK                B        0.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.40      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        5.70      0.30     0.400    56
  PUBLIC PARK                B        0.50      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.508
  SUBAREA AREA(ACRES) =    9.30      SUBAREA RUNOFF(CFS) =   19.20
  EFFECTIVE AREA(ACRES) =     71.50   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       71.5       PEAK FLOW RATE(CFS) =     148.57

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.446
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.467
  SUBAREA AREA(ACRES) =    2.70      SUBAREA RUNOFF(CFS) =    5.60
  EFFECTIVE AREA(ACRES) =     74.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       74.2       PEAK FLOW RATE(CFS) =     154.18

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
```

```
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.446
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.30      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.80      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.70      0.30     0.400    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.00      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.90      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.644
  SUBAREA AREA(ACRES) =   12.10      SUBAREA RUNOFF(CFS) =   24.54
  EFFECTIVE AREA(ACRES) =     86.30   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       86.3       PEAK FLOW RATE(CFS) =     178.72

******************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.446
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.10      0.30     0.400    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.40      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.00      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.431
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    9.38
  EFFECTIVE AREA(ACRES) =     90.80   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       90.8       PEAK FLOW RATE(CFS) =     188.10

******************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   340.00
  FLOW LENGTH(FEET) =   886.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  42.0 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.18
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     188.10
  PIPE TRAVEL TIME(MIN.) =   1.04    Tc(MIN.) =   16.04
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    217.00 =    4417.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   16.04
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.358
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.40      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.80      0.30     0.200    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  PUBLIC PARK                B        2.20      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.00      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.460
  SUBAREA AREA(ACRES) =    6.10      SUBAREA RUNOFF(CFS) =   12.19
  EFFECTIVE AREA(ACRES) =     96.90   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       96.9       PEAK FLOW RATE(CFS) =     193.02

******************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   16.04
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.358
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        5.20      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        8.60      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.191
  SUBAREA AREA(ACRES) =   14.40      SUBAREA RUNOFF(CFS) =   29.81
  EFFECTIVE AREA(ACRES) =    111.30   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      111.3       PEAK FLOW RATE(CFS) =     222.83

******************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
```

```
 MAINLINE Tc(MIN.) =   16.04
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.358
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        1.70      0.30     0.200    56
 COMMERCIAL                 B        4.30      0.30     0.100    56
 PUBLIC PARK                B        3.00      0.30     0.850    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B       10.30      0.30     0.200    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        3.70      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.298
 SUBAREA AREA(ACRES) =   23.00      SUBAREA RUNOFF(CFS) =   46.95
 EFFECTIVE AREA(ACRES) =    134.30   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =      134.3       PEAK FLOW RATE(CFS) =     269.78

****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    221.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   340.00  DOWNSTREAM(FEET) =   330.00
 FLOW LENGTH(FEET) =  1266.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  66.0 INCH PIPE IS  51.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.56
 ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     269.78
 PIPE TRAVEL TIME(MIN.) =   1.56    Tc(MIN.) =   17.59
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    221.00 =    5683.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 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.) =   17.59
 RAINFALL INTENSITY(INCH/HR) =   2.23
 AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.42
 EFFECTIVE STREAM AREA(ACRES) =     134.30
 TOTAL STREAM AREA(ACRES) =     134.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     269.78

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      127.13   14.73    2.487  0.30( 0.12) 0.39      59.6     200.00
     2      269.78   17.59    2.225  0.30( 0.13) 0.42     134.3     210.00
```



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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      381.18   14.73    2.487  0.30( 0.12) 0.41     172.0     200.00
     2      382.86   17.59    2.225  0.30( 0.12) 0.41     193.9     210.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     382.86    Tc(MIN.) =    17.59
 EFFECTIVE AREA(ACRES) =     193.90   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =      193.9
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    221.00 =    5683.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   330.00  DOWNSTREAM(FEET) =   280.00
 FLOW LENGTH(FEET) =   278.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  47.86
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     382.86
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   17.69
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    222.00 =    5961.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.69
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.217
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.80      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
 COMMERCIAL                 B        1.90      0.30     0.100    56
 AGRICULTURAL FAIR COVER
 "ORCHARDS"                 B        1.30      0.30     1.000    65
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        2.50      0.30     0.500    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.517
 SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   18.55
 EFFECTIVE AREA(ACRES) =    203.90   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =      203.9       PEAK FLOW RATE(CFS) =     383.96
```

```
 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      384.67   14.83    2.472  0.30( 0.12) 0.41     182.0     200.00
     2      383.96   17.69    2.217  0.30( 0.12) 0.41     203.9     210.00
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =     384.67  Tc(MIN.) =   14.83
 AREA-AVERAGED Fm(INCH/HR) =  0.12  AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.41  EFFECTIVE AREA(ACRES) =     182.05

****************************************************************************
 FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.83
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.472
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
 COMMERCIAL                 B        4.70      0.30     0.100    56
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.30      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        4.00      0.30     0.900    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.60      0.30     0.500    56
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.40      0.30     1.000    65
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
 SUBAREA AREA(ACRES) =   10.10      SUBAREA RUNOFF(CFS) =   21.08
 EFFECTIVE AREA(ACRES) =    192.15   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =      214.0       PEAK FLOW RATE(CFS) =     405.75

****************************************************************************
 FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.83
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.472
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 AGRICULTURAL FAIR COVER
 "ORCHARDS"                 B        0.60      0.30     1.000    65
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.986
 SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    1.37
 EFFECTIVE AREA(ACRES) =    192.85   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =      214.7       PEAK FLOW RATE(CFS) =     407.12
```



```
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =      214.7  TC(MIN.) =     14.83
 EFFECTIVE AREA(ACRES) =    192.85  AREA-AVERAGED Fm(INCH/HR)=  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.422
 PEAK FLOW RATE(CFS)   =     407.12

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      407.12   14.83    2.472  0.30( 0.13) 0.42     192.8     200.00
     2      403.92   17.69    2.217  0.30( 0.13) 0.42     214.7     210.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                         Analysis prepared by:

                       Michael Baker International
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                              Santa Ana, CA
                                  92707

 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA B                                                    *
* RATIONAL METHOD - REGIONAL RAINFALL                                   *
* 50-YR EV JUNE 2018 ROKAMOTO                                          *
 ************************************************************************

  FILE NAME: 3B50EVRL.DAT
  TIME/DATE OF STUDY: 07:04 07/17/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  5.437
   2)   10.00;  3.431
   3)   15.00;  2.666
   4)   20.00;  2.226
   5)   25.00;  1.924
   6)   30.00;  1.731
   7)   40.00;  1.465
   8)   50.00;  1.303
   9)   60.00;  1.200
  10)   90.00;  0.997
  11)  120.00;  0.867
  12)  180.00;  0.745
  13)  360.00;  0.552
  14) 1200.00;  0.243
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   305.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    402.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.935
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  5.062
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.30      0.30      0.100    56    5.94
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30      0.900    56    9.51
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30      0.600    56    8.04
  COMMERCIAL                 B        0.30      0.30      0.100    56    5.94
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30      0.900    56    9.51
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.50      0.30      0.600    56    8.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.580
  SUBAREA RUNOFF(CFS) =     13.20
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =     13.20

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  402.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   520.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      19.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.57
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.78
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.02
  STREET FLOW TRAVEL TIME(MIN.) =   1.81   Tc(MIN.) =    7.75
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.335
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.40      0.30     0.600    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.50      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.525
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =   13.53
  EFFECTIVE AREA(ACRES) =      6.60    AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        6.6        PEAK FLOW RATE(CFS) =      24.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  15.90
  FLOW VELOCITY(FEET/SEC.) =  5.05   DEPTH*VELOCITY(FT*FT/SEC.) =   2.26
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     825.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.75
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.335
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.40      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.40      SUBAREA RUNOFF(CFS) =   12.71
  EFFECTIVE AREA(ACRES) =     10.00   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       10.0       PEAK FLOW RATE(CFS) =      37.48

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  385.00  DOWNSTREAM ELEVATION(FEET) =  375.00
  STREET LENGTH(FEET) =   430.00   CURB HEIGHT(INCHES) =  8.0
```



```
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      52.95
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.58
    HALFSTREET FLOOD WIDTH(FEET) =   23.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.06
  STREET FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =    9.10
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.793
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.60      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.340
  SUBAREA AREA(ACRES) =    9.30      SUBAREA RUNOFF(CFS) =   30.89
  EFFECTIVE AREA(ACRES) =     19.30    AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       19.3        PEAK FLOW RATE(CFS) =      63.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.61   HALFSTREET FLOOD WIDTH(FEET) =  24.80
  FLOW VELOCITY(FEET/SEC.) =  5.58   DEPTH*VELOCITY(FT*FT/SEC.) =   3.38
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =    1255.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.10
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.793
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.00      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  COMMERCIAL                 B        2.10      0.30     0.100    56
```

```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.40      0.30     0.900    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.586
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   29.63
  EFFECTIVE AREA(ACRES) =     28.40   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       28.4       PEAK FLOW RATE(CFS) =      93.13

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.10
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.793
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.80      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    5.71
  EFFECTIVE AREA(ACRES) =     30.20   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       30.2       PEAK FLOW RATE(CFS) =      98.84

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   375.00  DOWNSTREAM(FEET) =   360.00
  FLOW LENGTH(FEET) =  1242.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.40
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      98.84
  PIPE TRAVEL TIME(MIN.) =   1.67    Tc(MIN.) =   10.77
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =    2497.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.77
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.314
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.90      0.30     0.100    56
  RESIDENTIAL
```



```
  ".4 DWELLING/ACRE"         B        1.60      0.30     0.900    56
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.609
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    9.30
  EFFECTIVE AREA(ACRES) =     33.50   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       33.5       PEAK FLOW RATE(CFS) =      98.84
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   360.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =   937.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.01
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      98.84
  PIPE TRAVEL TIME(MIN.) =   1.30    Tc(MIN.) =   12.07
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =    3434.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.07
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.115
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.00      0.30     0.900    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.660
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    7.87
  EFFECTIVE AREA(ACRES) =     36.50   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       36.5       PEAK FLOW RATE(CFS) =      98.84
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =   587.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.89
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      98.84
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =   12.97
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =    4021.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.97
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.977
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.30      0.30     0.100    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.30      0.30     0.400    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    3.92
  EFFECTIVE AREA(ACRES) =     38.00   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       38.0       PEAK FLOW RATE(CFS) =      98.84
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.97
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.977
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.10      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.26
  EFFECTIVE AREA(ACRES) =     38.10   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       38.1       PEAK FLOW RATE(CFS) =      98.84
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    221.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   345.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1217.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.51
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      98.84
  PIPE TRAVEL TIME(MIN.) =   1.62    Tc(MIN.) =   14.59
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    221.00 =    5238.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.59
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.729
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        7.70      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  COMMERCIAL                 B        3.80      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.40      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.135
  SUBAREA AREA(ACRES) =   12.80      SUBAREA RUNOFF(CFS) =   30.97
  EFFECTIVE AREA(ACRES) =     50.90   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       50.9       PEAK FLOW RATE(CFS) =     119.11

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.59
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.729
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.620
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.14
  EFFECTIVE AREA(ACRES) =     51.40   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       51.4       PEAK FLOW RATE(CFS) =     120.25

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.59
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.729
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        6.20      0.30     0.100    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.120
  SUBAREA AREA(ACRES) =    8.20      SUBAREA RUNOFF(CFS) =   19.88
  EFFECTIVE AREA(ACRES) =     59.60   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       59.6       PEAK FLOW RATE(CFS) =     140.13

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 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.) =   14.59
  RAINFALL INTENSITY(INCH/HR) =   2.73
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.39
  EFFECTIVE STREAM AREA(ACRES) =      59.60
  TOTAL STREAM AREA(ACRES) =      59.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     140.13

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    467.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.740
```



```
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.535
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.80      0.30     0.850    56   12.58
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56   12.68
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.50      0.30     0.500    56   10.13
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56    9.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.615
  SUBAREA RUNOFF(CFS) =      7.84
  TOTAL AREA(ACRES) =      2.60   PEAK FLOW RATE(CFS) =      7.84

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  467.00  DOWNSTREAM ELEVATION(FEET) =  466.00
  STREET LENGTH(FEET) =   193.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      14.96
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   18.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   1.45   Tc(MIN.) =   11.19
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.249
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  PUBLIC PARK                B        0.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.20      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.00      0.30     0.400    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.501
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =   14.22
  EFFECTIVE AREA(ACRES) =      7.70    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        7.7        PEAK FLOW RATE(CFS) =      21.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.76
  FLOW VELOCITY(FEET/SEC.) =  2.42   DEPTH*VELOCITY(FT*FT/SEC.) =   1.33
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     523.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.19
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.249
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    1.97
  EFFECTIVE AREA(ACRES) =      8.40   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        8.4       PEAK FLOW RATE(CFS) =      23.36

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  466.00  DOWNSTREAM ELEVATION(FEET) =  460.00
  STREET LENGTH(FEET) =   324.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      32.83
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   20.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.34
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.26
  STREET FLOW TRAVEL TIME(MIN.) =   1.24   Tc(MIN.) =   12.43
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.059
  SUBAREA LOSS RATE DATA(AMC  II):
```



```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.00      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.457
  SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =   18.93
  EFFECTIVE AREA(ACRES) =     15.60    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       15.6        PEAK FLOW RATE(CFS) =      40.86

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.84
  FLOW VELOCITY(FEET/SEC.) =  4.59   DEPTH*VELOCITY(FT*FT/SEC.) =   2.54
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =     847.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   405.00
  FLOW LENGTH(FEET) =   508.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.97
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.86
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   12.80
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.80
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.002
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.10      0.30     0.400    56
  COMMERCIAL                 B        1.60      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.524
  SUBAREA AREA(ACRES) =    7.90      SUBAREA RUNOFF(CFS) =   20.23
  EFFECTIVE AREA(ACRES) =     23.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       23.5       PEAK FLOW RATE(CFS) =      60.29

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.80
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.002
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.80      0.30     0.400    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.80      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.427
  SUBAREA AREA(ACRES) =    6.00      SUBAREA RUNOFF(CFS) =   15.52
  EFFECTIVE AREA(ACRES) =     29.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       29.5       PEAK FLOW RATE(CFS) =      75.81

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   376.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.20
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      75.81
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   13.32
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =    1731.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.32
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.924
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
```



```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.40      0.30     0.500    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.349
  SUBAREA AREA(ACRES) =    8.30      SUBAREA RUNOFF(CFS) =   21.06
  EFFECTIVE AREA(ACRES) =     37.80   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       37.8       PEAK FLOW RATE(CFS) =      94.78

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.32
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.924
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.10      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    4.20      SUBAREA RUNOFF(CFS) =   10.48
  EFFECTIVE AREA(ACRES) =     42.00   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       42.0       PEAK FLOW RATE(CFS) =     105.27

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.32
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.924
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.80      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.50      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.50      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.30      0.30     0.400    56
  PUBLIC PARK                B        1.20      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.503
```

```
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =   21.71
  EFFECTIVE AREA(ACRES) =     50.70   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       50.7       PEAK FLOW RATE(CFS) =     126.98

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.32
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.924
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.50      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.80      0.30     0.400    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.80      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.368
  SUBAREA AREA(ACRES) =   11.40      SUBAREA RUNOFF(CFS) =   28.86
  EFFECTIVE AREA(ACRES) =     62.10   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       62.1       PEAK FLOW RATE(CFS) =     155.84

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.32
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.924
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.24
  EFFECTIVE AREA(ACRES) =     62.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       62.2       PEAK FLOW RATE(CFS) =     156.08

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```



```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =  1800.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  33.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.85
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     156.08
  PIPE TRAVEL TIME(MIN.) =   1.59    Tc(MIN.) =   14.91
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    216.00 =    3531.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.91
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.680
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      0.30     0.100    56
  PUBLIC PARK                B        0.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.40      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        5.70      0.30     0.400    56
  PUBLIC PARK                B        0.50      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.508
  SUBAREA AREA(ACRES) =    9.30      SUBAREA RUNOFF(CFS) =   21.16
  EFFECTIVE AREA(ACRES) =     71.50   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       71.5       PEAK FLOW RATE(CFS) =     163.60

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.91
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.680
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.467
  SUBAREA AREA(ACRES) =    2.70      SUBAREA RUNOFF(CFS) =    6.17
  EFFECTIVE AREA(ACRES) =     74.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       74.2       PEAK FLOW RATE(CFS) =     169.78

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
```

```
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.91
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.680
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.30      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.80      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.70      0.30     0.400    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.00      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.90      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.644
  SUBAREA AREA(ACRES) =   12.10      SUBAREA RUNOFF(CFS) =   27.08
  EFFECTIVE AREA(ACRES) =     86.30   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       86.3       PEAK FLOW RATE(CFS) =     196.86

******************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.91
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.680
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.10      0.30     0.400    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.40      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.00      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.431
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =   10.33
  EFFECTIVE AREA(ACRES) =     90.80   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       90.8       PEAK FLOW RATE(CFS) =     207.19

******************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   340.00
  FLOW LENGTH(FEET) =   886.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.5 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.63
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     207.19
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =   15.92
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    217.00 =    4417.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.92
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.585
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.40      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.80      0.30     0.200    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  PUBLIC PARK                B        2.20      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.00      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.460
  SUBAREA AREA(ACRES) =    6.10      SUBAREA RUNOFF(CFS) =   13.44
  EFFECTIVE AREA(ACRES) =     96.90   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       96.9       PEAK FLOW RATE(CFS) =     212.88

******************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.92
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.585
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        5.20      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        8.60      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.191
  SUBAREA AREA(ACRES) =   14.40      SUBAREA RUNOFF(CFS) =   32.76
  EFFECTIVE AREA(ACRES) =    111.30   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      111.3       PEAK FLOW RATE(CFS) =     245.64

******************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
```

```
  MAINLINE Tc(MIN.) =   15.92
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.585
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.70      0.30     0.200    56
  COMMERCIAL                 B        4.30      0.30     0.100    56
  PUBLIC PARK                B        3.00      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       10.30      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.298
  SUBAREA AREA(ACRES) =   23.00      SUBAREA RUNOFF(CFS) =   51.66
  EFFECTIVE AREA(ACRES) =    134.30   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      134.3       PEAK FLOW RATE(CFS) =     297.30

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    221.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   340.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1266.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  69.0 INCH PIPE IS  52.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.95
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     297.30
  PIPE TRAVEL TIME(MIN.) =   1.51    Tc(MIN.) =   17.43
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    221.00 =    5683.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 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.) =   17.43
  RAINFALL INTENSITY(INCH/HR) =   2.45
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =     134.30
  TOTAL STREAM AREA(ACRES) =     134.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     297.30

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      140.13   14.59    2.729  0.30( 0.12) 0.39      59.6     200.00
      2      297.30   17.43    2.452  0.30( 0.13) 0.42     134.3     210.00
```



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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      418.57   14.59    2.729  0.30( 0.12) 0.41     172.0     200.00
      2      422.57   17.43    2.452  0.30( 0.12) 0.41     193.9     210.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     422.57    Tc(MIN.) =    17.43
  EFFECTIVE AREA(ACRES) =     193.90   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =      193.9
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    221.00 =    5683.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   330.00  DOWNSTREAM(FEET) =   280.00
  FLOW LENGTH(FEET) =   278.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  49.61
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     422.57
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   17.52
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    222.00 =    5961.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.52
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.444
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  COMMERCIAL                 B        1.90      0.30     0.100    56
  AGRICULTURAL FAIR COVER
  "ORCHARDS"                 B        1.30      0.30     1.000    65
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.50      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.517
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   20.60
  EFFECTIVE AREA(ACRES) =    203.90   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =      203.9       PEAK FLOW RATE(CFS) =     425.64
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.52
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.444
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  COMMERCIAL                 B        4.70      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.00      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.60      0.30     0.500    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.40      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =   10.10      SUBAREA RUNOFF(CFS) =   20.82
  EFFECTIVE AREA(ACRES) =    214.00   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      214.0       PEAK FLOW RATE(CFS) =     446.46

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      447.60   14.68    2.715  0.30( 0.13) 0.42     192.1     200.00
      2      446.46   17.52    2.444  0.30( 0.13) 0.42     214.0     210.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     447.60  Tc(MIN.) =   14.68
  AREA-AVERAGED Fm(INCH/HR) =  0.13  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.42  EFFECTIVE AREA(ACRES) =     192.09

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.68
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.715
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL FAIR COVER
  "ORCHARDS"                 B        0.60      0.30     1.000    65
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.986
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    1.52
  EFFECTIVE AREA(ACRES) =    192.79   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      214.7       PEAK FLOW RATE(CFS) =     449.13
```



```
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      214.7  TC(MIN.) =     14.68
  EFFECTIVE AREA(ACRES) =    192.79  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.422
  PEAK FLOW RATE(CFS)   =     449.13

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      449.13   14.68    2.715  0.30( 0.13) 0.42     192.8     200.00
      2      447.82   17.52    2.444  0.30( 0.13) 0.42     214.7     210.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                        Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA B                                                    *
* RATIONAL METHOD - REGIONAL RAINFALL                                   *
* 100-YR EV JUNE 2018 ROKAMOTO                                         *
 ************************************************************************

  FILE NAME: 3B00EVRL.DAT
  TIME/DATE OF STUDY: 07:02 07/17/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  6.006
   2)   10.00;  3.853
   3)   15.00;  2.975
   4)   20.00;  2.445
   5)   25.00;  2.115
   6)   30.00;  1.889
   7)   40.00;  1.632
   8)   50.00;  1.411
   9)   60.00;  1.307
  10)   90.00;  1.106
  11)  120.00;  0.970
  12)  180.00;  0.813
  13)  360.00;  0.605
  14) 1200.00;  0.265
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
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    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   305.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    402.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.935
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.603
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.30      0.30      0.100    56    5.94
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30      0.900    56    9.51
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30      0.600    56    8.04
  COMMERCIAL                 B        0.30      0.30      0.100    56    5.94
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30      0.900    56    9.51
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.50      0.30      0.600    56    8.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.580
  SUBAREA RUNOFF(CFS) =     14.66
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =     14.66

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  402.00  DOWNSTREAM ELEVATION(FEET) =  385.00
  STREET LENGTH(FEET) =   520.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      22.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
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    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.93
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.14
  STREET FLOW TRAVEL TIME(MIN.) =   1.76   Tc(MIN.) =    7.69
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.847
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.40      0.30     0.600    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.50      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.525
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =   15.19
  EFFECTIVE AREA(ACRES) =      6.60    AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        6.6        PEAK FLOW RATE(CFS) =      27.81

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.68
  FLOW VELOCITY(FEET/SEC.) =  5.19   DEPTH*VELOCITY(FT*FT/SEC.) =   2.39
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     825.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.69
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.847
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.40      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.40      SUBAREA RUNOFF(CFS) =   14.28
  EFFECTIVE AREA(ACRES) =     10.00   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       10.0       PEAK FLOW RATE(CFS) =      42.09

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  385.00  DOWNSTREAM ELEVATION(FEET) =  375.00
  STREET LENGTH(FEET) =   430.00   CURB HEIGHT(INCHES) =  8.0
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  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      59.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.60
    HALFSTREET FLOOD WIDTH(FEET) =   24.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.26
  STREET FLOW TRAVEL TIME(MIN.) =   1.31   Tc(MIN.) =    9.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.283
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.60      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.340
  SUBAREA AREA(ACRES) =    9.30      SUBAREA RUNOFF(CFS) =   34.99
  EFFECTIVE AREA(ACRES) =     19.30    AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       19.3        PEAK FLOW RATE(CFS) =      72.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.63   HALFSTREET FLOOD WIDTH(FEET) =  26.05
  FLOW VELOCITY(FEET/SEC.) =  5.76   DEPTH*VELOCITY(FT*FT/SEC.) =   3.61
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =    1255.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.283
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.00      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  COMMERCIAL                 B        2.10      0.30     0.100    56
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  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.40      0.30     0.900    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.586
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   33.64
  EFFECTIVE AREA(ACRES) =     28.40   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       28.4       PEAK FLOW RATE(CFS) =     105.65

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.283
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.80      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    6.50
  EFFECTIVE AREA(ACRES) =     30.20   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       30.2       PEAK FLOW RATE(CFS) =     112.15

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   375.00  DOWNSTREAM(FEET) =   360.00
  FLOW LENGTH(FEET) =  1242.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.90
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     112.15
  PIPE TRAVEL TIME(MIN.) =   1.60    Tc(MIN.) =   10.61
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =    2497.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.746
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.90      0.30     0.100    56
  RESIDENTIAL
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  ".4 DWELLING/ACRE"         B        1.60      0.30     0.900    56
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.609
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =   10.58
  EFFECTIVE AREA(ACRES) =     33.50   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       33.5       PEAK FLOW RATE(CFS) =     112.15
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   360.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =   937.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.21
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     112.15
  PIPE TRAVEL TIME(MIN.) =   1.28    Tc(MIN.) =   11.89
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =    3434.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.522
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.00      0.30     0.900    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.660
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    8.97
  EFFECTIVE AREA(ACRES) =     36.50   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       36.5       PEAK FLOW RATE(CFS) =     112.15
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
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  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   345.00
  FLOW LENGTH(FEET) =   587.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.31
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     112.15
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   12.75
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =    4021.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.75
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.370
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.30      0.30     0.100    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.30      0.30     0.400    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    4.45
  EFFECTIVE AREA(ACRES) =     38.00   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       38.0       PEAK FLOW RATE(CFS) =     112.15
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.75
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.370
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.10      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.29
  EFFECTIVE AREA(ACRES) =     38.10   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       38.1       PEAK FLOW RATE(CFS) =     112.15
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```



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****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    221.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   345.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1217.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.01
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     112.15
  PIPE TRAVEL TIME(MIN.) =   1.56    Tc(MIN.) =   14.31
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    221.00 =    5238.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.31
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.096
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        7.70      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  COMMERCIAL                 B        3.80      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.40      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.135
  SUBAREA AREA(ACRES) =   12.80      SUBAREA RUNOFF(CFS) =   35.20
  EFFECTIVE AREA(ACRES) =     50.90   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       50.9       PEAK FLOW RATE(CFS) =     135.92

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.31
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.096
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.620
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.31
  EFFECTIVE AREA(ACRES) =     51.40   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       51.4       PEAK FLOW RATE(CFS) =     137.23

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.31
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.096
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        6.20      0.30     0.100    56
  COMMERCIAL                  B        1.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.10      0.30     0.900    56
  COMMERCIAL                  B        0.50      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.120
  SUBAREA AREA(ACRES) =    8.20      SUBAREA RUNOFF(CFS) =   22.59
  EFFECTIVE AREA(ACRES) =     59.60   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       59.6       PEAK FLOW RATE(CFS) =     159.82

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 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.) =   14.31
  RAINFALL INTENSITY(INCH/HR) =   3.10
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.39
  EFFECTIVE STREAM AREA(ACRES) =      59.60
  TOTAL STREAM AREA(ACRES) =      59.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     159.82

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    467.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.740
```



```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.965
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                 B        0.80      0.30     0.850    56   12.58
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.10      0.30     0.900    56   12.68
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B        1.50      0.30     0.500    56   10.13
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        0.20      0.30     0.400    56    9.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.615
  SUBAREA RUNOFF(CFS) =      8.85
  TOTAL AREA(ACRES) =      2.60   PEAK FLOW RATE(CFS) =      8.85

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  467.00  DOWNSTREAM ELEVATION(FEET) =  466.00
  STREET LENGTH(FEET) =   193.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      16.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   19.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
  STREET FLOW TRAVEL TIME(MIN.) =   1.41   Tc(MIN.) =   11.15
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.651
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        0.20      0.30     0.400    56
  PUBLIC PARK                 B        0.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.10      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B        2.20      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        2.00      0.30     0.400    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        0.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.501
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =   16.07
  EFFECTIVE AREA(ACRES) =      7.70    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        7.7        PEAK FLOW RATE(CFS) =      24.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.57   HALFSTREET FLOOD WIDTH(FEET) =  22.85
  FLOW VELOCITY(FEET/SEC.) =  2.49   DEPTH*VELOCITY(FT*FT/SEC.) =   1.42
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     523.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.15
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.651
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    2.22
  EFFECTIVE AREA(ACRES) =      8.40   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        8.4       PEAK FLOW RATE(CFS) =      26.41

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  466.00  DOWNSTREAM ELEVATION(FEET) =  460.00
  STREET LENGTH(FEET) =   324.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      37.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.54
    HALFSTREET FLOOD WIDTH(FEET) =   21.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.41
  STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =   12.36
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.439
  SUBAREA LOSS RATE DATA(AMC  II):
```



```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.00      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.457
  SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =   21.40
  EFFECTIVE AREA(ACRES) =     15.60    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       15.6        PEAK FLOW RATE(CFS) =      46.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.57   HALFSTREET FLOOD WIDTH(FEET) =  22.93
  FLOW VELOCITY(FEET/SEC.) =  4.72   DEPTH*VELOCITY(FT*FT/SEC.) =   2.70
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =     847.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   405.00
  FLOW LENGTH(FEET) =   508.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.37
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      46.20
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   12.72
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.72
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.376
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.10      0.30     0.400    56
  COMMERCIAL                 B        1.60      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
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  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.524
  SUBAREA AREA(ACRES) =    7.90      SUBAREA RUNOFF(CFS) =   22.88
  EFFECTIVE AREA(ACRES) =     23.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       23.5       PEAK FLOW RATE(CFS) =      68.19

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.72
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.376
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.80      0.30     0.400    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.80      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.427
  SUBAREA AREA(ACRES) =    6.00      SUBAREA RUNOFF(CFS) =   17.54
  EFFECTIVE AREA(ACRES) =     29.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       29.5       PEAK FLOW RATE(CFS) =      85.73

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   376.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.39
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      85.73
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   13.22
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =    1731.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.22
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.287
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
```



```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.40      0.30     0.500    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.349
  SUBAREA AREA(ACRES) =    8.30      SUBAREA RUNOFF(CFS) =   23.77
  EFFECTIVE AREA(ACRES) =     37.80   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       37.8       PEAK FLOW RATE(CFS) =     107.14

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.22
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.287
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.10      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    4.20      SUBAREA RUNOFF(CFS) =   11.86
  EFFECTIVE AREA(ACRES) =     42.00   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       42.0       PEAK FLOW RATE(CFS) =     118.99

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.22
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.287
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.80      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.50      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.50      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.30      0.30     0.400    56
  PUBLIC PARK                B        1.20      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.503
```

```
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =   24.55
  EFFECTIVE AREA(ACRES) =     50.70   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       50.7       PEAK FLOW RATE(CFS) =     143.55

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.22
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.287
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.50      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.80      0.30     0.400    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.80      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.368
  SUBAREA AREA(ACRES) =   11.40      SUBAREA RUNOFF(CFS) =   32.59
  EFFECTIVE AREA(ACRES) =     62.10   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       62.1       PEAK FLOW RATE(CFS) =     176.14

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.22
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.287
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.27
  EFFECTIVE AREA(ACRES) =     62.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       62.2       PEAK FLOW RATE(CFS) =     176.41

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```



```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =  1800.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.65
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     176.41
  PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =   14.75
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    216.00 =    3531.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.75
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.019
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      0.30     0.100    56
  PUBLIC PARK                B        0.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.40      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        5.70      0.30     0.400    56
  PUBLIC PARK                B        0.50      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.508
  SUBAREA AREA(ACRES) =    9.30      SUBAREA RUNOFF(CFS) =   23.99
  EFFECTIVE AREA(ACRES) =     71.50   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       71.5       PEAK FLOW RATE(CFS) =     185.39

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.75
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.019
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.467
  SUBAREA AREA(ACRES) =    2.70      SUBAREA RUNOFF(CFS) =    7.00
  EFFECTIVE AREA(ACRES) =     74.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       74.2       PEAK FLOW RATE(CFS) =     192.39

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
```

```
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.75
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.019
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.30      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.80      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.70      0.30     0.400    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.00      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.90      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.644
  SUBAREA AREA(ACRES) =   12.10      SUBAREA RUNOFF(CFS) =   30.77
  EFFECTIVE AREA(ACRES) =     86.30   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       86.3       PEAK FLOW RATE(CFS) =     223.15

******************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.75
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.019
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.10      0.30     0.400    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.40      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.00      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.431
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =   11.70
  EFFECTIVE AREA(ACRES) =     90.80   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       90.8       PEAK FLOW RATE(CFS) =     234.85

******************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   340.00
  FLOW LENGTH(FEET) =   886.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  44.3 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.12
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     234.85
  PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =   15.73
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    217.00 =    4417.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.73
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.898
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.40      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.80      0.30     0.200    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  PUBLIC PARK                B        2.20      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.00      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.460
  SUBAREA AREA(ACRES) =    6.10      SUBAREA RUNOFF(CFS) =   15.15
  EFFECTIVE AREA(ACRES) =     96.90   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       96.9       PEAK FLOW RATE(CFS) =     240.13

******************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.73
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.898
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        5.20      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        8.60      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.191
  SUBAREA AREA(ACRES) =   14.40      SUBAREA RUNOFF(CFS) =   36.81
  EFFECTIVE AREA(ACRES) =    111.30   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      111.3       PEAK FLOW RATE(CFS) =     276.95

******************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
```

```
 MAINLINE Tc(MIN.) =   15.73
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.898
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        1.70      0.30     0.200    56
 COMMERCIAL                 B        4.30      0.30     0.100    56
 PUBLIC PARK                B        3.00      0.30     0.850    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B       10.30      0.30     0.200    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        3.70      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.298
 SUBAREA AREA(ACRES) =   23.00      SUBAREA RUNOFF(CFS) =   58.13
 EFFECTIVE AREA(ACRES) =    134.30   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =      134.3       PEAK FLOW RATE(CFS) =     335.08

****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    221.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   340.00  DOWNSTREAM(FEET) =   330.00
 FLOW LENGTH(FEET) =  1266.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  72.0 INCH PIPE IS  55.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.36
 ESTIMATED PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     335.08
 PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =   17.20
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    221.00 =    5683.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    221.00 TO NODE    221.00 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.) =   17.20
 RAINFALL INTENSITY(INCH/HR) =   2.74
 AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.42
 EFFECTIVE STREAM AREA(ACRES) =     134.30
 TOTAL STREAM AREA(ACRES) =     134.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     335.08

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      159.82   14.31    3.096  0.30( 0.12) 0.39      59.6     200.00
     2      335.08   17.20    2.742  0.30( 0.13) 0.42     134.3     210.00
```



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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      476.36   14.31    3.096  0.30( 0.12) 0.41     171.3     200.00
     2      475.89   17.20    2.742  0.30( 0.12) 0.41     193.9     210.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     476.36    Tc(MIN.) =    14.31
 EFFECTIVE AREA(ACRES) =     171.34   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =      193.9
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    221.00 =    5683.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   330.00  DOWNSTREAM(FEET) =   280.00
 FLOW LENGTH(FEET) =   278.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  50.21
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     476.36
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   14.40
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    222.00 =    5961.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.40
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.080
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.80      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
 COMMERCIAL                 B        1.90      0.30     0.100    56
 AGRICULTURAL FAIR COVER
 "ORCHARDS"                 B        1.30      0.30     1.000    65
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        2.50      0.30     0.500    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.517
 SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   26.32
 EFFECTIVE AREA(ACRES) =    181.34   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =      203.9       PEAK FLOW RATE(CFS) =     482.40
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.40
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.080
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  COMMERCIAL                 B        4.70      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.00      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.60      0.30     0.500    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.40      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =   10.10      SUBAREA RUNOFF(CFS) =   26.60
  EFFECTIVE AREA(ACRES) =    191.44   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      214.0       PEAK FLOW RATE(CFS) =     509.00

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.40
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.080
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  AGRICULTURAL FAIR COVER
  "ORCHARDS"                 B        0.60      0.30     1.000    65
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.986
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    1.75
  EFFECTIVE AREA(ACRES) =    192.14   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      214.7       PEAK FLOW RATE(CFS) =     510.76
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      214.7  TC(MIN.) =     14.40
  EFFECTIVE AREA(ACRES) =    192.14  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.422
  PEAK FLOW RATE(CFS)   =     510.76

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```



```
       1      510.76   14.40    3.080  0.30( 0.13) 0.42     192.1     200.00
       2      503.52   17.29    2.732  0.30( 0.13) 0.42     214.7     210.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

                        Michael Baker International
                      5 Hutton Centre Drive Suite 500
                            Santa Ana, CA92707


 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA C                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 2-YR EV DECEMBER 2018 CCHIU                                          *
 **********************************************************************

  FILE NAME: 3C02EVRL.DAT
  TIME/DATE OF STUDY: 09:14 12/24/2018
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  1.857
   2)   10.00;  1.238
   3)   15.00;  0.945
   4)   20.00;  0.774
   5)   25.00;  0.667
   6)   30.00;  0.591
   7)   40.00;  0.510
   8)   50.00;  0.453
   9)   60.00;  0.395
  10)   90.00;  0.335
  11)  120.00;  0.275
  12)  180.00;  0.215
  13)  360.00;  0.155
  14) 1200.00;  0.083
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   320.00
  ELEVATION DATA: UPSTREAM(FEET) =    640.00  DOWNSTREAM(FEET) =    634.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.766
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.638
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 -        0.20      0.60      0.100    56    6.77
  PUBLIC PARK                -        0.90      0.60      0.850    56   10.75
  COMMERCIAL                 -        0.30      0.60      0.100    56    6.77
  PUBLIC PARK                -        1.90      0.60      0.850    56   10.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.736
  SUBAREA RUNOFF(CFS) =      3.55
  TOTAL AREA(ACRES) =      3.30   PEAK FLOW RATE(CFS) =      3.55

******************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  634.00  DOWNSTREAM ELEVATION(FEET) =  630.00
  STREET LENGTH(FEET) =   503.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       7.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.20
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   3.80   Tc(MIN.) =   10.57
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.205
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.50      0.60     0.100     -
  USER-DEFINED               -        2.10      0.60     0.850     -
  USER-DEFINED               -        4.60      0.60     0.600     -
  USER-DEFINED               -        0.30      0.60     0.100     -
  USER-DEFINED               -        1.40      0.60     0.850     -
  USER-DEFINED               -        1.10      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.648
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =    7.35
  EFFECTIVE AREA(ACRES) =     13.30    AREA-AVERAGED Fm(INCH/HR) =  0.40
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.67
  TOTAL AREA(ACRES) =       13.3        PEAK FLOW RATE(CFS) =       9.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.41
  FLOW VELOCITY(FEET/SEC.) =  2.35   DEPTH*VELOCITY(FT*FT/SEC.) =   0.98
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     823.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    302.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.57
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.205
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.00      0.60     0.850     -
  USER-DEFINED               -        9.30      0.60     0.200     -
  USER-DEFINED               -        0.40      0.60     0.850     -
  USER-DEFINED               -        1.30      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.276
  SUBAREA AREA(ACRES) =   12.00      SUBAREA RUNOFF(CFS) =   11.22
  EFFECTIVE AREA(ACRES) =     25.30   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       25.3       PEAK FLOW RATE(CFS) =      20.83

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   630.00  DOWNSTREAM(FEET) =   625.00
  FLOW LENGTH(FEET) =   651.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.21
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.83
  PIPE TRAVEL TIME(MIN.) =   1.50    Tc(MIN.) =   12.08
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =    1474.00 FEET.

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



```
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.08
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.116
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.40      0.60     0.100     -
  USER-DEFINED               -        0.40      0.60     0.850     -
  USER-DEFINED               -        1.80      0.60     0.400     -
  USER-DEFINED               -        1.30      0.60     0.600     -
  USER-DEFINED               -        0.60      0.60     0.100     -
  USER-DEFINED               -        0.60      0.60     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.480
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =    3.80
  EFFECTIVE AREA(ACRES) =     30.40   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       30.4       PEAK FLOW RATE(CFS) =      22.63

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.08
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.116
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.50      0.60     0.400     -
  USER-DEFINED               -        5.20      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.520
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =    6.30
  EFFECTIVE AREA(ACRES) =     39.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       39.1       PEAK FLOW RATE(CFS) =      28.93

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.08
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.116
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.80      0.60     0.100     -
  USER-DEFINED               -        0.40      0.60     0.850     -
  USER-DEFINED               -        7.40      0.60     0.200     -
  USER-DEFINED               -        0.30      0.60     0.850     -
  USER-DEFINED               -        0.50      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.215
```

```
  SUBAREA AREA(ACRES) =   11.40      SUBAREA RUNOFF(CFS) =   10.13
  EFFECTIVE AREA(ACRES) =     50.50   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       50.5       PEAK FLOW RATE(CFS) =      39.06

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.08
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.116
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.70      0.60     0.100     -
  USER-DEFINED               -        2.30      0.60     0.850     -
  USER-DEFINED               -        4.90      0.60     0.200     -
  USER-DEFINED               -        1.70      0.60     0.100     -
  USER-DEFINED               -        1.80      0.60     0.850     -
  USER-DEFINED               -        6.20      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.294
  SUBAREA AREA(ACRES) =   21.60      SUBAREA RUNOFF(CFS) =   18.28
  EFFECTIVE AREA(ACRES) =     72.10   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       72.1       PEAK FLOW RATE(CFS) =      57.33

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   625.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =  1029.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.01
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.33
  PIPE TRAVEL TIME(MIN.) =   1.71    Tc(MIN.) =   13.79
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =    2503.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.79
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.016
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.10      0.60     0.100     -
  USER-DEFINED               -        1.80      0.60     0.850     -
  USER-DEFINED               -        1.00      0.60     0.200     -
  USER-DEFINED               -        5.00      0.60     0.400     -
  USER-DEFINED               -        2.80      0.60     0.100     -
```



```
  USER-DEFINED               -        0.90      0.60     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.367
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =    9.74
  EFFECTIVE AREA(ACRES) =     85.70   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       85.7       PEAK FLOW RATE(CFS) =      60.56

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.79
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.016
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.80      0.60     0.200     -
  USER-DEFINED               -        1.20      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.280
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    2.29
  EFFECTIVE AREA(ACRES) =     88.70   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       88.7       PEAK FLOW RATE(CFS) =      62.85

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 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.) =   13.79
  RAINFALL INTENSITY(INCH/HR) =   1.02
  AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.38
  EFFECTIVE STREAM AREA(ACRES) =      88.70
  TOTAL STREAM AREA(ACRES) =      88.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      62.85

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    307.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   317.00
  ELEVATION DATA: UPSTREAM(FEET) =    646.00  DOWNSTREAM(FEET) =    645.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   15.296
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.935
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  PUBLIC PARK                 -        0.40      0.60     0.850    56   15.30
  RESIDENTIAL
  ".4 DWELLING/ACRE"          -        0.10      0.60     0.900    56   15.42
  PUBLIC PARK                 -        1.50      0.60     0.850    56   15.30
  RESIDENTIAL
  ".4 DWELLING/ACRE"          -        0.20      0.60     0.900    56   15.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.857
  SUBAREA RUNOFF(CFS) =      0.83
  TOTAL AREA(ACRES) =      2.20   PEAK FLOW RATE(CFS) =      0.83

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.10 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  645.00  DOWNSTREAM ELEVATION(FEET) =  641.00
  STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       1.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    5.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.89
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
  STREET FLOW TRAVEL TIME(MIN.) =   3.31   Tc(MIN.) =   18.61
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.822
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.40      0.60     0.850     -
  USER-DEFINED               -        2.00      0.60     0.600     -
  USER-DEFINED               -        0.30      0.60     0.850     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  USER-DEFINED               -        1.40      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.649
  SUBAREA AREA(ACRES) =    4.20      SUBAREA RUNOFF(CFS) =    1.63
  EFFECTIVE AREA(ACRES) =      6.40    AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =        6.4        PEAK FLOW RATE(CFS) =       2.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   6.53
  FLOW VELOCITY(FEET/SEC.) =  1.95   DEPTH*VELOCITY(FT*FT/SEC.) =   0.55
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    307.10 =     692.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    307.10 TO NODE    308.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  641.00  DOWNSTREAM ELEVATION(FEET) =  635.00
  STREET LENGTH(FEET) =   506.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       3.74
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   3.76   Tc(MIN.) =   22.37
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.723
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.00      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.850     -
  USER-DEFINED               -        4.80      0.60     0.600     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  USER-DEFINED               -        2.30      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.554
  SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =    2.99
  EFFECTIVE AREA(ACRES) =     14.90    AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =       14.9        PEAK FLOW RATE(CFS) =       4.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.47
  FLOW VELOCITY(FEET/SEC.) =  2.35   DEPTH*VELOCITY(FT*FT/SEC.) =   0.78
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    308.00 =    1198.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   635.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =  1516.00   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.) =   6.15
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.67
  PIPE TRAVEL TIME(MIN.) =   4.11    Tc(MIN.) =   26.48
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    305.00 =    2714.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   26.48
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.645
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.20      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.850     -
  USER-DEFINED               -        2.20      0.60     0.200     -
  USER-DEFINED               -        0.80      0.60     0.600     -
  USER-DEFINED               -        0.50      0.60     0.400     -
  USER-DEFINED               -        0.20      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.289
  SUBAREA AREA(ACRES) =    5.00      SUBAREA RUNOFF(CFS) =    2.12
  EFFECTIVE AREA(ACRES) =     19.90   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       19.9       PEAK FLOW RATE(CFS) =       5.73

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   26.48
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.645
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.20      0.60     0.100     -
  USER-DEFINED               -        0.20      0.60     0.850     -
  USER-DEFINED               -        2.30      0.60     0.200     -
  USER-DEFINED               -        0.30      0.60     0.900     -
  USER-DEFINED               -        4.00      0.60     0.600     -
  USER-DEFINED               -        6.60      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.415
  SUBAREA AREA(ACRES) =   14.60      SUBAREA RUNOFF(CFS) =    5.20
  EFFECTIVE AREA(ACRES) =     34.50   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       34.5       PEAK FLOW RATE(CFS) =      10.93

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   26.48
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.645
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.05
  EFFECTIVE AREA(ACRES) =     34.70   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       34.7       PEAK FLOW RATE(CFS) =      10.98

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 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.) =   26.48
  RAINFALL INTENSITY(INCH/HR) =   0.64
  AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =      34.70
  TOTAL STREAM AREA(ACRES) =      34.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.98

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       62.85   13.79    1.016  0.60( 0.23) 0.38      88.7     300.00
      2       10.98   26.48    0.645  0.60( 0.29) 0.49      34.7     306.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       73.84   13.79    1.016  0.60( 0.24) 0.40     106.8     300.00
      2       44.18   26.48    0.645  0.60( 0.25) 0.41     123.4     306.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      73.84    Tc(MIN.) =    13.79
  EFFECTIVE AREA(ACRES) =     106.77   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      123.4
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    305.00 =    2714.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    310.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   615.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =  2954.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.14
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      73.84
  PIPE TRAVEL TIME(MIN.) =   2.57    Tc(MIN.) =   16.36
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    310.00 =    5668.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.36
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.898
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.80      0.60     0.100     -
  USER-DEFINED               -        0.40      0.60     0.900     -
  USER-DEFINED               -        0.20      0.60     0.600     -
  USER-DEFINED               -        2.30      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.164
  SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =    5.62
  EFFECTIVE AREA(ACRES) =    114.57   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      131.2       PEAK FLOW RATE(CFS) =      73.84
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.36
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.898
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     0.100     -
  USER-DEFINED               -        0.20      0.60     0.850     -
  USER-DEFINED               -        2.30      0.60     0.850     -
  USER-DEFINED               -        6.40      0.60     0.200     -
  USER-DEFINED               -        2.60      0.60     0.200     -
  USER-DEFINED               -        0.70      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.371
  SUBAREA AREA(ACRES) =   12.30      SUBAREA RUNOFF(CFS) =    7.48
  EFFECTIVE AREA(ACRES) =    126.87   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      143.5       PEAK FLOW RATE(CFS) =      76.42

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   16.36
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.898
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.20      0.60     0.900     -
  USER-DEFINED               -        0.10      0.60     0.600     -
  USER-DEFINED               -        0.80      0.60     0.500     -
  USER-DEFINED               -       10.20      0.60     0.500     -
  USER-DEFINED               -        2.50      0.60     0.400     -
  USER-DEFINED               -        3.70      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.514
  SUBAREA AREA(ACRES) =   19.50      SUBAREA RUNOFF(CFS) =   10.36
  EFFECTIVE AREA(ACRES) =    146.37   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      163.0       PEAK FLOW RATE(CFS) =      86.78

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =  1056.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.40
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      86.78
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   17.22
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    311.00 =    6724.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.22
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.869
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.60      0.60     0.100     -
  USER-DEFINED               -        3.60      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.850     -
  USER-DEFINED               -        3.90      0.60     0.200     -
  USER-DEFINED               -        5.10      0.60     0.200     -
  USER-DEFINED               -        0.80      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.191
  SUBAREA AREA(ACRES) =   15.10      SUBAREA RUNOFF(CFS) =   10.25
  EFFECTIVE AREA(ACRES) =    161.47   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      178.1       PEAK FLOW RATE(CFS) =      93.14

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE =  81
```

```
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   17.22
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.869
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        6.70      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    6.70      SUBAREA RUNOFF(CFS) =    3.07
  EFFECTIVE AREA(ACRES) =    168.17   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =      184.8       PEAK FLOW RATE(CFS) =      96.21

******************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   373.00
  FLOW LENGTH(FEET) =  1373.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.57
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      96.21
  PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =   18.39
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    312.00 =    8097.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   18.39
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.829
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.50      0.60     0.100     -
  USER-DEFINED               -        4.50      0.60     0.100     -
  USER-DEFINED               -        3.40      0.60     0.200     -
  USER-DEFINED               -        0.30      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.850     -
  USER-DEFINED               -        0.20      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.157
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =    6.61
  EFFECTIVE AREA(ACRES) =    178.17   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      194.8       PEAK FLOW RATE(CFS) =      96.77

******************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
==============================================================================
  MAINLINE Tc(MIN.) =   18.39
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.829
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     0.900     -
  USER-DEFINED               -        0.40      0.60     0.500     -
  USER-DEFINED               -        0.10      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.567
  SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    0.26
  EFFECTIVE AREA(ACRES) =    178.77   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      195.4       PEAK FLOW RATE(CFS) =      97.04

******************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    339.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   373.00  DOWNSTREAM(FEET) =   301.00
  FLOW LENGTH(FEET) =  1370.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.71
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      97.04
  PIPE TRAVEL TIME(MIN.) =   1.05    Tc(MIN.) =   19.44
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    339.00 =    9467.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  10
------------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  13
------------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE    390.00 TO NODE    391.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   317.00
  ELEVATION DATA: UPSTREAM(FEET) =    860.00  DOWNSTREAM(FEET) =    775.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.195
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.338
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     -        0.20      0.60     1.000    56    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        1.20      0.60     1.000    56    9.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.93
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      0.93

****************************************************************************
  FLOW PROCESS FROM NODE    391.00 TO NODE    392.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    775.00  DOWNSTREAM(FEET) =    700.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   545.00   CHANNEL SLOPE =  0.1376
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.157
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.70      0.60     1.000     -
  USER-DEFINED               -        0.60      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.15
  AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   2.19
  Tc(MIN.) =   11.38
  SUBAREA AREA(ACRES) =     2.30       SUBAREA RUNOFF(CFS) =    1.15
  EFFECTIVE AREA(ACRES) =      3.70     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       1.86

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   4.36
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    392.00 =     862.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    392.00 TO NODE    393.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    700.00  DOWNSTREAM(FEET) =    635.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1093.00   CHANNEL SLOPE =  0.0595
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.917
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.40      0.60     1.000     -
  USER-DEFINED               -        8.40      0.60     1.000     -
  USER-DEFINED               -        2.70      0.60     1.000     -
  USER-DEFINED               -        0.40      0.60     1.000     -
```



```
  USER-DEFINED               -        9.20      0.60     1.000     -
  USER-DEFINED               -        0.60      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.12
  AVERAGE FLOW DEPTH(FEET) =   0.65   TRAVEL TIME(MIN.) =   4.42
  Tc(MIN.) =   15.81
  SUBAREA AREA(ACRES) =    22.70       SUBAREA RUNOFF(CFS) =    6.49
  EFFECTIVE AREA(ACRES) =     26.40     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       26.4         PEAK FLOW RATE(CFS) =       7.55

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   4.53
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    393.00 =    1955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    393.00 TO NODE    394.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    635.00  DOWNSTREAM(FEET) =    598.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   904.00   CHANNEL SLOPE =  0.0409
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.792
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.60      0.60     1.000     -
  USER-DEFINED               -        5.50      0.60     1.000     -
  USER-DEFINED               -        1.80      0.60     1.000     -
  USER-DEFINED               -        0.60      0.60     1.000     -
  USER-DEFINED               -        1.00      0.60     1.000     -
  USER-DEFINED               -        6.80      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.11
  AVERAGE FLOW DEPTH(FEET) =   0.86   TRAVEL TIME(MIN.) =   3.66
  Tc(MIN.) =   19.47
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =    2.99
  EFFECTIVE AREA(ACRES) =     43.70     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       43.7         PEAK FLOW RATE(CFS) =       7.56

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOW VELOCITY(FEET/SEC.) =   3.96
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    394.00 =    2859.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    394.00 TO NODE    394.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.47
```

```
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.792
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.50      0.60     1.000     -
  USER-DEFINED               -        0.10      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    2.60      SUBAREA RUNOFF(CFS) =    0.45
  EFFECTIVE AREA(ACRES) =     46.30   AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       46.3       PEAK FLOW RATE(CFS) =       8.01

****************************************************************************
  FLOW PROCESS FROM NODE    394.00 TO NODE    395.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    598.00  DOWNSTREAM(FEET) =    573.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   664.00   CHANNEL SLOPE =  0.0377
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.726
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        6.30      0.60     1.000     -
  USER-DEFINED               -        5.90      0.60     1.000     -
  USER-DEFINED               -        6.80      0.60     1.000     -
  USER-DEFINED               -        0.90      0.60     0.900     -
  USER-DEFINED               -        0.50      0.60     1.000     -
  USER-DEFINED               -        0.20      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.996
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.22
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.02
  AVERAGE FLOW DEPTH(FEET) =   0.87   TRAVEL TIME(MIN.) =   2.75
  Tc(MIN.) =   22.22
  SUBAREA AREA(ACRES) =    20.60       SUBAREA RUNOFF(CFS) =    2.39
  EFFECTIVE AREA(ACRES) =     66.90     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       66.9         PEAK FLOW RATE(CFS) =       8.01
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.83   FLOW VELOCITY(FEET/SEC.) =   3.89
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    395.00 =    3523.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    395.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.22
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.726
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```



```
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       12.60      0.60     1.000     -
  USER-DEFINED               -        3.10      0.60     1.000     -
  USER-DEFINED               -        2.40      0.60     0.900     -
  USER-DEFINED               -        0.10      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.987
  SUBAREA AREA(ACRES) =   18.20      SUBAREA RUNOFF(CFS) =    2.20
  EFFECTIVE AREA(ACRES) =     85.10   AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       85.1       PEAK FLOW RATE(CFS) =       9.87

****************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    370.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   573.00  DOWNSTREAM(FEET) =   389.00
  FLOW LENGTH(FEET) =  5717.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.87
  PIPE TRAVEL TIME(MIN.) =   9.19    Tc(MIN.) =   31.42
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    370.00 =    9240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    370.00 TO NODE    371.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    389.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1996.00   CHANNEL SLOPE =  0.0220
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.502
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.90      0.60     1.000     -
  USER-DEFINED               -        4.40      0.60     1.000     -
  USER-DEFINED               -        0.50      0.60     0.100     -
  USER-DEFINED               -        6.60      0.60     1.000     -
  USER-DEFINED               -        3.60      0.60     1.000     -
  USER-DEFINED               -        6.10      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.956
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.11
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.35
  AVERAGE FLOW DEPTH(FEET) =   1.00   TRAVEL TIME(MIN.) =   9.92
  Tc(MIN.) =   41.33
  SUBAREA AREA(ACRES) =    24.10       SUBAREA RUNOFF(CFS) =    0.48
  EFFECTIVE AREA(ACRES) =    109.20     AREA-AVERAGED Fm(INCH/HR) =   0.59
```

```
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   0.99
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TOTAL AREA(ACRES) =      109.2         PEAK FLOW RATE(CFS) =       9.87
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.99   FLOW VELOCITY(FEET/SEC.) =   3.33
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    371.00 =   11236.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   41.33
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.502
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.10      0.60     1.000     -
  USER-DEFINED               -        1.10      0.60     0.100     -
  USER-DEFINED               -        2.00      0.60     1.000     -
  USER-DEFINED               -        0.40      0.60     1.000     -
  USER-DEFINED               -        2.20      0.60     0.900     -
  USER-DEFINED               -        0.30      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.830
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =    0.55
  EFFECTIVE AREA(ACRES) =    116.30   AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.98
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TOTAL AREA(ACRES) =      116.3       PEAK FLOW RATE(CFS) =       9.87
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   41.33
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.502
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.70      0.60     0.900     -
  USER-DEFINED               -        0.20      0.60     1.000     -
  USER-DEFINED               -        0.10      0.60     0.850     -
  USER-DEFINED               -        0.10      0.60     0.500     -
  USER-DEFINED               -        3.00      0.60     1.000     -
  USER-DEFINED               -        1.40      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.975
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
```



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  SUBAREA AREA(ACRES) =    5.50      SUBAREA RUNOFF(CFS) =    0.06
  EFFECTIVE AREA(ACRES) =    121.80   AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.98
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TOTAL AREA(ACRES) =      121.8       PEAK FLOW RATE(CFS) =       9.87
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   41.33
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.502
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.40      0.60     0.900     -
  USER-DEFINED               -        0.10      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.907
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    0.06
  EFFECTIVE AREA(ACRES) =    123.30   AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.98
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TOTAL AREA(ACRES) =      123.3       PEAK FLOW RATE(CFS) =       9.87
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    372.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   345.00  DOWNSTREAM(FEET) =   301.00
  FLOW LENGTH(FEET) =   488.00   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.) =  15.19
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.87
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   41.87
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    372.00 =   11724.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    372.00 TO NODE    373.00 IS CODE =  56
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    301.00  DOWNSTREAM(FEET) =    300.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   924.00   CHANNEL SLOPE =  0.0011
  GIVEN CHANNEL BASE(FEET) =   30.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
```

```
 *ESTIMATED CHANNEL HEIGHT(FEET) =   1.43
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.412
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED                -       32.30      0.60     0.100     -
 USER-DEFINED                -        2.70      0.60     0.100     -
 USER-DEFINED                -        0.60      0.60     0.100     -
 USER-DEFINED                -        1.80      0.60     0.100     -
 USER-DEFINED                -        7.20      0.60     0.850     -
 USER-DEFINED                -        9.80      0.60     0.850     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.334
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.39
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.01
 AVERAGE FLOW DEPTH(FEET) =   0.51   TRAVEL TIME(MIN.) =  15.23
 Tc(MIN.) =   57.10
 SUBAREA AREA(ACRES) =    54.40       SUBAREA RUNOFF(CFS) =   13.42
 EFFECTIVE AREA(ACRES) =    177.70     AREA-AVERAGED Fm(INCH/HR) =   0.47
 AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   0.78
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) =      177.7         PEAK FLOW RATE(CFS) =      14.49
 GIVEN CHANNEL BASE(FEET) =   30.00   CHANNEL FREEBOARD(FEET) =  1.0
 "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
 *ESTIMATED CHANNEL HEIGHT(FEET) =   1.48

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =   0.96
 LONGEST FLOWPATH FROM NODE    390.00 TO NODE    373.00 =   12648.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    373.00 TO NODE    373.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   57.10
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.412
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED                -        2.60      0.60     0.850     -
 USER-DEFINED                -        2.10      0.60     0.850     -
 USER-DEFINED                -        3.50      0.60     0.900     -
 USER-DEFINED                -        4.80      0.60     0.900     -
 USER-DEFINED                -        3.60      0.60     0.900     -
 USER-DEFINED                -        0.80      0.60     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.886
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 SUBAREA AREA(ACRES) =   17.40      SUBAREA RUNOFF(CFS) =    0.73
 EFFECTIVE AREA(ACRES) =    195.10   AREA-AVERAGED Fm(INCH/HR) =  0.47
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.79
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
```



```
 TOTAL AREA(ACRES) =      195.1       PEAK FLOW RATE(CFS) =      15.22

****************************************************************************
 FLOW PROCESS FROM NODE    373.00 TO NODE    374.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   300.00  DOWNSTREAM(FEET) =   298.00
 FLOW LENGTH(FEET) =  1188.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.70
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.22
 PIPE TRAVEL TIME(MIN.) =   5.35    Tc(MIN.) =   62.45
 LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    320.00 TO NODE    321.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
 ELEVATION DATA: UPSTREAM(FEET) =    622.00  DOWNSTREAM(FEET) =    621.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.511
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.208
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 APARTMENTS                  -        1.50      0.60     0.200    56   10.51
 APARTMENTS                  -        2.00      0.60     0.200    56   10.51
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      3.43
 TOTAL AREA(ACRES) =      3.50   PEAK FLOW RATE(CFS) =      3.43

****************************************************************************
 FLOW PROCESS FROM NODE    321.00 TO NODE    322.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  621.00  DOWNSTREAM ELEVATION(FEET) =  612.00
```

```
  STREET LENGTH(FEET) =   569.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.91
  STREET FLOW TRAVEL TIME(MIN.) =   3.49   Tc(MIN.) =   14.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.004
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.20      0.60     0.200     -
  USER-DEFINED               -        3.20      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =    4.30
  EFFECTIVE AREA(ACRES) =      8.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        8.9        PEAK FLOW RATE(CFS) =       7.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.82
  FLOW VELOCITY(FEET/SEC.) =  2.86   DEPTH*VELOCITY(FT*FT/SEC.) =   1.02
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    322.00 =     899.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    324.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  612.00  DOWNSTREAM ELEVATION(FEET) =  590.00
  STREET LENGTH(FEET) =   891.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      10.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```



```
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.37
  STREET FLOW TRAVEL TIME(MIN.) =   3.99   Tc(MIN.) =   17.99
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.843
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.00      0.60     0.400     -
  USER-DEFINED               -        5.70      0.60     0.400     -
  USER-DEFINED               -        1.20      0.60     0.350     -
  USER-DEFINED               -        0.30      0.60     0.850     -
  USER-DEFINED               -        0.90      0.60     0.850     -
  USER-DEFINED               -        0.80      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.420
  SUBAREA AREA(ACRES) =   11.90      SUBAREA RUNOFF(CFS) =    6.33
  EFFECTIVE AREA(ACRES) =     20.80    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       20.8        PEAK FLOW RATE(CFS) =      12.12

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.46
  FLOW VELOCITY(FEET/SEC.) =  3.83   DEPTH*VELOCITY(FT*FT/SEC.) =   1.48
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    324.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.99
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.843
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.70      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    1.20
  EFFECTIVE AREA(ACRES) =     22.50   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      13.31

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    325.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   590.00  DOWNSTREAM(FEET) =   575.00
  FLOW LENGTH(FEET) =   529.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.54
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.31
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   18.83
```

```
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    325.00 =    2319.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   18.83
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.814
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.50      0.60     0.100     -
 USER-DEFINED               -        4.30      0.60     0.600     -
 USER-DEFINED               -        0.30      0.60     0.100     -
 USER-DEFINED               -        2.10      0.60     0.600     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.544
 SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =    3.16
 EFFECTIVE AREA(ACRES) =     29.70   AREA-AVERAGED Fm(INCH/HR) =  0.22
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.37
 TOTAL AREA(ACRES) =       29.7       PEAK FLOW RATE(CFS) =      15.89

****************************************************************************
 FLOW PROCESS FROM NODE    325.00 TO NODE    325.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   18.83
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.814
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.10      0.60     0.850     -
 USER-DEFINED               -        0.20      0.60     0.900     -
 USER-DEFINED               -        4.80      0.60     0.600     -
 USER-DEFINED               -       10.20      0.60     0.600     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.606
 SUBAREA AREA(ACRES) =   15.30      SUBAREA RUNOFF(CFS) =    6.21
 EFFECTIVE AREA(ACRES) =     45.00   AREA-AVERAGED Fm(INCH/HR) =  0.27
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =       45.0       PEAK FLOW RATE(CFS) =      22.10

****************************************************************************
 FLOW PROCESS FROM NODE    325.00 TO NODE    326.00 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) =   515.00
 FLOW LENGTH(FEET) =   284.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  25.69
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.10
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   19.01
```



```
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    326.00 =    2603.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.01
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.808
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.70      0.60     0.100     -
 USER-DEFINED               -        0.10      0.60     0.850     -
 USER-DEFINED               -        0.80      0.60     0.900     -
 USER-DEFINED               -        1.40      0.60     0.100     -
 USER-DEFINED               -        2.30      0.60     0.900     -
 USER-DEFINED               -        0.10      0.60     0.600     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.582
 SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =    2.23
 EFFECTIVE AREA(ACRES) =     50.40   AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.46
 TOTAL AREA(ACRES) =       50.4       PEAK FLOW RATE(CFS) =      24.07

****************************************************************************
 FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.01
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.808
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        2.10      0.60     0.100     -
 USER-DEFINED               -        2.80      0.60     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.557
 SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =    2.09
 EFFECTIVE AREA(ACRES) =     55.30   AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.47
 TOTAL AREA(ACRES) =       55.3       PEAK FLOW RATE(CFS) =      26.16

****************************************************************************
 FLOW PROCESS FROM NODE    326.00 TO NODE    333.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   500.00
 FLOW LENGTH(FEET) =  1644.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.02
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      26.16
 PIPE TRAVEL TIME(MIN.) =   3.42    Tc(MIN.) =   22.43
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    333.00 =    4247.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.43
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.722
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.40      0.60     0.100     -
  USER-DEFINED               -        2.20      0.60     0.900     -
  USER-DEFINED               -        1.80      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.900     -
  USER-DEFINED               -        5.60      0.60     0.100     -
  USER-DEFINED               -        4.10      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.467
  SUBAREA AREA(ACRES) =   14.40      SUBAREA RUNOFF(CFS) =    5.73
  EFFECTIVE AREA(ACRES) =     69.70   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       69.7       PEAK FLOW RATE(CFS) =      27.62

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.43
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.722
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.07
  EFFECTIVE AREA(ACRES) =     69.90   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       69.9       PEAK FLOW RATE(CFS) =      27.69

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 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.) =   22.43
  RAINFALL INTENSITY(INCH/HR) =   0.72
  AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      69.90
  TOTAL STREAM AREA(ACRES) =      69.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      27.69
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.50 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =    615.00  DOWNSTREAM(FEET) =    614.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.844
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.257
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 -        0.40      0.60     0.100    56    9.84
  PUBLIC PARK                -        0.20      0.60     0.850    56   15.64
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      -        0.10      0.60     0.400    56   12.11
  COMMERCIAL                 -        0.10      0.60     0.100    56    9.84
  PUBLIC PARK                -        0.10      0.60     0.850    56   15.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.383
  SUBAREA RUNOFF(CFS) =      0.83
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      0.83

****************************************************************************
  FLOW PROCESS FROM NODE    327.50 TO NODE    328.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  614.00  DOWNSTREAM ELEVATION(FEET) =  610.00
  STREET LENGTH(FEET) =   425.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       2.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    6.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
  STREET FLOW TRAVEL TIME(MIN.) =   3.86   Tc(MIN.) =   13.70
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.021
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.00      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.850     -
```

```
  USER-DEFINED               -        0.20      0.60     0.400     -
  USER-DEFINED               -        0.90      0.60     0.100     -
  USER-DEFINED               -        0.60      0.60     0.850     -
  USER-DEFINED               -        0.20      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.348
  SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    2.34
  EFFECTIVE AREA(ACRES) =      4.10    AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        4.1        PEAK FLOW RATE(CFS) =       2.98

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   7.97
  FLOW VELOCITY(FEET/SEC.) =  1.96   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    328.00 =     754.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    329.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  610.00  DOWNSTREAM ELEVATION(FEET) =  595.00
  STREET LENGTH(FEET) =   366.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       4.94
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.03
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.89
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
  STREET FLOW TRAVEL TIME(MIN.) =   1.57   Tc(MIN.) =   15.27
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.936
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     0.100     -
  USER-DEFINED               -        0.20      0.60     0.850     -
  USER-DEFINED               -        3.10      0.60     0.400     -
  USER-DEFINED               -        0.50      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.850     -
  USER-DEFINED               -        2.10      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.407
  SUBAREA AREA(ACRES) =    6.30      SUBAREA RUNOFF(CFS) =    3.92
  EFFECTIVE AREA(ACRES) =     10.40    AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       10.4        PEAK FLOW RATE(CFS) =       6.59
```



```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.22
  FLOW VELOCITY(FEET/SEC.) =  4.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    329.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.27
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.936
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.80      0.60     0.400     -
  USER-DEFINED               -        0.10      0.60     0.600     -
  USER-DEFINED               -        6.10      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.402
  SUBAREA AREA(ACRES) =    9.00      SUBAREA RUNOFF(CFS) =    5.63
  EFFECTIVE AREA(ACRES) =     19.40   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       19.4        PEAK FLOW RATE(CFS) =      12.21

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    330.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   595.00  DOWNSTREAM(FEET) =   575.00
  FLOW LENGTH(FEET) =   378.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.21
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   15.75
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    330.00 =    1498.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.75
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.919
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.90      0.60     0.850     -
  USER-DEFINED               -        4.10      0.60     0.600     -
  USER-DEFINED               -        2.50      0.60     0.400     -
  USER-DEFINED               -        0.60      0.60     0.100     -
  USER-DEFINED               -       10.20      0.60     0.600     -
  USER-DEFINED               -        0.90      0.60     0.400     -
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.561
  SUBAREA AREA(ACRES) =   19.20      SUBAREA RUNOFF(CFS) =   10.08
  EFFECTIVE AREA(ACRES) =     38.60   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       38.6       PEAK FLOW RATE(CFS) =      22.00

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    331.00 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) =   555.00
  FLOW LENGTH(FEET) =   457.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.15
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.00
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   16.28
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    331.00 =    1955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.28
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.901
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.10      0.60     0.850     -
  USER-DEFINED               -        0.80      0.60     0.900     -
  USER-DEFINED               -       10.50      0.60     0.600     -
  USER-DEFINED               -        0.30      0.60     0.100     -
  USER-DEFINED               -        0.50      0.60     0.900     -
  USER-DEFINED               -       13.70      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.619
  SUBAREA AREA(ACRES) =   26.90      SUBAREA RUNOFF(CFS) =   12.82
  EFFECTIVE AREA(ACRES) =     65.50   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       65.5       PEAK FLOW RATE(CFS) =      34.19

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    332.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   555.00  DOWNSTREAM(FEET) =   520.00
  FLOW LENGTH(FEET) =   324.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.17
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.19
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   16.53
```



```
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    332.00 =    2279.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    332.00 TO NODE    332.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.53
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.893
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     0.100     -
  USER-DEFINED               -        2.10      0.60     0.900     -
  USER-DEFINED               -        3.70      0.60     0.100     -
  USER-DEFINED               -        5.00      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.621
  SUBAREA AREA(ACRES) =   10.90      SUBAREA RUNOFF(CFS) =    5.10
  EFFECTIVE AREA(ACRES) =     76.40   AREA-AVERAGED Fm(INCH/HR) =  0.33
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       76.4       PEAK FLOW RATE(CFS) =      38.80

****************************************************************************
  FLOW PROCESS FROM NODE    332.00 TO NODE    333.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   520.00  DOWNSTREAM(FEET) =   500.00
  FLOW LENGTH(FEET) =  1740.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.65
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.80
  PIPE TRAVEL TIME(MIN.) =   3.00    Tc(MIN.) =   19.53
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    333.00 =    4019.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.53
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.790
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.20      0.60     0.100     -
  USER-DEFINED               -        4.40      0.60     0.900     -
  USER-DEFINED               -        3.90      0.60     0.100     -
  USER-DEFINED               -        9.80      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.689
  SUBAREA AREA(ACRES) =   19.30      SUBAREA RUNOFF(CFS) =    6.55
  EFFECTIVE AREA(ACRES) =     95.70   AREA-AVERAGED Fm(INCH/HR) =  0.35
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       95.7       PEAK FLOW RATE(CFS) =      38.80
```

```
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 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.) =   19.53
  RAINFALL INTENSITY(INCH/HR) =   0.79
  AREA-AVERAGED Fm(INCH/HR) =  0.35
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =      95.70
  TOTAL STREAM AREA(ACRES) =      95.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      38.80

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       27.69   22.43    0.722  0.60( 0.28) 0.47      69.9     320.00
      2       38.80   19.53    0.790  0.60( 0.35) 0.58      95.7     327.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       66.49   19.53    0.790  0.60( 0.32) 0.53     156.6     327.00
      2       60.56   22.43    0.722  0.60( 0.32) 0.53     165.6     320.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      66.49    Tc(MIN.) =    19.53
  EFFECTIVE AREA(ACRES) =     156.58   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      165.6
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    333.00 =    4247.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    334.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   819.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.63
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      66.49
  PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =   20.31
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    334.00 =    5066.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.31
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.767
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.00      0.60      0.200     -
  USER-DEFINED               -        2.30      0.60      0.100     -
  USER-DEFINED               -        1.00      0.60      0.100     -
  USER-DEFINED               -        0.40      0.60      0.850     -
  USER-DEFINED               -        2.40      0.60      0.850     -
  USER-DEFINED               -        3.50      0.60      0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.310
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =    7.12
  EFFECTIVE AREA(ACRES) =    170.18   AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      179.2       PEAK FLOW RATE(CFS) =      70.06

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.31
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.767
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.00      0.60      0.200     -
  USER-DEFINED               -        1.60      0.60      0.400     -
  USER-DEFINED               -        2.10      0.60      0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.330
  SUBAREA AREA(ACRES) =    5.70      SUBAREA RUNOFF(CFS) =    2.92
  EFFECTIVE AREA(ACRES) =    175.88   AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      184.9       PEAK FLOW RATE(CFS) =      72.98

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 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.) =   20.31
  RAINFALL INTENSITY(INCH/HR) =   0.77
  AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =     175.88
  TOTAL STREAM AREA(ACRES) =     184.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      72.98

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

```
 FLOW PROCESS FROM NODE    350.00 TO NODE    351.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
 ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    492.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.730
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.195
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       -        0.80      0.60     0.600    56   10.73
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       -        1.70      0.60     0.600    56   10.73
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      1.88
 TOTAL AREA(ACRES) =      2.50   PEAK FLOW RATE(CFS) =      1.88

****************************************************************************
 FLOW PROCESS FROM NODE    351.00 TO NODE    352.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  492.00  DOWNSTREAM ELEVATION(FEET) =  488.00
 STREET LENGTH(FEET) =   456.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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) =       2.86
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    7.97
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.88
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.57
 STREET FLOW TRAVEL TIME(MIN.) =   4.04   Tc(MIN.) =   14.77
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.958
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        3.20      0.60     0.600     -
 USER-DEFINED               -        0.40      0.60     0.600     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    1.94
```



```
 EFFECTIVE AREA(ACRES) =      6.10    AREA-AVERAGED Fm(INCH/HR) =  0.36
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        6.1        PEAK FLOW RATE(CFS) =       3.29

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.59
 FLOW VELOCITY(FEET/SEC.) =  1.93   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
 LONGEST FLOWPATH FROM NODE    350.00 TO NODE    352.00 =     786.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    352.00 TO NODE    353.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   488.00  DOWNSTREAM(FEET) =   485.00
 FLOW LENGTH(FEET) =   883.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.39
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.29
 PIPE TRAVEL TIME(MIN.) =   4.34    Tc(MIN.) =   19.12
 LONGEST FLOWPATH FROM NODE    350.00 TO NODE    353.00 =    1669.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    353.00 TO NODE    353.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.12
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.804
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.50      0.60     0.600     -
 USER-DEFINED               -        1.10      0.60     0.400     -
 USER-DEFINED               -        0.10      0.60     0.850     -
 USER-DEFINED               -        0.60      0.60     0.600     -
 USER-DEFINED               -        4.50      0.60     0.400     -
 USER-DEFINED               -        1.70      0.60     0.600     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.471
 SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =    3.99
 EFFECTIVE AREA(ACRES) =     14.60   AREA-AVERAGED Fm(INCH/HR) =  0.31
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =       14.6       PEAK FLOW RATE(CFS) =       6.43

****************************************************************************
 FLOW PROCESS FROM NODE    353.00 TO NODE    353.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.12
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.804
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  USER-DEFINED               -        0.30      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.15
  EFFECTIVE AREA(ACRES) =     14.90   AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       14.9       PEAK FLOW RATE(CFS) =       6.58

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    334.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =  1136.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.58
  PIPE TRAVEL TIME(MIN.) =   2.69    Tc(MIN.) =   21.81
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    334.00 =    2805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.81
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.735
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.90      0.60     0.100     -
  USER-DEFINED               -        2.00      0.60     0.850     -
  USER-DEFINED               -        1.40      0.60     0.200     -
  USER-DEFINED               -        1.50      0.60     0.400     -
  USER-DEFINED               -        0.50      0.60     0.100     -
  USER-DEFINED               -        1.50      0.60     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =    3.00
  EFFECTIVE AREA(ACRES) =     22.70   AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       22.7       PEAK FLOW RATE(CFS) =       8.66

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.81
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.735
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.10      0.60     0.200     -
```



```
  USER-DEFINED               -        1.40      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.262
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    2.34
  EFFECTIVE AREA(ACRES) =     27.20   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       27.2       PEAK FLOW RATE(CFS) =      11.00

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.81
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.735
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.50      0.60     0.850     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  USER-DEFINED               -        1.20      0.60     0.600     -
  USER-DEFINED               -        2.70      0.60     0.850     -
  USER-DEFINED               -        0.20      0.60     0.900     -
  USER-DEFINED               -        7.30      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.674
  SUBAREA AREA(ACRES) =   12.00      SUBAREA RUNOFF(CFS) =    3.57
  EFFECTIVE AREA(ACRES) =     39.20   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       39.2       PEAK FLOW RATE(CFS) =      14.58

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.81
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.735
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     0.100     -
  USER-DEFINED               -        0.60      0.60     0.850     -
  USER-DEFINED               -        3.10      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.626
  SUBAREA AREA(ACRES) =    3.80      SUBAREA RUNOFF(CFS) =    1.23
  EFFECTIVE AREA(ACRES) =     43.00   AREA-AVERAGED Fm(INCH/HR) =  0.33
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       43.0       PEAK FLOW RATE(CFS) =      15.81

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 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.) =   21.81
  RAINFALL INTENSITY(INCH/HR) =   0.74
  AREA-AVERAGED Fm(INCH/HR) =  0.33
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =      43.00
  TOTAL STREAM AREA(ACRES) =      43.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.81

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       72.98   20.31    0.767  0.60( 0.31) 0.51     175.9     327.00
      1       66.57   23.21    0.705  0.60( 0.31) 0.51     184.9     320.00
      2       15.81   21.81    0.735  0.60( 0.33) 0.54      43.0     350.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       88.79   20.31    0.767  0.60( 0.31) 0.52     215.9     327.00
      2       85.47   21.81    0.735  0.60( 0.31) 0.52     223.5     350.00
      3       81.21   23.21    0.705  0.60( 0.31) 0.52     227.9     320.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      88.79    Tc(MIN.) =    20.31
  EFFECTIVE AREA(ACRES) =     215.91   AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      227.9
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    334.00 =    5066.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    335.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   422.00
  FLOW LENGTH(FEET) =  1086.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.55
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      88.79
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =   21.23
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    335.00 =    6152.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    335.00 TO NODE    335.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.23
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.748
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```



```
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.00      0.60      0.100     -
  USER-DEFINED               -        4.20      0.60      0.100     -
  USER-DEFINED               -        0.60      0.60      0.850     -
  USER-DEFINED               -       10.80      0.60      0.850     -
  USER-DEFINED               -        1.00      0.60      0.900     -
  USER-DEFINED               -        3.90      0.60      0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.631
  SUBAREA AREA(ACRES) =   23.50      SUBAREA RUNOFF(CFS) =    7.81
  EFFECTIVE AREA(ACRES) =    239.41   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      251.4       PEAK FLOW RATE(CFS) =      92.82

****************************************************************************
  FLOW PROCESS FROM NODE    335.00 TO NODE    335.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.23
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.748
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60      0.600     -
  USER-DEFINED               -        0.10      0.60      0.600     -
  USER-DEFINED               -        0.10      0.60      0.500     -
  USER-DEFINED               -        9.20      0.60      0.500     -
  USER-DEFINED               -        0.70      0.60      0.400     -
  USER-DEFINED               -        2.90      0.60      0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.474
  SUBAREA AREA(ACRES) =   13.10      SUBAREA RUNOFF(CFS) =    5.46
  EFFECTIVE AREA(ACRES) =    252.51   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      264.5       PEAK FLOW RATE(CFS) =      98.28

****************************************************************************
  FLOW PROCESS FROM NODE    335.00 TO NODE    336.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   422.00  DOWNSTREAM(FEET) =   380.00
  FLOW LENGTH(FEET) =   780.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.98
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      98.28
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   21.82
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    336.00 =    6932.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.82
```

```
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.735
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.70      0.60     0.100     -
  USER-DEFINED               -        0.60      0.60     0.100     -
  USER-DEFINED               -        1.60      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.850     -
  USER-DEFINED               -        3.70      0.60     0.200     -
  USER-DEFINED               -        5.60      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.182
  SUBAREA AREA(ACRES) =   12.30      SUBAREA RUNOFF(CFS) =    6.93
  EFFECTIVE AREA(ACRES) =    264.81   AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      276.8       PEAK FLOW RATE(CFS) =     102.33

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.82
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.735
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.60     0.900     -
  USER-DEFINED               -        0.50      0.60     0.900     -
  USER-DEFINED               -        0.60      0.60     0.900     -
  USER-DEFINED               -        3.40      0.60     0.600     -
  USER-DEFINED               -       16.80      0.60     0.600     -
  USER-DEFINED               -        0.70      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.611
  SUBAREA AREA(ACRES) =   22.20      SUBAREA RUNOFF(CFS) =    7.36
  EFFECTIVE AREA(ACRES) =    287.01   AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      299.0       PEAK FLOW RATE(CFS) =     109.69

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.82
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.735
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        6.30      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    6.30      SUBAREA RUNOFF(CFS) =    2.81
  EFFECTIVE AREA(ACRES) =    293.31   AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      305.3       PEAK FLOW RATE(CFS) =     112.50
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    337.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   380.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =   803.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.63
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     112.50
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   22.51
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    337.00 =    7735.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.51
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.720
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.40      0.60     0.200     -
  USER-DEFINED               -        3.00      0.60     0.200     -
  USER-DEFINED               -        1.30      0.60     0.100     -
  USER-DEFINED               -        2.70      0.60     0.100     -
  USER-DEFINED               -        6.00      0.60     0.100     -
  USER-DEFINED               -        1.30      0.60     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.189
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =    8.03
  EFFECTIVE AREA(ACRES) =    308.01   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      320.0       PEAK FLOW RATE(CFS) =     116.67

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.51
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.720
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.30      0.60     0.850     -
  USER-DEFINED               -        1.50      0.60     0.850     -
  USER-DEFINED               -        2.50      0.60     0.200     -
  USER-DEFINED               -        6.70      0.60     0.200     -
  USER-DEFINED               -        2.20      0.60     0.900     -
  USER-DEFINED               -        0.10      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.488
  SUBAREA AREA(ACRES) =   16.30      SUBAREA RUNOFF(CFS) =    6.27
  EFFECTIVE AREA(ACRES) =    324.31   AREA-AVERAGED Fm(INCH/HR) =  0.30
```

```
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =      336.3       PEAK FLOW RATE(CFS) =     122.94

****************************************************************************
 FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   22.51
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.720
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.60      0.60     0.600     -
 USER-DEFINED               -        4.60      0.60     0.400     -
 USER-DEFINED               -        2.90      0.60     0.400     -
 USER-DEFINED               -        0.20      0.60     0.600     -
 USER-DEFINED               -        5.90      0.60     0.600     -
 USER-DEFINED               -        6.00      0.60     0.600     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.526
 SUBAREA AREA(ACRES) =   20.20      SUBAREA RUNOFF(CFS) =    7.36
 EFFECTIVE AREA(ACRES) =    344.51   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =      356.5       PEAK FLOW RATE(CFS) =     130.31

****************************************************************************
 FLOW PROCESS FROM NODE    337.00 TO NODE    338.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   332.00
 FLOW LENGTH(FEET) =   838.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.52
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     130.31
 PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =   23.35
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    338.00 =    8573.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   23.35
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.702
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        6.90      0.60     0.200     -
 USER-DEFINED               -        2.80      0.60     0.100     -
 USER-DEFINED               -       11.50      0.60     0.100     -
 USER-DEFINED               -        4.70      0.60     0.100     -
 USER-DEFINED               -        8.60      0.60     0.100     -
 USER-DEFINED               -        2.60      0.60     0.850     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
```



```
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.171
 SUBAREA AREA(ACRES) =   37.10      SUBAREA RUNOFF(CFS) =   20.02
 EFFECTIVE AREA(ACRES) =    381.61   AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.47
 TOTAL AREA(ACRES) =      393.6       PEAK FLOW RATE(CFS) =     144.72

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   23.35
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.702
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.10      0.60     0.850     -
 USER-DEFINED               -        0.60      0.60     0.850     -
 USER-DEFINED               -        0.30      0.60     0.200     -
 USER-DEFINED               -        9.70      0.60     0.200     -
 USER-DEFINED               -        1.20      0.60     0.200     -
 USER-DEFINED               -        3.40      0.60     0.200     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.230
 SUBAREA AREA(ACRES) =   15.30      SUBAREA RUNOFF(CFS) =    7.77
 EFFECTIVE AREA(ACRES) =    396.91   AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.46
 TOTAL AREA(ACRES) =      408.9       PEAK FLOW RATE(CFS) =     152.49

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   23.35
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.702
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        5.60      0.60     0.100     -
 USER-DEFINED               -        3.60      0.60     0.100     -
 USER-DEFINED               -        5.80      0.60     0.100     -
 USER-DEFINED               -        0.80      0.60     0.600     -
 USER-DEFINED               -        1.20      0.60     0.600     -
 USER-DEFINED               -        4.50      0.60     0.600     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.251
 SUBAREA AREA(ACRES) =   21.50      SUBAREA RUNOFF(CFS) =   10.67
 EFFECTIVE AREA(ACRES) =    418.41   AREA-AVERAGED Fm(INCH/HR) =  0.27
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      430.4       PEAK FLOW RATE(CFS) =     163.16

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   23.35
```

```
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.702
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.30      0.60     0.900     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.04
EFFECTIVE AREA(ACRES) =    418.71   AREA-AVERAGED Fm(INCH/HR) =  0.27
AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.45
TOTAL AREA(ACRES) =      430.7       PEAK FLOW RATE(CFS) =     163.21

****************************************************************************
  FLOW PROCESS FROM NODE    338.00 TO NODE    339.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   332.00  DOWNSTREAM(FEET) =   301.00
  FLOW LENGTH(FEET) =  1956.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  37.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.54
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     163.21
  PIPE TRAVEL TIME(MIN.) =   2.10    Tc(MIN.) =   25.45
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      163.21   25.45    0.660  0.60( 0.27) 0.45     418.7     327.00
      2      153.46   26.99    0.637  0.60( 0.27) 0.45     426.3     350.00
      3      146.12   28.46    0.614  0.60( 0.27) 0.45     430.7     320.00
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       97.04   19.44    0.793  0.60( 0.23) 0.38     178.8     300.00
      2       62.28   32.94    0.567  0.60( 0.23) 0.39     195.4     306.00
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    339.00 =    9467.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      260.24   19.44    0.793  0.60( 0.25) 0.42     498.7     300.00
      2      244.77   25.45    0.660  0.60( 0.26) 0.43     604.9     327.00
      3      231.07   26.99    0.637  0.60( 0.26) 0.43     614.4     350.00
      4      219.95   28.46    0.614  0.60( 0.26) 0.43     620.6     320.00
      5      194.57   32.94    0.567  0.60( 0.26) 0.43     626.1     306.00
    TOTAL AREA(ACRES) =       626.1
```



```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      260.24  Tc(MIN.) =   19.444
  EFFECTIVE AREA(ACRES) =    498.67  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      626.1
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    340.00 IS CODE =  56
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    301.00  DOWNSTREAM(FEET) =    300.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   196.00   CHANNEL SLOPE =  0.0051
  GIVEN CHANNEL BASE(FEET) =  300.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   1.44
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.752
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       31.90      0.60     0.100     -
  USER-DEFINED               -        2.30      0.60     0.100     -
  USER-DEFINED               -        1.90      0.60     0.100     -
  USER-DEFINED               -        1.00      0.60     0.100     -
  USER-DEFINED               -        3.10      0.60     0.850     -
  USER-DEFINED               -        0.80      0.60     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.171
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     272.21
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.05
  AVERAGE FLOW DEPTH(FEET) =   0.44   TRAVEL TIME(MIN.) =   1.59
  Tc(MIN.) =   21.03
  SUBAREA AREA(ACRES) =    41.00       SUBAREA RUNOFF(CFS) =   23.95
  EFFECTIVE AREA(ACRES) =    539.67     AREA-AVERAGED Fm(INCH/HR) =   0.24
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   0.40
  TOTAL AREA(ACRES) =      667.1         PEAK FLOW RATE(CFS) =     260.24
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
  GIVEN CHANNEL BASE(FEET) =  300.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   1.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.43   FLOW VELOCITY(FEET/SEC.) =   2.01
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    340.00 =   10725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    340.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.03
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.752
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.00      0.60     0.900     -
```

```
  USER-DEFINED               -        1.80      0.60     0.900     -
  USER-DEFINED               -        2.40      0.60     0.900     -
  USER-DEFINED               -        0.10      0.60     0.850     -
  USER-DEFINED               -        0.10      0.60     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.899
  SUBAREA AREA(ACRES) =    8.40      SUBAREA RUNOFF(CFS) =    1.61
  EFFECTIVE AREA(ACRES) =    548.07   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =      675.5       PEAK FLOW RATE(CFS) =     260.24
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    374.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   300.00  DOWNSTREAM(FEET) =   298.00
  FLOW LENGTH(FEET) =   221.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  50.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.09
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     260.24
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   21.30
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    374.00 =   10946.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      260.24   21.30    0.746  0.60( 0.25) 0.41     548.1     300.00
      2      244.77   27.35    0.631  0.60( 0.25) 0.42     654.3     327.00
      3      231.07   28.93    0.607  0.60( 0.25) 0.42     663.8     350.00
      4      219.95   30.44    0.587  0.60( 0.25) 0.42     670.0     320.00
      5      194.83   35.02    0.550  0.60( 0.25) 0.42     675.5     306.00
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    374.00 =   10946.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       15.22   62.45    0.390  0.60( 0.47) 0.79     195.1     390.00
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      275.46   21.30    0.746  0.60( 0.27) 0.45     614.6     300.00
      2      257.57   27.35    0.631  0.60( 0.28) 0.46     739.7     327.00
      3      242.55   28.93    0.607  0.60( 0.28) 0.46     754.2     350.00
      4      231.12   30.44    0.587  0.60( 0.28) 0.47     765.1     320.00
      5      206.87   35.02    0.550  0.60( 0.28) 0.47     784.9     306.00
      6      153.32   62.45    0.390  0.60( 0.30) 0.50     870.6     390.00
```



```
    TOTAL AREA(ACRES) =       870.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      275.46  Tc(MIN.) =   21.295
  EFFECTIVE AREA(ACRES) =    614.60  AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      870.6
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    380.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   298.00  DOWNSTREAM(FEET) =   261.00
  FLOW LENGTH(FEET) =  1402.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.59
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     275.46
  PIPE TRAVEL TIME(MIN.) =   1.08    Tc(MIN.) =   22.38
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    380.00 =   15238.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      870.6  TC(MIN.) =     22.38
  EFFECTIVE AREA(ACRES) =    614.60  AREA-AVERAGED Fm(INCH/HR)=  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap = 0.452
  PEAK FLOW RATE(CFS)   =     275.46

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      275.46   22.38    0.723  0.60( 0.27) 0.45     614.6     300.00
      2      257.57   28.47    0.614  0.60( 0.28) 0.46     739.7     327.00
      3      242.55   30.05    0.591  0.60( 0.28) 0.46     754.2     350.00
      4      231.12   31.57    0.578  0.60( 0.28) 0.47     765.1     320.00
      5      206.87   36.19    0.541  0.60( 0.28) 0.47     784.9     306.00
      6      153.32   63.72    0.388  0.60( 0.30) 0.50     870.6     390.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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            Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:

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                          Santa Ana, CA92707


 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA C                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 5-YR EV DECEMBER 2018 CCHIU                                          *
 ************************************************************************

  FILE NAME: 3C05EVRL.DAT
  TIME/DATE OF STUDY: 09:12 12/24/2018
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    5.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  2.707
   2)   10.00;  1.797
   3)   15.00;  1.318
   4)   20.00;  1.128
   5)   25.00;  0.984
   6)   30.00;  0.882
   7)   40.00;  0.755
   8)   50.00;  0.672
   9)   60.00;  0.611
  10)   90.00;  0.509
  11)  120.00;  0.450
  12)  180.00;  0.378
  13)  360.00;  0.280
  14) 1200.00;  0.123
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   320.00
  ELEVATION DATA: UPSTREAM(FEET) =    640.00  DOWNSTREAM(FEET) =    634.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.766
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.386
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 -        0.20      0.50      0.100    56    6.77
  PUBLIC PARK                -        0.90      0.50      0.850    56   10.75
  COMMERCIAL                 -        0.30      0.50      0.100    56    6.77
  PUBLIC PARK                -        1.90      0.50      0.850    56   10.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.736
  SUBAREA RUNOFF(CFS) =      5.99
  TOTAL AREA(ACRES) =      3.30   PEAK FLOW RATE(CFS) =      5.99

************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  62
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  634.00  DOWNSTREAM ELEVATION(FEET) =  630.00
  STREET LENGTH(FEET) =   503.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      12.66
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   16.13
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.51
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   3.34   Tc(MIN.) =   10.10
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.787
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.50      0.50     0.100     -
  USER-DEFINED               -        2.10      0.50     0.850     -
  USER-DEFINED               -        4.60      0.50     0.600     -
  USER-DEFINED               -        0.30      0.50     0.100     -
  USER-DEFINED               -        1.40      0.50     0.850     -
  USER-DEFINED               -        1.10      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.648
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   13.17
  EFFECTIVE AREA(ACRES) =     13.30    AREA-AVERAGED Fm(INCH/HR) =  0.33
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.67
  TOTAL AREA(ACRES) =       13.3        PEAK FLOW RATE(CFS) =      17.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.40
  FLOW VELOCITY(FEET/SEC.) =  2.70   DEPTH*VELOCITY(FT*FT/SEC.) =   1.33
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     823.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    302.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.10
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.787
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.00      0.50     0.850     -
  USER-DEFINED               -        9.30      0.50     0.200     -
  USER-DEFINED               -        0.40      0.50     0.850     -
  USER-DEFINED               -        1.30      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.276
  SUBAREA AREA(ACRES) =   12.00      SUBAREA RUNOFF(CFS) =   17.81
  EFFECTIVE AREA(ACRES) =     25.30   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       25.3       PEAK FLOW RATE(CFS) =      35.20

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   630.00  DOWNSTREAM(FEET) =   625.00
  FLOW LENGTH(FEET) =   651.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.20
  PIPE TRAVEL TIME(MIN.) =   1.32    Tc(MIN.) =   11.42
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =    1474.00 FEET.

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



```
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.42
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.661
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.40      0.50     0.100     -
  USER-DEFINED               -        0.40      0.50     0.850     -
  USER-DEFINED               -        1.80      0.50     0.400     -
  USER-DEFINED               -        1.30      0.50     0.600     -
  USER-DEFINED               -        0.60      0.50     0.100     -
  USER-DEFINED               -        0.60      0.50     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.480
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =    6.52
  EFFECTIVE AREA(ACRES) =     30.40   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       30.4       PEAK FLOW RATE(CFS) =      38.84

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.42
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.661
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.50      0.50     0.400     -
  USER-DEFINED               -        5.20      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.520
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =   10.97
  EFFECTIVE AREA(ACRES) =     39.10   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       39.1       PEAK FLOW RATE(CFS) =      49.81

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.42
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.661
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.80      0.50     0.100     -
  USER-DEFINED               -        0.40      0.50     0.850     -
  USER-DEFINED               -        7.40      0.50     0.200     -
  USER-DEFINED               -        0.30      0.50     0.850     -
  USER-DEFINED               -        0.50      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.215
```

```
  SUBAREA AREA(ACRES) =   11.40      SUBAREA RUNOFF(CFS) =   15.94
  EFFECTIVE AREA(ACRES) =     50.50   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       50.5       PEAK FLOW RATE(CFS) =      65.74

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.42
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.661
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.70      0.50     0.100     -
  USER-DEFINED               -        2.30      0.50     0.850     -
  USER-DEFINED               -        4.90      0.50     0.200     -
  USER-DEFINED               -        1.70      0.50     0.100     -
  USER-DEFINED               -        1.80      0.50     0.850     -
  USER-DEFINED               -        6.20      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.294
  SUBAREA AREA(ACRES) =   21.60      SUBAREA RUNOFF(CFS) =   29.43
  EFFECTIVE AREA(ACRES) =     72.10   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       72.1       PEAK FLOW RATE(CFS) =      95.17

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   625.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =  1029.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.48
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      95.17
  PIPE TRAVEL TIME(MIN.) =   1.49    Tc(MIN.) =   12.92
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =    2503.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.92
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.518
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.10      0.50     0.100     -
  USER-DEFINED               -        1.80      0.50     0.850     -
  USER-DEFINED               -        1.00      0.50     0.200     -
  USER-DEFINED               -        5.00      0.50     0.400     -
  USER-DEFINED               -        2.80      0.50     0.100     -
```



```
  USER-DEFINED               -        0.90      0.50     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.367
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   16.33
  EFFECTIVE AREA(ACRES) =     85.70   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       85.7       PEAK FLOW RATE(CFS) =     102.22

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.92
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.518
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.80      0.50     0.200     -
  USER-DEFINED               -        1.20      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.280
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    3.72
  EFFECTIVE AREA(ACRES) =     88.70   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       88.7       PEAK FLOW RATE(CFS) =     105.94

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 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.) =   12.92
  RAINFALL INTENSITY(INCH/HR) =   1.52
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.38
  EFFECTIVE STREAM AREA(ACRES) =      88.70
  TOTAL STREAM AREA(ACRES) =      88.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     105.94

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    307.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   317.00
  ELEVATION DATA: UPSTREAM(FEET) =    646.00  DOWNSTREAM(FEET) =    645.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   15.296
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.307
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  PUBLIC PARK                -        0.40      0.50     0.850    56   15.30
  RESIDENTIAL
  ".4 DWELLING/ACRE"         -        0.10      0.50     0.900    56   15.42
  PUBLIC PARK                -        1.50      0.50     0.850    56   15.30
  RESIDENTIAL
  ".4 DWELLING/ACRE"         -        0.20      0.50     0.900    56   15.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.857
  SUBAREA RUNOFF(CFS) =      1.74
  TOTAL AREA(ACRES) =      2.20   PEAK FLOW RATE(CFS) =      1.74

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.10 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  645.00  DOWNSTREAM ELEVATION(FEET) =  641.00
  STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       3.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
  STREET FLOW TRAVEL TIME(MIN.) =   2.98   Tc(MIN.) =   18.28
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.194
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.40      0.50     0.850     -
  USER-DEFINED               -        2.00      0.50     0.600     -
  USER-DEFINED               -        0.30      0.50     0.850     -
  USER-DEFINED               -        0.10      0.50     0.900     -
  USER-DEFINED               -        1.40      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.649
  SUBAREA AREA(ACRES) =    4.20      SUBAREA RUNOFF(CFS) =    3.28
  EFFECTIVE AREA(ACRES) =      6.40    AREA-AVERAGED Fm(INCH/HR) =  0.36
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =        6.4        PEAK FLOW RATE(CFS) =       4.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   9.84
  FLOW VELOCITY(FEET/SEC.) =  2.27   DEPTH*VELOCITY(FT*FT/SEC.) =   0.77
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    307.10 =     692.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    307.10 TO NODE    308.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  641.00  DOWNSTREAM ELEVATION(FEET) =  635.00
  STREET LENGTH(FEET) =   506.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       7.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.99
  STREET FLOW TRAVEL TIME(MIN.) =   3.23   Tc(MIN.) =   21.51
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.085
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.00      0.50     0.100     -
  USER-DEFINED               -        0.30      0.50     0.850     -
  USER-DEFINED               -        4.80      0.50     0.600     -
  USER-DEFINED               -        0.10      0.50     0.900     -
  USER-DEFINED               -        2.30      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.554
  SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =    6.18
  EFFECTIVE AREA(ACRES) =     14.90    AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =       14.9        PEAK FLOW RATE(CFS) =      10.35

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.63
  FLOW VELOCITY(FEET/SEC.) =  2.79   DEPTH*VELOCITY(FT*FT/SEC.) =   1.13
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    308.00 =    1198.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   635.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =  1516.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.34
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      10.35
  PIPE TRAVEL TIME(MIN.) =   3.44    Tc(MIN.) =   24.95
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    305.00 =    2714.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   24.95
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.985
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.20      0.50     0.100     -
  USER-DEFINED               -        0.10      0.50     0.850     -
  USER-DEFINED               -        2.20      0.50     0.200     -
  USER-DEFINED               -        0.80      0.50     0.600     -
  USER-DEFINED               -        0.50      0.50     0.400     -
  USER-DEFINED               -        0.20      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.289
  SUBAREA AREA(ACRES) =    5.00      SUBAREA RUNOFF(CFS) =    3.78
  EFFECTIVE AREA(ACRES) =     19.90   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       19.9       PEAK FLOW RATE(CFS) =      12.80

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   24.95
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.985
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.20      0.50     0.100     -
  USER-DEFINED               -        0.20      0.50     0.850     -
  USER-DEFINED               -        2.30      0.50     0.200     -
  USER-DEFINED               -        0.30      0.50     0.900     -
  USER-DEFINED               -        4.00      0.50     0.600     -
  USER-DEFINED               -        6.60      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.415
  SUBAREA AREA(ACRES) =   14.60      SUBAREA RUNOFF(CFS) =   10.22
  EFFECTIVE AREA(ACRES) =     34.50   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       34.5       PEAK FLOW RATE(CFS) =      23.03

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   24.95
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.985
  SUBAREA LOSS RATE DATA(AMC  II):
```



```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.12
  EFFECTIVE AREA(ACRES) =     34.70   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       34.7       PEAK FLOW RATE(CFS) =      23.15

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 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.) =   24.95
  RAINFALL INTENSITY(INCH/HR) =   0.99
  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =      34.70
  TOTAL STREAM AREA(ACRES) =      34.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.15

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      105.94   12.92    1.518  0.50( 0.19) 0.38      88.7     300.00
      2       23.15   24.95    0.985  0.50( 0.24) 0.49      34.7     306.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      126.52   12.92    1.518  0.50( 0.20) 0.40     106.7     300.00
      2       86.59   24.95    0.985  0.50( 0.21) 0.41     123.4     306.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     126.52    Tc(MIN.) =    12.92
  EFFECTIVE AREA(ACRES) =     106.66   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      123.4
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    305.00 =    2714.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    310.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   615.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =  2954.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.6 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.75
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     126.52
  PIPE TRAVEL TIME(MIN.) =   2.26    Tc(MIN.) =   15.18
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    310.00 =    5668.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.18
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.311
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.80      0.50     0.100     -
  USER-DEFINED               -        0.40      0.50     0.900     -
  USER-DEFINED               -        0.20      0.50     0.600     -
  USER-DEFINED               -        2.30      0.50     0.100     -
  USER-DEFINED               -        0.10      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.164
  SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =    8.63
  EFFECTIVE AREA(ACRES) =    114.46   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      131.2       PEAK FLOW RATE(CFS) =     126.52
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.18
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.311
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     0.100     -
  USER-DEFINED               -        0.20      0.50     0.850     -
  USER-DEFINED               -        2.30      0.50     0.850     -
  USER-DEFINED               -        6.40      0.50     0.200     -
  USER-DEFINED               -        2.60      0.50     0.200     -
  USER-DEFINED               -        0.70      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.371
  SUBAREA AREA(ACRES) =   12.30      SUBAREA RUNOFF(CFS) =   12.46
  EFFECTIVE AREA(ACRES) =    126.76   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      143.5       PEAK FLOW RATE(CFS) =     127.79

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.18
```



```
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.311
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.20      0.50     0.900     -
  USER-DEFINED               -        0.10      0.50     0.600     -
  USER-DEFINED               -        0.80      0.50     0.500     -
  USER-DEFINED               -       10.20      0.50     0.500     -
  USER-DEFINED               -        2.50      0.50     0.400     -
  USER-DEFINED               -        3.70      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.514
  SUBAREA AREA(ACRES) =   19.50      SUBAREA RUNOFF(CFS) =   18.50
  EFFECTIVE AREA(ACRES) =    146.26   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      163.0       PEAK FLOW RATE(CFS) =     146.29

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =  1056.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.10
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     146.29
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =   15.94
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    311.00 =    6724.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.94
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.282
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.60      0.50     0.100     -
  USER-DEFINED               -        3.60      0.50     0.100     -
  USER-DEFINED               -        0.10      0.50     0.850     -
  USER-DEFINED               -        3.90      0.50     0.200     -
  USER-DEFINED               -        5.10      0.50     0.200     -
  USER-DEFINED               -        0.80      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.191
  SUBAREA AREA(ACRES) =   15.10      SUBAREA RUNOFF(CFS) =   16.13
  EFFECTIVE AREA(ACRES) =    161.36   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      178.1       PEAK FLOW RATE(CFS) =     158.60

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   15.94
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.282
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED              -        6.70      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    6.70      SUBAREA RUNOFF(CFS) =    5.92
  EFFECTIVE AREA(ACRES) =    168.06   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =      184.8       PEAK FLOW RATE(CFS) =     164.53

********************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   373.00
  FLOW LENGTH(FEET) =  1373.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.67
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     164.53
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =   16.95
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    312.00 =    8097.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   16.95
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.244
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED              -        1.50      0.50     0.100     -
  USER-DEFINED              -        4.50      0.50     0.100     -
  USER-DEFINED              -        3.40      0.50     0.200     -
  USER-DEFINED              -        0.30      0.50     0.100     -
  USER-DEFINED              -        0.10      0.50     0.850     -
  USER-DEFINED              -        0.20      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.157
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   10.49
  EFFECTIVE AREA(ACRES) =    178.06   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      194.8       PEAK FLOW RATE(CFS) =     169.21

********************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
```



```
  MAINLINE Tc(MIN.) =   16.95
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.244
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED              -        0.10      0.50     0.900     -
  USER-DEFINED              -        0.40      0.50     0.500     -
  USER-DEFINED              -        0.10      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.567
  SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    0.52
  EFFECTIVE AREA(ACRES) =    178.66   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      195.4       PEAK FLOW RATE(CFS) =     169.73

********************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    339.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   373.00  DOWNSTREAM(FEET) =   301.00
  FLOW LENGTH(FEET) =  1370.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.62
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     169.73
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =   17.88
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    339.00 =    9467.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  10
--------------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
================================================================================

********************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  13
--------------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
================================================================================

********************************************************************************
  FLOW PROCESS FROM NODE    390.00 TO NODE    391.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   317.00
  ELEVATION DATA: UPSTREAM(FEET) =    860.00  DOWNSTREAM(FEET) =    775.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.195
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.943
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
```

```
  "CHAPARRAL,NARROWLEAF"     -        0.20      0.50     1.000    56    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        1.20      0.50     1.000    56    9.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.82
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      1.82

****************************************************************************
  FLOW PROCESS FROM NODE    391.00 TO NODE    392.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    775.00  DOWNSTREAM(FEET) =    700.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   545.00   CHANNEL SLOPE =  0.1376
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.698
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.70      0.50     1.000     -
  USER-DEFINED               -        0.60      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.93
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   1.84
  Tc(MIN.) =   11.04
  SUBAREA AREA(ACRES) =     2.30       SUBAREA RUNOFF(CFS) =    2.48
  EFFECTIVE AREA(ACRES) =      3.70     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       3.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.50   FLOW VELOCITY(FEET/SEC.) =   5.30
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    392.00 =     862.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    392.00 TO NODE    393.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    700.00  DOWNSTREAM(FEET) =    635.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1093.00   CHANNEL SLOPE =  0.0595
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.361
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.40      0.50     1.000     -
  USER-DEFINED               -        8.40      0.50     1.000     -
  USER-DEFINED               -        2.70      0.50     1.000     -
  USER-DEFINED               -        0.40      0.50     1.000     -
  USER-DEFINED               -        9.20      0.50     1.000     -
```



```
  USER-DEFINED               -        0.60      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.19
  AVERAGE FLOW DEPTH(FEET) =   0.91   TRAVEL TIME(MIN.) =   3.51
  Tc(MIN.) =   14.55
  SUBAREA AREA(ACRES) =    22.70       SUBAREA RUNOFF(CFS) =   17.59
  EFFECTIVE AREA(ACRES) =     26.40     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       26.4          PEAK FLOW RATE(CFS) =      20.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.08   FLOW VELOCITY(FEET/SEC.) =   5.84
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    393.00 =    1955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    393.00 TO NODE    394.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    635.00  DOWNSTREAM(FEET) =    598.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   904.00   CHANNEL SLOPE =  0.0409
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.229
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.60      0.50     1.000     -
  USER-DEFINED               -        5.50      0.50     1.000     -
  USER-DEFINED               -        1.80      0.50     1.000     -
  USER-DEFINED               -        0.60      0.50     1.000     -
  USER-DEFINED               -        1.00      0.50     1.000     -
  USER-DEFINED               -        6.80      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      26.13
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.39
  AVERAGE FLOW DEPTH(FEET) =   1.27   TRAVEL TIME(MIN.) =   2.80
  Tc(MIN.) =   17.35
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   11.35
  EFFECTIVE AREA(ACRES) =     43.70     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       43.7          PEAK FLOW RATE(CFS) =      28.66

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.32   FLOW VELOCITY(FEET/SEC.) =   5.51
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    394.00 =    2859.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    394.00 TO NODE    394.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.35
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.229
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED              -        2.50      0.50     1.000     -
  USER-DEFINED              -        0.10      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    2.60      SUBAREA RUNOFF(CFS) =    1.71
  EFFECTIVE AREA(ACRES) =     46.30   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       46.3       PEAK FLOW RATE(CFS) =      30.36

****************************************************************************
  FLOW PROCESS FROM NODE    394.00 TO NODE    395.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    598.00  DOWNSTREAM(FEET) =    573.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   664.00   CHANNEL SLOPE =  0.0377
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.154
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED              -        6.30      0.50     1.000     -
  USER-DEFINED              -        5.90      0.50     1.000     -
  USER-DEFINED              -        6.80      0.50     1.000     -
  USER-DEFINED              -        0.90      0.50     0.900     -
  USER-DEFINED              -        0.50      0.50     1.000     -
  USER-DEFINED              -        0.20      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.996
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      36.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.64
  AVERAGE FLOW DEPTH(FEET) =   1.47   TRAVEL TIME(MIN.) =   1.96
  Tc(MIN.) =   19.31
  SUBAREA AREA(ACRES) =    20.60       SUBAREA RUNOFF(CFS) =   12.17
  EFFECTIVE AREA(ACRES) =     66.90     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       66.9         PEAK FLOW RATE(CFS) =      39.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.51   FLOW VELOCITY(FEET/SEC.) =   5.78
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    395.00 =    3523.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    395.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.31
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.154
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED              -       12.60      0.50     1.000     -
```



```
  USER-DEFINED              -        3.10      0.50     1.000     -
  USER-DEFINED              -        2.40      0.50     0.900     -
  USER-DEFINED              -        0.10      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.987
  SUBAREA AREA(ACRES) =   18.20      SUBAREA RUNOFF(CFS) =   10.82
  EFFECTIVE AREA(ACRES) =     85.10   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       85.1       PEAK FLOW RATE(CFS) =      50.25

****************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    370.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   573.00  DOWNSTREAM(FEET) =   389.00
  FLOW LENGTH(FEET) =  5717.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.09
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.25
  PIPE TRAVEL TIME(MIN.) =   6.31    Tc(MIN.) =   25.62
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    370.00 =    9240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    370.00 TO NODE    371.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    389.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1996.00   CHANNEL SLOPE =  0.0220
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.855
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED              -        2.90      0.50     1.000     -
  USER-DEFINED              -        4.40      0.50     1.000     -
  USER-DEFINED              -        0.50      0.50     0.100     -
  USER-DEFINED              -        6.60      0.50     1.000     -
  USER-DEFINED              -        3.60      0.50     1.000     -
  USER-DEFINED              -        6.10      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.956
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      54.35
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.12
  AVERAGE FLOW DEPTH(FEET) =   1.88   TRAVEL TIME(MIN.) =   6.50
  Tc(MIN.) =   32.12
  SUBAREA AREA(ACRES) =    24.10       SUBAREA RUNOFF(CFS) =    8.17
  EFFECTIVE AREA(ACRES) =    109.20     AREA-AVERAGED Fm(INCH/HR) =   0.49
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   0.99
  TOTAL AREA(ACRES) =      109.2         PEAK FLOW RATE(CFS) =      50.25
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  1.83   FLOW VELOCITY(FEET/SEC.) =   5.01
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    371.00 =   11236.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   32.12
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.855
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.10      0.50     1.000     -
  USER-DEFINED               -        1.10      0.50     0.100     -
  USER-DEFINED               -        2.00      0.50     1.000     -
  USER-DEFINED               -        0.40      0.50     1.000     -
  USER-DEFINED               -        2.20      0.50     0.900     -
  USER-DEFINED               -        0.30      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.830
  SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =    2.81
  EFFECTIVE AREA(ACRES) =    116.30   AREA-AVERAGED Fm(INCH/HR) =  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =      116.3       PEAK FLOW RATE(CFS) =      50.25
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   32.12
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.855
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.70      0.50     0.900     -
  USER-DEFINED               -        0.20      0.50     1.000     -
  USER-DEFINED               -        0.10      0.50     0.850     -
  USER-DEFINED               -        0.10      0.50     0.500     -
  USER-DEFINED               -        3.00      0.50     1.000     -
  USER-DEFINED               -        1.40      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.975
  SUBAREA AREA(ACRES) =    5.50      SUBAREA RUNOFF(CFS) =    1.82
  EFFECTIVE AREA(ACRES) =    121.80   AREA-AVERAGED Fm(INCH/HR) =  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =      121.8       PEAK FLOW RATE(CFS) =      50.25
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   32.12
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.855
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.40      0.50     0.900     -
  USER-DEFINED               -        0.10      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.907
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    0.54
  EFFECTIVE AREA(ACRES) =    123.30   AREA-AVERAGED Fm(INCH/HR) =  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =      123.3       PEAK FLOW RATE(CFS) =      50.25
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    372.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   345.00  DOWNSTREAM(FEET) =   301.00
  FLOW LENGTH(FEET) =   488.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.68
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.25
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   32.48
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    372.00 =   11724.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    372.00 TO NODE    373.00 IS CODE =  56
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    301.00  DOWNSTREAM(FEET) =    300.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   924.00   CHANNEL SLOPE =  0.0011
  GIVEN CHANNEL BASE(FEET) =   30.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   2.12
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.741
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       32.30      0.50     0.100     -
  USER-DEFINED               -        2.70      0.50     0.100     -
  USER-DEFINED               -        0.60      0.50     0.100     -
  USER-DEFINED               -        1.80      0.50     0.100     -
  USER-DEFINED               -        7.20      0.50     0.850     -
  USER-DEFINED               -        9.80      0.50     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.334
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      64.25
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.66
  AVERAGE FLOW DEPTH(FEET) =   1.15   TRAVEL TIME(MIN.) =   9.26
  Tc(MIN.) =   41.75
  SUBAREA AREA(ACRES) =    54.40      SUBAREA RUNOFF(CFS) =   28.07
  EFFECTIVE AREA(ACRES) =    177.70     AREA-AVERAGED Fm(INCH/HR) =   0.39
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   0.78
```

```
  TOTAL AREA(ACRES) =      177.7         PEAK FLOW RATE(CFS) =      56.03
  GIVEN CHANNEL BASE(FEET) =   30.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   2.06

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.06   FLOW VELOCITY(FEET/SEC.) =   1.59
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    373.00 =   12648.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    373.00 TO NODE    373.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   41.75
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.741
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.60      0.50     0.850     -
  USER-DEFINED               -        2.10      0.50     0.850     -
  USER-DEFINED               -        3.50      0.50     0.900     -
  USER-DEFINED               -        4.80      0.50     0.900     -
  USER-DEFINED               -        3.60      0.50     0.900     -
  USER-DEFINED               -        0.80      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.886
  SUBAREA AREA(ACRES) =   17.40      SUBAREA RUNOFF(CFS) =    4.65
  EFFECTIVE AREA(ACRES) =    195.10   AREA-AVERAGED Fm(INCH/HR) =  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =      195.1       PEAK FLOW RATE(CFS) =      60.68

****************************************************************************
  FLOW PROCESS FROM NODE    373.00 TO NODE    374.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   300.00  DOWNSTREAM(FEET) =   298.00
  FLOW LENGTH(FEET) =  1188.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  38.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.26
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.68
  PIPE TRAVEL TIME(MIN.) =   3.77    Tc(MIN.) =   45.51
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    321.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    622.00  DOWNSTREAM(FEET) =    621.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.511
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.748
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                 -        1.50      0.50     0.200    56   10.51
  APARTMENTS                 -        2.00      0.50     0.200    56   10.51
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.19
  TOTAL AREA(ACRES) =      3.50   PEAK FLOW RATE(CFS) =      5.19

****************************************************************************
  FLOW PROCESS FROM NODE    321.00 TO NODE    322.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  621.00  DOWNSTREAM ELEVATION(FEET) =  612.00
  STREET LENGTH(FEET) =   569.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       8.47
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.96
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.10
  STREET FLOW TRAVEL TIME(MIN.) =   3.20   Tc(MIN.) =   13.71
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.442
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.20      0.50     0.200     -
  USER-DEFINED               -        3.20      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =    6.52
```

```
  EFFECTIVE AREA(ACRES) =      8.90    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        8.9        PEAK FLOW RATE(CFS) =      10.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.01
  FLOW VELOCITY(FEET/SEC.) =  3.15   DEPTH*VELOCITY(FT*FT/SEC.) =   1.24
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    322.00 =     899.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    324.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  612.00  DOWNSTREAM ELEVATION(FEET) =  590.00
  STREET LENGTH(FEET) =   891.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      16.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   14.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.71
  STREET FLOW TRAVEL TIME(MIN.) =   3.61   Tc(MIN.) =   17.32
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.230
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.00      0.50     0.400     -
  USER-DEFINED               -        5.70      0.50     0.400     -
  USER-DEFINED               -        1.20      0.50     0.350     -
  USER-DEFINED               -        0.30      0.50     0.850     -
  USER-DEFINED               -        0.90      0.50     0.850     -
  USER-DEFINED               -        0.80      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.420
  SUBAREA AREA(ACRES) =   11.90      SUBAREA RUNOFF(CFS) =   10.92
  EFFECTIVE AREA(ACRES) =     20.80    AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       20.8        PEAK FLOW RATE(CFS) =      19.97

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.43
  FLOW VELOCITY(FEET/SEC.) =  4.31   DEPTH*VELOCITY(FT*FT/SEC.) =   1.89
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    324.00 =    1790.00 FEET.

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



```
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.32
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.230
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.70      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    1.81
  EFFECTIVE AREA(ACRES) =     22.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      21.78

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    325.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   590.00  DOWNSTREAM(FEET) =   575.00
  FLOW LENGTH(FEET) =   529.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.84
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.78
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   18.06
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    325.00 =    2319.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.06
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.202
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.50      0.50     0.100     -
  USER-DEFINED               -        4.30      0.50     0.600     -
  USER-DEFINED               -        0.30      0.50     0.100     -
  USER-DEFINED               -        2.10      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.544
  SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =    6.02
  EFFECTIVE AREA(ACRES) =     29.70   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =       29.7       PEAK FLOW RATE(CFS) =      27.23

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    325.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =   18.06
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.202
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     0.850     -
  USER-DEFINED               -        0.20      0.50     0.900     -
  USER-DEFINED               -        4.80      0.50     0.600     -
  USER-DEFINED               -       10.20      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.606
  SUBAREA AREA(ACRES) =   15.30      SUBAREA RUNOFF(CFS) =   12.38
  EFFECTIVE AREA(ACRES) =     45.00   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       45.0       PEAK FLOW RATE(CFS) =      39.60

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    326.00 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) =   515.00
  FLOW LENGTH(FEET) =   284.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.17
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.60
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   18.22
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    326.00 =    2603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.22
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.196
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.70      0.50     0.100     -
  USER-DEFINED               -        0.10      0.50     0.850     -
  USER-DEFINED               -        0.80      0.50     0.900     -
  USER-DEFINED               -        1.40      0.50     0.100     -
  USER-DEFINED               -        2.30      0.50     0.900     -
  USER-DEFINED               -        0.10      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.582
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =    4.39
  EFFECTIVE AREA(ACRES) =     50.40   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       50.4       PEAK FLOW RATE(CFS) =      43.75

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   18.22
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.196
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.10      0.50     0.100     -
  USER-DEFINED               -        2.80      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.557
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =    4.04
  EFFECTIVE AREA(ACRES) =     55.30   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       55.3       PEAK FLOW RATE(CFS) =      47.79

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    333.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   500.00
  FLOW LENGTH(FEET) =  1644.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  27.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.20
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.79
  PIPE TRAVEL TIME(MIN.) =   2.98    Tc(MIN.) =   21.20
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    333.00 =    4247.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.20
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.093
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.40      0.50     0.100     -
  USER-DEFINED               -        2.20      0.50     0.900     -
  USER-DEFINED               -        1.80      0.50     0.100     -
  USER-DEFINED               -        0.30      0.50     0.900     -
  USER-DEFINED               -        5.60      0.50     0.100     -
  USER-DEFINED               -        4.10      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.467
  SUBAREA AREA(ACRES) =   14.40      SUBAREA RUNOFF(CFS) =   11.15
  EFFECTIVE AREA(ACRES) =     69.70   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       69.7       PEAK FLOW RATE(CFS) =      53.85

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =   21.20
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.093
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.14
  EFFECTIVE AREA(ACRES) =     69.90   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       69.9       PEAK FLOW RATE(CFS) =      54.00

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 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.) =   21.20
  RAINFALL INTENSITY(INCH/HR) =   1.09
  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      69.90
  TOTAL STREAM AREA(ACRES) =      69.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      54.00

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.50 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =    615.00  DOWNSTREAM(FEET) =    614.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.844
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.825
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 -        0.40      0.50     0.100    56    9.84
  PUBLIC PARK                -        0.20      0.50     0.850    56   15.64
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      -        0.10      0.50     0.400    56   12.11
  COMMERCIAL                 -        0.10      0.50     0.100    56    9.84
  PUBLIC PARK                -        0.10      0.50     0.850    56   15.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.383
  SUBAREA RUNOFF(CFS) =      1.32
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      1.32

****************************************************************************
  FLOW PROCESS FROM NODE    327.50 TO NODE    328.00 IS CODE =  62
----------------------------------------------------------------------------
```



```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  614.00  DOWNSTREAM ELEVATION(FEET) =  610.00
  STREET LENGTH(FEET) =   425.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       3.20
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.99
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   3.57   Tc(MIN.) =   13.41
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.470
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.00      0.50     0.100     -
  USER-DEFINED               -        0.30      0.50     0.850     -
  USER-DEFINED               -        0.20      0.50     0.400     -
  USER-DEFINED               -        0.90      0.50     0.100     -
  USER-DEFINED               -        0.60      0.50     0.850     -
  USER-DEFINED               -        0.20      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.348
  SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    3.73
  EFFECTIVE AREA(ACRES) =      4.10    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        4.1        PEAK FLOW RATE(CFS) =       4.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.12
  FLOW VELOCITY(FEET/SEC.) =  2.15   DEPTH*VELOCITY(FT*FT/SEC.) =   0.74
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    328.00 =     754.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    329.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  610.00  DOWNSTREAM ELEVATION(FEET) =  595.00
  STREET LENGTH(FEET) =   366.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  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) =       7.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.09
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.43   Tc(MIN.) =   14.84
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.334
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     0.100     -
  USER-DEFINED               -        0.20      0.50     0.850     -
  USER-DEFINED               -        3.10      0.50     0.400     -
  USER-DEFINED               -        0.50      0.50     0.100     -
  USER-DEFINED               -        0.30      0.50     0.850     -
  USER-DEFINED               -        2.10      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.407
  SUBAREA AREA(ACRES) =    6.30      SUBAREA RUNOFF(CFS) =    6.41
  EFFECTIVE AREA(ACRES) =     10.40    AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       10.4        PEAK FLOW RATE(CFS) =      10.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.51
  FLOW VELOCITY(FEET/SEC.) =  4.52   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    329.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.84
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.334
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.80      0.50     0.400     -
  USER-DEFINED               -        0.10      0.50     0.600     -
  USER-DEFINED               -        6.10      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.402
  SUBAREA AREA(ACRES) =    9.00      SUBAREA RUNOFF(CFS) =    9.17
  EFFECTIVE AREA(ACRES) =     19.40   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       19.4       PEAK FLOW RATE(CFS) =      19.84

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    330.00 IS CODE =  31
----------------------------------------------------------------------------
```



```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   595.00  DOWNSTREAM(FEET) =   575.00
  FLOW LENGTH(FEET) =   378.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.60
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.84
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   15.27
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    330.00 =    1498.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.27
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.308
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.90      0.50     0.850     -
  USER-DEFINED               -        4.10      0.50     0.600     -
  USER-DEFINED               -        2.50      0.50     0.400     -
  USER-DEFINED               -        0.60      0.50     0.100     -
  USER-DEFINED               -       10.20      0.50     0.600     -
  USER-DEFINED               -        0.90      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.561
  SUBAREA AREA(ACRES) =   19.20      SUBAREA RUNOFF(CFS) =   17.75
  EFFECTIVE AREA(ACRES) =     38.60   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       38.6       PEAK FLOW RATE(CFS) =      37.14

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    331.00 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) =   555.00
  FLOW LENGTH(FEET) =   457.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.97
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.14
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   15.75
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    331.00 =    1955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.75
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.290
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        1.10      0.50      0.850     -
  USER-DEFINED                -        0.80      0.50      0.900     -
  USER-DEFINED                -       10.50      0.50      0.600     -
  USER-DEFINED                -        0.30      0.50      0.100     -
  USER-DEFINED                -        0.50      0.50      0.900     -
  USER-DEFINED                -       13.70      0.50      0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.619
  SUBAREA AREA(ACRES) =   26.90      SUBAREA RUNOFF(CFS) =   23.72
  EFFECTIVE AREA(ACRES) =     65.50   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       65.5       PEAK FLOW RATE(CFS) =      60.24

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    332.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   555.00  DOWNSTREAM(FEET) =   520.00
  FLOW LENGTH(FEET) =   324.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.22
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.24
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   15.96
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    332.00 =    2279.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    332.00 TO NODE    332.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.96
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.282
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.10      0.50      0.100     -
  USER-DEFINED                -        2.10      0.50      0.900     -
  USER-DEFINED                -        3.70      0.50      0.100     -
  USER-DEFINED                -        5.00      0.50      0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.621
  SUBAREA AREA(ACRES) =   10.90      SUBAREA RUNOFF(CFS) =    9.52
  EFFECTIVE AREA(ACRES) =     76.40   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       76.4       PEAK FLOW RATE(CFS) =      69.28

****************************************************************************
  FLOW PROCESS FROM NODE    332.00 TO NODE    333.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   520.00  DOWNSTREAM(FEET) =   500.00
```



```
  FLOW LENGTH(FEET) =  1740.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.31
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      69.28
  PIPE TRAVEL TIME(MIN.) =   2.56    Tc(MIN.) =   18.52
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    333.00 =    4019.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.52
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.184
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        1.20      0.50      0.100     -
  USER-DEFINED                -        4.40      0.50      0.900     -
  USER-DEFINED                -        3.90      0.50      0.100     -
  USER-DEFINED                -        9.80      0.50      0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.689
  SUBAREA AREA(ACRES) =   19.30      SUBAREA RUNOFF(CFS) =   14.58
  EFFECTIVE AREA(ACRES) =     95.70   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       95.7       PEAK FLOW RATE(CFS) =      77.17

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 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.) =   18.52
  RAINFALL INTENSITY(INCH/HR) =   1.18
  AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =      95.70
  TOTAL STREAM AREA(ACRES) =      95.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      77.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.00   21.20    1.093  0.50( 0.24) 0.47      69.9     320.00
      2       77.17   18.52    1.184  0.50( 0.29) 0.58      95.7     327.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
     1      129.33   18.52    1.184  0.50( 0.27) 0.53     156.8     327.00
     2      123.36   21.20    1.093  0.50( 0.27) 0.53     165.6     320.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     129.33    Tc(MIN.) =    18.52
  EFFECTIVE AREA(ACRES) =     156.78   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      165.6
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    333.00 =    4247.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    334.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   819.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.89
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     129.33
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   19.18
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    334.00 =    5066.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.18
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.159
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.00      0.50     0.200     -
  USER-DEFINED               -        2.30      0.50     0.100     -
  USER-DEFINED               -        1.00      0.50     0.100     -
  USER-DEFINED               -        0.40      0.50     0.850     -
  USER-DEFINED               -        2.40      0.50     0.850     -
  USER-DEFINED               -        3.50      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.310
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   12.29
  EFFECTIVE AREA(ACRES) =    170.38   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      179.2       PEAK FLOW RATE(CFS) =     138.12

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.18
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.159
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  USER-DEFINED               -        2.00      0.50     0.200     -
  USER-DEFINED               -        1.60      0.50     0.400     -
  USER-DEFINED               -        2.10      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.330
  SUBAREA AREA(ACRES) =    5.70      SUBAREA RUNOFF(CFS) =    5.10
  EFFECTIVE AREA(ACRES) =    176.08   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      184.9       PEAK FLOW RATE(CFS) =     143.22

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 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.) =   19.18
  RAINFALL INTENSITY(INCH/HR) =   1.16
  AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =     176.08
  TOTAL STREAM AREA(ACRES) =     184.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     143.22

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    351.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    492.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.730
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.727
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       -        0.80      0.50     0.600    56   10.73
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       -        1.70      0.50     0.600    56   10.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.21
  TOTAL AREA(ACRES) =      2.50   PEAK FLOW RATE(CFS) =      3.21

****************************************************************************
  FLOW PROCESS FROM NODE    351.00 TO NODE    352.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  492.00  DOWNSTREAM ELEVATION(FEET) =  488.00
  STREET LENGTH(FEET) =   456.00   CURB HEIGHT(INCHES) =  8.0
```

```
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       4.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.51
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.74
  STREET FLOW TRAVEL TIME(MIN.) =   3.61   Tc(MIN.) =   14.34
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.382
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.20      0.50     0.600     -
  USER-DEFINED               -        0.40      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    3.50
  EFFECTIVE AREA(ACRES) =      6.10    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        6.1        PEAK FLOW RATE(CFS) =       5.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.37
  FLOW VELOCITY(FEET/SEC.) =  2.20   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    352.00 =     786.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    352.00 TO NODE    353.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   488.00  DOWNSTREAM(FEET) =   485.00
  FLOW LENGTH(FEET) =   883.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.91
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.94
  PIPE TRAVEL TIME(MIN.) =   3.76    Tc(MIN.) =   18.09
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    353.00 =    1669.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    353.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.09
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.200
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.50      0.50     0.600     -
  USER-DEFINED               -        1.10      0.50     0.400     -
  USER-DEFINED               -        0.10      0.50     0.850     -
  USER-DEFINED               -        0.60      0.50     0.600     -
  USER-DEFINED               -        4.50      0.50     0.400     -
  USER-DEFINED               -        1.70      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.471
  SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =    7.38
  EFFECTIVE AREA(ACRES) =     14.60   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       14.6       PEAK FLOW RATE(CFS) =      12.32

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    353.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.09
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.200
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.30      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.27
  EFFECTIVE AREA(ACRES) =     14.90   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       14.9       PEAK FLOW RATE(CFS) =      12.59

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    334.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =  1136.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.59
  PIPE TRAVEL TIME(MIN.) =   2.30    Tc(MIN.) =   20.39
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    334.00 =    2805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.39
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.117
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED             -        0.90      0.50      0.100     -
  USER-DEFINED             -        2.00      0.50      0.850     -
  USER-DEFINED             -        1.40      0.50      0.200     -
  USER-DEFINED             -        1.50      0.50      0.400     -
  USER-DEFINED             -        0.50      0.50      0.100     -
  USER-DEFINED             -        1.50      0.50      0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =    6.04
  EFFECTIVE AREA(ACRES) =     22.70   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       22.7       PEAK FLOW RATE(CFS) =      17.51

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.39
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.117
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED             -        3.10      0.50      0.200     -
  USER-DEFINED             -        1.40      0.50      0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.262
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    3.99
  EFFECTIVE AREA(ACRES) =     27.20   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       27.2       PEAK FLOW RATE(CFS) =      21.50

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.39
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.117
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED             -        0.50      0.50      0.850     -
  USER-DEFINED             -        0.10      0.50      0.900     -
  USER-DEFINED             -        1.20      0.50      0.600     -
  USER-DEFINED             -        2.70      0.50      0.850     -
  USER-DEFINED             -        0.20      0.50      0.900     -
  USER-DEFINED             -        7.30      0.50      0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.674
  SUBAREA AREA(ACRES) =   12.00      SUBAREA RUNOFF(CFS) =    8.42
  EFFECTIVE AREA(ACRES) =     39.20   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       39.2       PEAK FLOW RATE(CFS) =      29.92

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.39
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.117
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED             -        0.10      0.50      0.100     -
  USER-DEFINED             -        0.60      0.50      0.850     -
  USER-DEFINED             -        3.10      0.50      0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.626
  SUBAREA AREA(ACRES) =    3.80      SUBAREA RUNOFF(CFS) =    2.75
  EFFECTIVE AREA(ACRES) =     43.00   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       43.0       PEAK FLOW RATE(CFS) =      32.67

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 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.) =   20.39
  RAINFALL INTENSITY(INCH/HR) =   1.12
  AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =      43.00
  TOTAL STREAM AREA(ACRES) =      43.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.67

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      143.22   19.18    1.159  0.50( 0.26) 0.51     176.1     327.00
      1      136.36   21.88    1.074  0.50( 0.25) 0.51     184.9     320.00
      2       32.67   20.39    1.117  0.50( 0.27) 0.54      43.0     350.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      175.49   19.18    1.159  0.50( 0.26) 0.52     216.5     327.00
      2      172.80   20.39    1.117  0.50( 0.26) 0.52     223.1     350.00
      3      167.38   21.88    1.074  0.50( 0.26) 0.52     227.9     320.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     175.49    Tc(MIN.) =    19.18
  EFFECTIVE AREA(ACRES) =     216.51   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      227.9
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    334.00 =    5066.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    335.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   422.00
  FLOW LENGTH(FEET) =  1086.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.08
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     175.49
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   19.96
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    335.00 =    6152.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    335.00 TO NODE    335.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.96
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.129
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.00      0.50     0.100     -
  USER-DEFINED               -        4.20      0.50     0.100     -
  USER-DEFINED               -        0.60      0.50     0.850     -
  USER-DEFINED               -       10.80      0.50     0.850     -
  USER-DEFINED               -        1.00      0.50     0.900     -
  USER-DEFINED               -        3.90      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.631
  SUBAREA AREA(ACRES) =   23.50      SUBAREA RUNOFF(CFS) =   17.22
  EFFECTIVE AREA(ACRES) =    240.01   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      251.4       PEAK FLOW RATE(CFS) =     186.90

****************************************************************************
  FLOW PROCESS FROM NODE    335.00 TO NODE    335.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.96
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.129
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     0.600     -
  USER-DEFINED               -        0.10      0.50     0.600     -
  USER-DEFINED               -        0.10      0.50     0.500     -
  USER-DEFINED               -        9.20      0.50     0.500     -
  USER-DEFINED               -        0.70      0.50     0.400     -
  USER-DEFINED               -        2.90      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.474
  SUBAREA AREA(ACRES) =   13.10      SUBAREA RUNOFF(CFS) =   10.52
```



```
  EFFECTIVE AREA(ACRES) =    253.11   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      264.5       PEAK FLOW RATE(CFS) =     197.42

****************************************************************************
  FLOW PROCESS FROM NODE    335.00 TO NODE    336.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   422.00  DOWNSTREAM(FEET) =   380.00
  FLOW LENGTH(FEET) =   780.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.02
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     197.42
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   20.46
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    336.00 =    6932.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.46
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.115
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.70      0.50     0.100     -
  USER-DEFINED               -        0.60      0.50     0.100     -
  USER-DEFINED               -        1.60      0.50     0.100     -
  USER-DEFINED               -        0.10      0.50     0.850     -
  USER-DEFINED               -        3.70      0.50     0.200     -
  USER-DEFINED               -        5.60      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.182
  SUBAREA AREA(ACRES) =   12.30      SUBAREA RUNOFF(CFS) =   11.33
  EFFECTIVE AREA(ACRES) =    265.41   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      276.8       PEAK FLOW RATE(CFS) =     205.40

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.46
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.115
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.50     0.900     -
  USER-DEFINED               -        0.50      0.50     0.900     -
  USER-DEFINED               -        0.60      0.50     0.900     -
  USER-DEFINED               -        3.40      0.50     0.600     -
  USER-DEFINED               -       16.80      0.50     0.600     -
  USER-DEFINED               -        0.70      0.50     0.400     -
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.611
  SUBAREA AREA(ACRES) =   22.20      SUBAREA RUNOFF(CFS) =   16.16
  EFFECTIVE AREA(ACRES) =    287.61   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      299.0       PEAK FLOW RATE(CFS) =     221.56

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.46
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.115
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        6.30      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    6.30      SUBAREA RUNOFF(CFS) =    5.19
  EFFECTIVE AREA(ACRES) =    293.91   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      305.3       PEAK FLOW RATE(CFS) =     226.74

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    337.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   380.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =   803.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.57
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     226.74
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   21.03
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    337.00 =    7735.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.03
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.098
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.40      0.50     0.200     -
  USER-DEFINED               -        3.00      0.50     0.200     -
  USER-DEFINED               -        1.30      0.50     0.100     -
  USER-DEFINED               -        2.70      0.50     0.100     -
  USER-DEFINED               -        6.00      0.50     0.100     -
  USER-DEFINED               -        1.30      0.50     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.189
```



```
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =   13.28
  EFFECTIVE AREA(ACRES) =    308.61   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      320.0       PEAK FLOW RATE(CFS) =     235.70

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.03
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.098
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.30      0.50     0.850     -
  USER-DEFINED               -        1.50      0.50     0.850     -
  USER-DEFINED               -        2.50      0.50     0.200     -
  USER-DEFINED               -        6.70      0.50     0.200     -
  USER-DEFINED               -        2.20      0.50     0.900     -
  USER-DEFINED               -        0.10      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.488
  SUBAREA AREA(ACRES) =   16.30      SUBAREA RUNOFF(CFS) =   12.53
  EFFECTIVE AREA(ACRES) =    324.91   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      336.3       PEAK FLOW RATE(CFS) =     248.22

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.03
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.098
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.60      0.50     0.600     -
  USER-DEFINED               -        4.60      0.50     0.400     -
  USER-DEFINED               -        2.90      0.50     0.400     -
  USER-DEFINED               -        0.20      0.50     0.600     -
  USER-DEFINED               -        5.90      0.50     0.600     -
  USER-DEFINED               -        6.00      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.526
  SUBAREA AREA(ACRES) =   20.20      SUBAREA RUNOFF(CFS) =   15.19
  EFFECTIVE AREA(ACRES) =    345.11   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      356.5       PEAK FLOW RATE(CFS) =     263.41

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    338.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   332.00
```

```
  FLOW LENGTH(FEET) =   838.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  42.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.58
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     263.41
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   21.74
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    338.00 =    8573.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.74
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.078
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        6.90      0.50     0.200     -
  USER-DEFINED               -        2.80      0.50     0.100     -
  USER-DEFINED               -       11.50      0.50     0.100     -
  USER-DEFINED               -        4.70      0.50     0.100     -
  USER-DEFINED               -        8.60      0.50     0.100     -
  USER-DEFINED               -        2.60      0.50     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.171
  SUBAREA AREA(ACRES) =   37.10      SUBAREA RUNOFF(CFS) =   33.13
  EFFECTIVE AREA(ACRES) =    382.21   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =      393.6       PEAK FLOW RATE(CFS) =     290.16

****************************************************************************
  FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.74
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.078
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     0.850     -
  USER-DEFINED               -        0.60      0.50     0.850     -
  USER-DEFINED               -        0.30      0.50     0.200     -
  USER-DEFINED               -        9.70      0.50     0.200     -
  USER-DEFINED               -        1.20      0.50     0.200     -
  USER-DEFINED               -        3.40      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.230
  SUBAREA AREA(ACRES) =   15.30      SUBAREA RUNOFF(CFS) =   13.26
  EFFECTIVE AREA(ACRES) =    397.51   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      408.9       PEAK FLOW RATE(CFS) =     303.42

****************************************************************************
  FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   21.74
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.078
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.60      0.50     0.100     -
  USER-DEFINED               -        3.60      0.50     0.100     -
  USER-DEFINED               -        5.80      0.50     0.100     -
  USER-DEFINED               -        0.80      0.50     0.600     -
  USER-DEFINED               -        1.20      0.50     0.600     -
  USER-DEFINED               -        4.50      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.251
  SUBAREA AREA(ACRES) =   21.50      SUBAREA RUNOFF(CFS) =   18.42
  EFFECTIVE AREA(ACRES) =    419.01   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      430.4       PEAK FLOW RATE(CFS) =     321.84

****************************************************************************
  FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.74
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.078
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.30      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.17
  EFFECTIVE AREA(ACRES) =    419.31   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      430.7       PEAK FLOW RATE(CFS) =     322.01

****************************************************************************
  FLOW PROCESS FROM NODE    338.00 TO NODE    339.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   332.00  DOWNSTREAM(FEET) =   301.00
  FLOW LENGTH(FEET) =  1956.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  47.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.54
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     322.01
  PIPE TRAVEL TIME(MIN.) =   1.76    Tc(MIN.) =   23.50
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
 ** MAIN STREAM CONFLUENCE DATA **
  STREAM        Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
  NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
     1       322.01   23.50    1.027  0.50( 0.22) 0.45      419.3      327.00
     2       313.39   24.73    0.992  0.50( 0.22) 0.45      425.9      350.00
     3       300.08   26.28    0.958  0.50( 0.23) 0.45      430.7      320.00
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM        Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
  NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
     1       169.73   17.88    1.209  0.50( 0.19) 0.38      178.7      300.00
     2       123.50   30.34    0.878  0.50( 0.19) 0.39      195.4      306.00
 LONGEST FLOWPATH FROM NODE    306.00 TO NODE    339.00 =    9467.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM        Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
  NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
     1       470.08   17.88    1.209  0.50( 0.21) 0.42      497.6      300.00
     2       470.88   23.50    1.027  0.50( 0.21) 0.43      605.5      327.00
     3       457.70   24.73    0.992  0.50( 0.21) 0.43      613.7      350.00
     4       438.63   26.28    0.958  0.50( 0.21) 0.43      620.7      320.00
     5       390.76   30.34    0.878  0.50( 0.22) 0.43      626.1      306.00
   TOTAL AREA(ACRES) =       626.1

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      470.88  Tc(MIN.) =   23.501
 EFFECTIVE AREA(ACRES) =    605.53  AREA-AVERAGED Fm(INCH/HR) =  0.21
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =      626.1
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    339.00 TO NODE    340.00 IS CODE =  56
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    301.00  DOWNSTREAM(FEET) =    300.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   196.00   CHANNEL SLOPE =  0.0051
 GIVEN CHANNEL BASE(FEET) =  300.00   CHANNEL FREEBOARD(FEET) =  1.0
 "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
 *ESTIMATED CHANNEL HEIGHT(FEET) =   1.63
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.991
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -       31.90      0.50     0.100     -
 USER-DEFINED               -        2.30      0.50     0.100     -
 USER-DEFINED               -        1.90      0.50     0.100     -
 USER-DEFINED               -        1.00      0.50     0.100     -
 USER-DEFINED               -        3.10      0.50     0.850     -
 USER-DEFINED               -        0.80      0.50     0.850     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.171
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     487.57
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.57
 AVERAGE FLOW DEPTH(FEET) =   0.63   TRAVEL TIME(MIN.) =   1.27
```



```
 Tc(MIN.) =   24.77
 SUBAREA AREA(ACRES) =    41.00       SUBAREA RUNOFF(CFS) =   33.39
 EFFECTIVE AREA(ACRES) =    646.53     AREA-AVERAGED Fm(INCH/HR) =   0.21
 AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   0.41
 TOTAL AREA(ACRES) =      667.1         PEAK FLOW RATE(CFS) =     470.88
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
 GIVEN CHANNEL BASE(FEET) =  300.00   CHANNEL FREEBOARD(FEET) =  1.0
 "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
 *ESTIMATED CHANNEL HEIGHT(FEET) =   1.61

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   2.54
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    340.00 =   10725.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    340.00 TO NODE    340.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   24.77
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.991
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        4.00      0.50     0.900     -
 USER-DEFINED               -        1.80      0.50     0.900     -
 USER-DEFINED               -        2.40      0.50     0.900     -
 USER-DEFINED               -        0.10      0.50     0.850     -
 USER-DEFINED               -        0.10      0.50     0.850     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.899
 SUBAREA AREA(ACRES) =    8.40      SUBAREA RUNOFF(CFS) =    4.09
 EFFECTIVE AREA(ACRES) =    654.93   AREA-AVERAGED Fm(INCH/HR) =  0.21
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =      675.5       PEAK FLOW RATE(CFS) =     470.88
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    340.00 TO NODE    374.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   300.00  DOWNSTREAM(FEET) =   298.00
 FLOW LENGTH(FEET) =   221.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  78.0 INCH PIPE IS  63.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.25
 ESTIMATED PIPE DIAMETER(INCH) =  78.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     470.88
 PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   25.00
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    374.00 =   10946.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
 ** MAIN STREAM CONFLUENCE DATA **
  STREAM        Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER      (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       470.09   19.37    1.152  0.50( 0.21) 0.41     547.0     300.00
     2       470.88   25.00    0.984  0.50( 0.21) 0.42     654.9     327.00
     3       457.70   26.24    0.959  0.50( 0.21) 0.42     663.1     350.00
     4       438.63   27.81    0.927  0.50( 0.21) 0.42     670.1     320.00
     5       395.35   31.93    0.857  0.50( 0.21) 0.42     675.5     306.00
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    374.00 =   10946.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM        Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER      (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        60.68   45.51    0.709  0.50( 0.39) 0.79     195.1     390.00
 LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM        Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER      (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       530.77   19.37    1.152  0.50( 0.23) 0.46     630.1     300.00
     2       531.56   25.00    0.984  0.50( 0.24) 0.47     762.1     327.00
     3       518.38   26.24    0.959  0.50( 0.24) 0.47     775.6     350.00
     4       499.31   27.81    0.927  0.50( 0.24) 0.48     789.3     320.00
     5       456.04   31.93    0.857  0.50( 0.24) 0.48     812.4     306.00
     6       365.52   45.51    0.709  0.50( 0.25) 0.50     870.6     390.00
   TOTAL AREA(ACRES) =       870.6

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      531.56  Tc(MIN.) =   24.999
 EFFECTIVE AREA(ACRES) =    762.10  AREA-AVERAGED Fm(INCH/HR) =  0.24
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.47
 TOTAL AREA(ACRES) =      870.6
 LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    374.00 TO NODE    380.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   298.00  DOWNSTREAM(FEET) =   261.00
 FLOW LENGTH(FEET) =  1402.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  69.0 INCH PIPE IS  51.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  25.43
 ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     531.56
 PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   25.92
 LONGEST FLOWPATH FROM NODE    390.00 TO NODE    380.00 =   15238.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =      870.6  TC(MIN.) =     25.92
 EFFECTIVE AREA(ACRES) =    762.10  AREA-AVERAGED Fm(INCH/HR)=  0.24
```



```
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap = 0.470
 PEAK FLOW RATE(CFS)   =     531.56

 ** PEAK FLOW RATE TABLE **
  STREAM        Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER      (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       530.77   20.29    1.120  0.50( 0.23) 0.46     630.1     300.00
     2       531.56   25.92    0.965  0.50( 0.24) 0.47     762.1     327.00
     3       518.38   27.16    0.940  0.50( 0.24) 0.47     775.6     350.00
     4       499.31   28.75    0.907  0.50( 0.24) 0.48     789.3     320.00
     5       456.04   32.90    0.845  0.50( 0.24) 0.48     812.4     306.00
     6       365.52   46.52    0.701  0.50( 0.25) 0.50     870.6     390.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
        (c) Copyright 1983-2013 Advanced Engineering Software (aes)
            Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:

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 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA C                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 10-YR EV DECEMBER 2018 CCHIU                                         *
 ***********************************************************************

  FILE NAME: 3C10EVRL.DAT
  TIME/DATE OF STUDY: 09:11 12/24/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  3.867
   2)   10.00;  2.568
   3)   15.00;  1.883
   4)   20.00;  1.612
   5)   25.00;  1.405
   6)   30.00;  1.260
   7)   40.00;  1.079
   8)   50.00;  0.961
   9)   60.00;  0.873
  10)   90.00;  0.726
  11)  120.00;  0.643
  12)  180.00;  0.540
  13)  360.00;  0.400
  14) 1200.00;  0.176
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   320.00
  ELEVATION DATA: UPSTREAM(FEET) =    640.00  DOWNSTREAM(FEET) =    634.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.766
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.408
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.20      0.30      0.100    56    6.77
  PUBLIC PARK                B        0.90      0.30      0.850    56   10.75
  COMMERCIAL                 B        0.30      0.30      0.100    56    6.77
  PUBLIC PARK                B        1.90      0.30      0.850    56   10.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.736
  SUBAREA RUNOFF(CFS) =      9.47
  TOTAL AREA(ACRES) =      3.30   PEAK FLOW RATE(CFS) =      9.47

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  634.00  DOWNSTREAM ELEVATION(FEET) =  630.00
  STREET LENGTH(FEET) =   503.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      20.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.65
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.45
  STREET FLOW TRAVEL TIME(MIN.) =   2.97   Tc(MIN.) =    9.73
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.638
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      0.30     0.100    56
  PUBLIC PARK                B        2.10      0.30     0.850    56
  SCHOOL                     B        4.60      0.30     0.600    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  PUBLIC PARK                B        1.40      0.30     0.850    56
  SCHOOL                     B        1.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.647
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   21.99
  EFFECTIVE AREA(ACRES) =     13.30    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.67
  TOTAL AREA(ACRES) =       13.3        PEAK FLOW RATE(CFS) =      29.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.57   HALFSTREET FLOOD WIDTH(FEET) =  22.62
  FLOW VELOCITY(FEET/SEC.) =  3.06   DEPTH*VELOCITY(FT*FT/SEC.) =   1.73
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     823.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    302.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.73
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.638
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.00      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        9.30      0.30     0.200    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.276
  SUBAREA AREA(ACRES) =   12.00      SUBAREA RUNOFF(CFS) =   27.59
  EFFECTIVE AREA(ACRES) =     25.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       25.3       PEAK FLOW RATE(CFS) =      56.76

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   630.00  DOWNSTREAM(FEET) =   625.00
  FLOW LENGTH(FEET) =   651.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.25
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      56.76
  PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =   10.91
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =    1474.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.91
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.444
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.80      0.30     0.400    56
  SCHOOL                     B        1.30      0.30     0.600    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.480
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =   10.56
  EFFECTIVE AREA(ACRES) =     30.40   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       30.4       PEAK FLOW RATE(CFS) =      62.91

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.91
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.444
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.50      0.30     0.400    56
  SCHOOL                     B        5.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.520
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =   17.92
  EFFECTIVE AREA(ACRES) =     39.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       39.1       PEAK FLOW RATE(CFS) =      80.82

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.91
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.444
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.80      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
```

```
  "11+ DWELLINGS/ACRE"       B        7.40      0.30     0.200    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.50      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.215
  SUBAREA AREA(ACRES) =   11.40      SUBAREA RUNOFF(CFS) =   24.41
  EFFECTIVE AREA(ACRES) =     50.50   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       50.5       PEAK FLOW RATE(CFS) =     105.23

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.91
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.444
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        4.70      0.30     0.100    56
  PUBLIC PARK                B        2.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.90      0.30     0.200    56
  COMMERCIAL                 B        1.70      0.30     0.100    56
  PUBLIC PARK                B        1.80      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        6.20      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.294
  SUBAREA AREA(ACRES) =   21.60      SUBAREA RUNOFF(CFS) =   45.80
  EFFECTIVE AREA(ACRES) =     72.10   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       72.1       PEAK FLOW RATE(CFS) =     151.03

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   625.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =  1029.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  39.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.67
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     151.03
  PIPE TRAVEL TIME(MIN.) =   1.35    Tc(MIN.) =   12.26
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =    2503.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.26
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.259
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.10      0.30     0.100    56
  PUBLIC PARK                B        1.80      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.00      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        5.00      0.30     0.400    56
  COMMERCIAL                 B        2.80      0.30     0.100    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.367
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   26.30
  EFFECTIVE AREA(ACRES) =     85.70   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       85.7       PEAK FLOW RATE(CFS) =     165.30

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.26
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.259
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.80      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.20      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.280
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    5.87
  EFFECTIVE AREA(ACRES) =     88.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       88.7       PEAK FLOW RATE(CFS) =     171.17

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 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.) =   12.26
  RAINFALL INTENSITY(INCH/HR) =   2.26
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.38
  EFFECTIVE STREAM AREA(ACRES) =      88.70
  TOTAL STREAM AREA(ACRES) =      88.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     171.17

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    307.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   317.00
  ELEVATION DATA: UPSTREAM(FEET) =    646.00  DOWNSTREAM(FEET) =    645.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   15.296
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.867
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.40      0.30     0.850    56   15.30
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56   15.42
  PUBLIC PARK                B        1.50      0.30     0.850    56   15.30
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56   15.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.857
  SUBAREA RUNOFF(CFS) =      3.19
  TOTAL AREA(ACRES) =      2.20   PEAK FLOW RATE(CFS) =      3.19

********************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.10 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  645.00  DOWNSTREAM ELEVATION(FEET) =  641.00
  STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       6.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.37
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   2.64   Tc(MIN.) =   17.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.724
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
```



```
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.40      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.649
  SUBAREA AREA(ACRES) =    4.20      SUBAREA RUNOFF(CFS) =    5.78
  EFFECTIVE AREA(ACRES) =      6.40    AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =        6.4        PEAK FLOW RATE(CFS) =       8.68

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.93
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    307.10 =     692.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    307.10 TO NODE    308.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  641.00  DOWNSTREAM ELEVATION(FEET) =  635.00
  STREET LENGTH(FEET) =   506.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      14.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.51
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.01
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.32
  STREET FLOW TRAVEL TIME(MIN.) =   2.80   Tc(MIN.) =   20.74
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.581
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.00      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.80      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.554
  SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =   10.83
  EFFECTIVE AREA(ACRES) =     14.90    AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.63
```

```
  TOTAL AREA(ACRES) =       14.9        PEAK FLOW RATE(CFS) =      18.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.46
  FLOW VELOCITY(FEET/SEC.) =  3.20   DEPTH*VELOCITY(FT*FT/SEC.) =   1.52
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    308.00 =    1198.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   635.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =  1516.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.63
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.69
  PIPE TRAVEL TIME(MIN.) =   2.93    Tc(MIN.) =   23.67
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    305.00 =    2714.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.67
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.460
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.20      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.20      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.80      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.50      0.30     0.400    56
  SCHOOL                     B        0.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.289
  SUBAREA AREA(ACRES) =    5.00      SUBAREA RUNOFF(CFS) =    6.18
  EFFECTIVE AREA(ACRES) =     19.90   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       19.9       PEAK FLOW RATE(CFS) =      23.25

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.67
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.460
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  COMMERCIAL                 B        1.20      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.00      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        6.60      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.415
  SUBAREA AREA(ACRES) =   14.60      SUBAREA RUNOFF(CFS) =   17.55
  EFFECTIVE AREA(ACRES) =     34.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       34.5       PEAK FLOW RATE(CFS) =      40.80

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.67
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.460
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  SCHOOL                     B        0.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.23
  EFFECTIVE AREA(ACRES) =     34.70   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       34.7       PEAK FLOW RATE(CFS) =      41.03

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 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.) =   23.67
  RAINFALL INTENSITY(INCH/HR) =   1.46
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =      34.70
  TOTAL STREAM AREA(ACRES) =      34.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      41.03

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      171.17   12.26    2.259  0.30( 0.11) 0.38      88.7     300.00
      2       41.03   23.67    1.460  0.30( 0.15) 0.49      34.7     306.00
```

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      205.34   12.26    2.259  0.30( 0.12) 0.40     106.7     300.00
     2      148.47   23.67    1.460  0.30( 0.12) 0.41     123.4     306.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     205.34    Tc(MIN.) =    12.26
 EFFECTIVE AREA(ACRES) =     106.67   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
 TOTAL AREA(ACRES) =      123.4
 LONGEST FLOWPATH FROM NODE    306.00 TO NODE    305.00 =    2714.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    310.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   615.00  DOWNSTREAM(FEET) =   480.00
 FLOW LENGTH(FEET) =  2954.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  24.87
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     205.34
 PIPE TRAVEL TIME(MIN.) =   1.98    Tc(MIN.) =   14.24
 LONGEST FLOWPATH FROM NODE    306.00 TO NODE    310.00 =    5668.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.24
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.987
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        4.80      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.20      0.30     0.600    56
 COMMERCIAL                 B        2.30      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.164
 SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =   13.61
 EFFECTIVE AREA(ACRES) =    114.47   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
 TOTAL AREA(ACRES) =      131.2       PEAK FLOW RATE(CFS) =     205.34
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
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```
 FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.24
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.987
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.10      0.30     0.100    56
 PUBLIC PARK                B        0.20      0.30     0.850    56
 PUBLIC PARK                B        2.30      0.30     0.850    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        6.40      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        2.60      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.371
 SUBAREA AREA(ACRES) =   12.30      SUBAREA RUNOFF(CFS) =   20.77
 EFFECTIVE AREA(ACRES) =    126.77   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
 TOTAL AREA(ACRES) =      143.5       PEAK FLOW RATE(CFS) =     213.67

****************************************************************************
 FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.24
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.987
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.80      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B       10.20      0.30     0.500    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.50      0.30     0.400    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        3.70      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.514
 SUBAREA AREA(ACRES) =   19.50      SUBAREA RUNOFF(CFS) =   32.17
 EFFECTIVE AREA(ACRES) =    146.27   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
 TOTAL AREA(ACRES) =      163.0       PEAK FLOW RATE(CFS) =     245.84

****************************************************************************
 FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
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```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =  1056.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.77
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     245.84
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   14.92
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    311.00 =    6724.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.92
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.894
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.60      0.30     0.100    56
  COMMERCIAL                 B        3.60      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.10      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.80      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.191
  SUBAREA AREA(ACRES) =   15.10      SUBAREA RUNOFF(CFS) =   24.96
  EFFECTIVE AREA(ACRES) =    161.37   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      178.1       PEAK FLOW RATE(CFS) =     258.47

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.92
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.894
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        6.70      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    6.70      SUBAREA RUNOFF(CFS) =   10.33
  EFFECTIVE AREA(ACRES) =    168.07   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =      184.8       PEAK FLOW RATE(CFS) =     268.81

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 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) =   430.00  DOWNSTREAM(FEET) =   373.00
  FLOW LENGTH(FEET) =  1373.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  38.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.17
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     268.81
  PIPE TRAVEL TIME(MIN.) =   0.91    Tc(MIN.) =   15.83
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    312.00 =    8097.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.83
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.838
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.50      0.30     0.100    56
  COMMERCIAL                 B        4.50      0.30     0.100    56
  APARTMENTS                 B        3.40      0.30     0.200    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.157
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   16.12
  EFFECTIVE AREA(ACRES) =    178.07   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      194.8       PEAK FLOW RATE(CFS) =     276.49

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.83
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.838
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.567
  SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    0.90
  EFFECTIVE AREA(ACRES) =    178.67   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
```

```
  TOTAL AREA(ACRES) =      195.4       PEAK FLOW RATE(CFS) =     277.39

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    339.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   373.00  DOWNSTREAM(FEET) =   301.00
  FLOW LENGTH(FEET) =  1370.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.08
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     277.39
  PIPE TRAVEL TIME(MIN.) =   0.81    Tc(MIN.) =   16.64
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    339.00 =    9467.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    390.00 TO NODE    391.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   317.00
  ELEVATION DATA: UPSTREAM(FEET) =    860.00  DOWNSTREAM(FEET) =    775.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.195
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.777
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.20      0.30     1.000    72    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.20      0.30     1.000    66    9.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.12
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      3.12

****************************************************************************
  FLOW PROCESS FROM NODE    391.00 TO NODE    392.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```



```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    775.00  DOWNSTREAM(FEET) =    700.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   545.00   CHANNEL SLOPE =  0.1376
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.460
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        1.70      0.30     1.000    72
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.60      0.30     1.000    72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.70
  AVERAGE FLOW DEPTH(FEET) =   0.56   TRAVEL TIME(MIN.) =   1.59
  Tc(MIN.) =   10.79
  SUBAREA AREA(ACRES) =     2.30       SUBAREA RUNOFF(CFS) =    4.47
  EFFECTIVE AREA(ACRES) =      3.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       7.19

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.62   FLOW VELOCITY(FEET/SEC.) =   6.18
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    392.00 =     862.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    392.00 TO NODE    393.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    700.00  DOWNSTREAM(FEET) =    635.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1093.00   CHANNEL SLOPE =  0.0595
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.052
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.40      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        8.40      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.70      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.40      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        9.20      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.60      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.13
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```
  AVERAGE FLOW DEPTH(FEET) =   1.17   TRAVEL TIME(MIN.) =   2.97
  Tc(MIN.) =   13.76
  SUBAREA AREA(ACRES) =    22.70       SUBAREA RUNOFF(CFS) =   35.80
  EFFECTIVE AREA(ACRES) =     26.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       26.4         PEAK FLOW RATE(CFS) =      41.64

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.41   FLOW VELOCITY(FEET/SEC.) =   6.94
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    393.00 =    1955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    393.00 TO NODE    394.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    635.00  DOWNSTREAM(FEET) =    598.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   904.00   CHANNEL SLOPE =  0.0409
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.823
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.60      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        5.50      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.80      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.60      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.00      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        6.80      0.30     1.000    72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      53.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.42
  AVERAGE FLOW DEPTH(FEET) =   1.67   TRAVEL TIME(MIN.) =   2.35
  Tc(MIN.) =   16.11
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   23.71
  EFFECTIVE AREA(ACRES) =     43.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       43.7         PEAK FLOW RATE(CFS) =      59.90

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.74   FLOW VELOCITY(FEET/SEC.) =   6.62
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    394.00 =    2859.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    394.00 TO NODE    394.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.11
```



```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.823
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.50      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =     2.60      SUBAREA RUNOFF(CFS) =    3.56
  EFFECTIVE AREA(ACRES) =     46.30   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       46.3       PEAK FLOW RATE(CFS) =      63.46

****************************************************************************
  FLOW PROCESS FROM NODE    394.00 TO NODE    395.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    598.00  DOWNSTREAM(FEET) =    573.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   664.00   CHANNEL SLOPE =  0.0377
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.735
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        6.30      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        5.90      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.80      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.50      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.20      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.996
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      76.78
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.80
  AVERAGE FLOW DEPTH(FEET) =   1.94   TRAVEL TIME(MIN.) =   1.63
  Tc(MIN.) =   17.74
  SUBAREA AREA(ACRES) =    20.60       SUBAREA RUNOFF(CFS) =   26.62
  EFFECTIVE AREA(ACRES) =     66.90     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       66.9         PEAK FLOW RATE(CFS) =      86.41

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.03   FLOW VELOCITY(FEET/SEC.) =   7.01
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    395.00 =    3523.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    395.00 IS CODE =  81
```

```
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   17.74
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.735
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B       12.60      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.10      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.987
  SUBAREA AREA(ACRES) =   18.20      SUBAREA RUNOFF(CFS) =   23.56
  EFFECTIVE AREA(ACRES) =     85.10   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       85.1       PEAK FLOW RATE(CFS) =     109.97

********************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    370.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   573.00  DOWNSTREAM(FEET) =   389.00
  FLOW LENGTH(FEET) =  5717.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.30
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     109.97
  PIPE TRAVEL TIME(MIN.) =   5.21    Tc(MIN.) =   22.94
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    370.00 =    9240.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    370.00 TO NODE    371.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    389.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1996.00   CHANNEL SLOPE =  0.0220
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.310
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                    B        2.90      0.30     1.000    69
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.40      0.30     1.000    63
  COMMERCIAL                 B        0.50      0.30     0.100    56
  NATURAL FAIR COVER
```



```
  "GRASS"                    B        6.60      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.60      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        6.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.956
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     121.09
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.24
  AVERAGE FLOW DEPTH(FEET) =   2.54   TRAVEL TIME(MIN.) =   5.33
  Tc(MIN.) =   28.28
  SUBAREA AREA(ACRES) =    24.10       SUBAREA RUNOFF(CFS) =   22.19
  EFFECTIVE AREA(ACRES) =    109.20     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.99
  TOTAL AREA(ACRES) =      109.2         PEAK FLOW RATE(CFS) =     109.97
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.45   FLOW VELOCITY(FEET/SEC.) =   6.10
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    371.00 =   11236.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   28.28
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.310
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.10      0.30     1.000    63
  COMMERCIAL                 B        1.10      0.30     0.100    56
  NATURAL FAIR COVER
  "GRASS"                    B        2.00      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.40      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.830
  SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =    6.78
  EFFECTIVE AREA(ACRES) =    116.30   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =      116.3       PEAK FLOW RATE(CFS) =     109.97
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

********************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   28.28
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.310
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.70      0.30      0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        0.20      0.30      1.000    65
  PUBLIC PARK                 B        0.10      0.30      0.850    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B        0.10      0.30      0.500    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        3.00      0.30      1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        1.40      0.30      1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.975
  SUBAREA AREA(ACRES) =    5.50      SUBAREA RUNOFF(CFS) =    5.04
  EFFECTIVE AREA(ACRES) =    121.80   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =      121.8       PEAK FLOW RATE(CFS) =     111.45

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   28.28
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.310
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        1.40      0.30      0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        0.10      0.30      1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.907
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    1.40
  EFFECTIVE AREA(ACRES) =    123.30   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =      123.3       PEAK FLOW RATE(CFS) =     112.85

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    372.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   345.00  DOWNSTREAM(FEET) =   301.00
  FLOW LENGTH(FEET) =   488.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.11
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     112.85
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   28.58
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    372.00 =   11724.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    372.00 TO NODE    373.00 IS CODE =  56
```



```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    301.00  DOWNSTREAM(FEET) =    300.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   924.00   CHANNEL SLOPE =  0.0011
  GIVEN CHANNEL BASE(FEET) =   30.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   2.80
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.157
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B       32.30      0.30      0.100    56
  COMMERCIAL                  B        2.70      0.30      0.100    56
  COMMERCIAL                  B        0.60      0.30      0.100    56
  COMMERCIAL                  B        1.80      0.30      0.100    56
  PUBLIC PARK                 B        7.20      0.30      0.850    56
  PUBLIC PARK                 B        9.80      0.30      0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.334
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     138.73
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.17
  AVERAGE FLOW DEPTH(FEET) =   1.80   TRAVEL TIME(MIN.) =   7.09
  Tc(MIN.) =   35.67
  SUBAREA AREA(ACRES) =    54.40       SUBAREA RUNOFF(CFS) =   51.76
  EFFECTIVE AREA(ACRES) =    177.70     AREA-AVERAGED Fm(INCH/HR) =   0.23
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.78
  TOTAL AREA(ACRES) =      177.7         PEAK FLOW RATE(CFS) =     147.69
  GIVEN CHANNEL BASE(FEET) =   30.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   2.87

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.87   FLOW VELOCITY(FEET/SEC.) =   2.22
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    373.00 =   12648.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    373.00 TO NODE    373.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   35.67
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.157
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 B        2.60      0.30      0.850    56
  PUBLIC PARK                 B        2.10      0.30      0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        3.50      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        4.80      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        3.60      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.80      0.30      0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.886
  SUBAREA AREA(ACRES) =   17.40      SUBAREA RUNOFF(CFS) =   13.96
  EFFECTIVE AREA(ACRES) =    195.10   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =      195.1       PEAK FLOW RATE(CFS) =     161.65

****************************************************************************
  FLOW PROCESS FROM NODE    373.00 TO NODE    374.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   300.00  DOWNSTREAM(FEET) =   298.00
  FLOW LENGTH(FEET) =  1188.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  72.0 INCH PIPE IS  57.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.65
  ESTIMATED PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     161.65
  PIPE TRAVEL TIME(MIN.) =   2.98    Tc(MIN.) =   38.64
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    321.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    622.00  DOWNSTREAM(FEET) =    621.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.511
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.498
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                B        1.50      0.30     0.200    56   10.51
  APARTMENTS                B        2.00      0.30     0.200    56   10.51
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      7.68
  TOTAL AREA(ACRES) =      3.50   PEAK FLOW RATE(CFS) =      7.68

****************************************************************************
  FLOW PROCESS FROM NODE    321.00 TO NODE    322.00 IS CODE =  62
----------------------------------------------------------------------------
```



```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  621.00  DOWNSTREAM ELEVATION(FEET) =  612.00
  STREET LENGTH(FEET) =   569.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      12.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.35
  STREET FLOW TRAVEL TIME(MIN.) =   2.89   Tc(MIN.) =   13.40
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.102
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        2.20      0.30     0.200    56
  APARTMENTS                B        3.20      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =    9.92
  EFFECTIVE AREA(ACRES) =      8.90    AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        8.9        PEAK FLOW RATE(CFS) =      16.35

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.59
  FLOW VELOCITY(FEET/SEC.) =  3.46   DEPTH*VELOCITY(FT*FT/SEC.) =   1.53
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    322.00 =     899.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    324.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  612.00  DOWNSTREAM ELEVATION(FEET) =  590.00
  STREET LENGTH(FEET) =   891.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      25.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   16.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.13
  STREET FLOW TRAVEL TIME(MIN.) =   3.25   Tc(MIN.) =   16.66
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.793
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.00      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        5.70      0.30     0.400    56
  CONDOMINIUMS               B        1.20      0.30     0.350    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.420
  SUBAREA AREA(ACRES) =   11.90      SUBAREA RUNOFF(CFS) =   17.85
  EFFECTIVE AREA(ACRES) =     20.80    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       20.8        PEAK FLOW RATE(CFS) =      31.73

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  18.63
  FLOW VELOCITY(FEET/SEC.) =  4.82   DEPTH*VELOCITY(FT*FT/SEC.) =   2.39
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    324.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.66
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.793
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.70      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    2.70
  EFFECTIVE AREA(ACRES) =     22.50   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      34.43

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    325.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   590.00  DOWNSTREAM(FEET) =   575.00
```



```
  FLOW LENGTH(FEET) =   529.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.09
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.43
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =   17.33
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    325.00 =    2319.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.33
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.757
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.30      0.30     0.600    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.544
  SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =   10.32
  EFFECTIVE AREA(ACRES) =     29.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =       29.7       PEAK FLOW RATE(CFS) =      44.02

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    325.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.33
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.757
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.80      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       10.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.606
  SUBAREA AREA(ACRES) =   15.30      SUBAREA RUNOFF(CFS) =   21.69
  EFFECTIVE AREA(ACRES) =     45.00   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       45.0       PEAK FLOW RATE(CFS) =      65.70

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    326.00 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) =   515.00
  FLOW LENGTH(FEET) =   284.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.69
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      65.70
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   17.48
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    326.00 =    2603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.48
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.749
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.70      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.80      0.30     0.900    56
  COMMERCIAL                 B        1.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.582
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =    7.65
  EFFECTIVE AREA(ACRES) =     50.40   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       50.4       PEAK FLOW RATE(CFS) =      73.03

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.48
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.749
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.80      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.557
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =    6.97
  EFFECTIVE AREA(ACRES) =     55.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       55.3       PEAK FLOW RATE(CFS) =      80.01
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    333.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   500.00
  FLOW LENGTH(FEET) =  1644.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.69
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      80.01
  PIPE TRAVEL TIME(MIN.) =   2.56    Tc(MIN.) =   20.04
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    333.00 =    4247.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.04
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.610
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
  COMMERCIAL                 B        1.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  COMMERCIAL                 B        5.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.467
  SUBAREA AREA(ACRES) =   14.40      SUBAREA RUNOFF(CFS) =   19.05
  EFFECTIVE AREA(ACRES) =     69.70   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       69.7       PEAK FLOW RATE(CFS) =      92.18

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.04
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.610
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.26
  EFFECTIVE AREA(ACRES) =     69.90   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
```

```
  TOTAL AREA(ACRES) =       69.9       PEAK FLOW RATE(CFS) =      92.43

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 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.) =   20.04
  RAINFALL INTENSITY(INCH/HR) =   1.61
  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      69.90
  TOTAL STREAM AREA(ACRES) =      69.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      92.43

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.50 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =    615.00  DOWNSTREAM(FEET) =    614.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.844
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.608
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.40      0.30     0.100    56    9.84
  PUBLIC PARK                B        0.20      0.30     0.850    56   15.64
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.10      0.30     0.400    56   12.11
  COMMERCIAL                 B        0.10      0.30     0.100    56    9.84
  PUBLIC PARK                B        0.10      0.30     0.850    56   15.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.383
  SUBAREA RUNOFF(CFS) =      2.02
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.02

****************************************************************************
  FLOW PROCESS FROM NODE    327.50 TO NODE    328.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  614.00  DOWNSTREAM ELEVATION(FEET) =  610.00
  STREET LENGTH(FEET) =   425.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```



```
  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) =       4.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.16
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   3.28   Tc(MIN.) =   13.12
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.140
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.00      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.348
  SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    5.86
  EFFECTIVE AREA(ACRES) =      4.10    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        4.1        PEAK FLOW RATE(CFS) =       7.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.46
  FLOW VELOCITY(FEET/SEC.) =  2.37   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    328.00 =     754.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    329.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  610.00  DOWNSTREAM ELEVATION(FEET) =  595.00
  STREET LENGTH(FEET) =   366.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      12.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
```

```
    HALFSTREET FLOOD WIDTH(FEET) =   11.37
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.73
  STREET FLOW TRAVEL TIME(MIN.) =   1.29   Tc(MIN.) =   14.41
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.963
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.10      0.30     0.400    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.10      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.407
  SUBAREA AREA(ACRES) =    6.30      SUBAREA RUNOFF(CFS) =   10.44
  EFFECTIVE AREA(ACRES) =     10.40    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       10.4        PEAK FLOW RATE(CFS) =      17.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.01
  FLOW VELOCITY(FEET/SEC.) =  5.07   DEPTH*VELOCITY(FT*FT/SEC.) =   2.00
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    329.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.41
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.963
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.80      0.30     0.400    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        6.10      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.402
  SUBAREA AREA(ACRES) =    9.00      SUBAREA RUNOFF(CFS) =   14.92
  EFFECTIVE AREA(ACRES) =     19.40   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       19.4       PEAK FLOW RATE(CFS) =      32.21

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    330.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   595.00  DOWNSTREAM(FEET) =   575.00
```



```
  FLOW LENGTH(FEET) =   378.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.33
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.21
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   14.80
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    330.00 =    1498.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.80
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.910
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.90      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.10      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.50      0.30     0.400    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       10.20      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.90      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.561
  SUBAREA AREA(ACRES) =   19.20      SUBAREA RUNOFF(CFS) =   30.10
  EFFECTIVE AREA(ACRES) =     38.60   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       38.6       PEAK FLOW RATE(CFS) =      61.39

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    331.00 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) =   555.00
  FLOW LENGTH(FEET) =   457.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  22.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.62
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.39
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   15.23
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    331.00 =    1955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.23
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.870
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        1.10      0.30      0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.80      0.30      0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B       10.50      0.30      0.600    56
 COMMERCIAL                 B        0.30      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.50      0.30      0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B       13.70      0.30      0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.619
 SUBAREA AREA(ACRES) =   26.90      SUBAREA RUNOFF(CFS) =   40.79
 EFFECTIVE AREA(ACRES) =     65.50   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
 TOTAL AREA(ACRES) =       65.5       PEAK FLOW RATE(CFS) =     100.79

****************************************************************************
 FLOW PROCESS FROM NODE    331.00 TO NODE    332.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   555.00  DOWNSTREAM(FEET) =   520.00
 FLOW LENGTH(FEET) =   324.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  28.87
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     100.79
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   15.42
 LONGEST FLOWPATH FROM NODE    327.00 TO NODE    332.00 =    2279.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    332.00 TO NODE    332.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.42
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.860
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.10      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.10      0.30      0.900    56
 COMMERCIAL                 B        3.70      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        5.00      0.30      0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.621
 SUBAREA AREA(ACRES) =   10.90      SUBAREA RUNOFF(CFS) =   16.42
 EFFECTIVE AREA(ACRES) =     76.40   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =       76.4       PEAK FLOW RATE(CFS) =     116.62

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



```
 FLOW PROCESS FROM NODE    332.00 TO NODE    333.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   520.00  DOWNSTREAM(FEET) =   500.00
 FLOW LENGTH(FEET) =  1740.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.67
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     116.62
 PIPE TRAVEL TIME(MIN.) =   2.29    Tc(MIN.) =   17.71
 LONGEST FLOWPATH FROM NODE    327.00 TO NODE    333.00 =    4019.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.71
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.736
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.20      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        4.40      0.30      0.900    56
 COMMERCIAL                 B        3.90      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        9.80      0.30      0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.689
 SUBAREA AREA(ACRES) =   19.30      SUBAREA RUNOFF(CFS) =   26.57
 EFFECTIVE AREA(ACRES) =     95.70   AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.58
 TOTAL AREA(ACRES) =       95.7       PEAK FLOW RATE(CFS) =     134.66

****************************************************************************
 FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 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.) =   17.71
 RAINFALL INTENSITY(INCH/HR) =   1.74
 AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.58
 EFFECTIVE STREAM AREA(ACRES) =      95.70
 TOTAL STREAM AREA(ACRES) =      95.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     134.66

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
     1       92.43   20.04    1.610  0.30( 0.14) 0.47      69.9     320.00
```

```
     2      134.66   17.71    1.736  0.30( 0.17) 0.58      95.7     327.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      223.33   17.71    1.736  0.30( 0.16) 0.53     157.5     327.00
      2      216.24   20.04    1.610  0.30( 0.16) 0.53     165.6     320.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     223.33    Tc(MIN.) =    17.71
  EFFECTIVE AREA(ACRES) =     157.46   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      165.6
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    333.00 =    4247.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    334.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   819.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.41
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     223.33
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   18.29
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    334.00 =    5066.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.705
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        4.00      0.30     0.200    56
  COMMERCIAL                 B        2.30      0.30     0.100    56
  COMMERCIAL                 B        1.00      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  PUBLIC PARK                B        2.40      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.50      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.310
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   19.73
  EFFECTIVE AREA(ACRES) =    171.06   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      179.2       PEAK FLOW RATE(CFS) =     238.57

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



```
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.705
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.00      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.60      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.10      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.330
  SUBAREA AREA(ACRES) =    5.70      SUBAREA RUNOFF(CFS) =    8.24
  EFFECTIVE AREA(ACRES) =    176.76   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      184.9       PEAK FLOW RATE(CFS) =     246.81

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 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.) =   18.29
  RAINFALL INTENSITY(INCH/HR) =   1.70
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =     176.76
  TOTAL STREAM AREA(ACRES) =     184.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     246.81

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    351.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    492.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.730
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.468
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.80      0.30     0.600    56   10.73
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.70      0.30     0.600    56   10.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      5.15
  TOTAL AREA(ACRES) =      2.50   PEAK FLOW RATE(CFS) =      5.15

****************************************************************************
  FLOW PROCESS FROM NODE    351.00 TO NODE    352.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  492.00  DOWNSTREAM ELEVATION(FEET) =  488.00
  STREET LENGTH(FEET) =   456.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       8.15
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.09
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
  STREET FLOW TRAVEL TIME(MIN.) =   3.21   Tc(MIN.) =   13.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.028
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.20      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.40      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    5.99
  EFFECTIVE AREA(ACRES) =      6.10    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        6.1        PEAK FLOW RATE(CFS) =      10.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.41
  FLOW VELOCITY(FEET/SEC.) =  2.48   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    352.00 =     786.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    352.00 TO NODE    353.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   488.00  DOWNSTREAM(FEET) =   485.00
  FLOW LENGTH(FEET) =   883.00   MANNING'S N =  0.013
```



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  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.44
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.14
  PIPE TRAVEL TIME(MIN.) =   3.32    Tc(MIN.) =   17.26
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    353.00 =    1669.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    353.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.26
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.760
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.50      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.10      0.30     0.400    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.60      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.50      0.30     0.400    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.70      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.471
  SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =   12.39
  EFFECTIVE AREA(ACRES) =     14.60   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       14.6       PEAK FLOW RATE(CFS) =      21.06

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    353.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.26
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.760
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.44
  EFFECTIVE AREA(ACRES) =     14.90   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       14.9       PEAK FLOW RATE(CFS) =      21.51

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    334.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =  1136.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.32
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.51
  PIPE TRAVEL TIME(MIN.) =   2.03    Tc(MIN.) =   19.29
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    334.00 =    2805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.650
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        2.00      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.40      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.50      0.30     0.400    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  PUBLIC PARK                B        1.50      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =   10.51
  EFFECTIVE AREA(ACRES) =     22.70   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       22.7       PEAK FLOW RATE(CFS) =      30.54

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.650
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.10      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.40      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.262
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    6.37
  EFFECTIVE AREA(ACRES) =     27.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       27.2       PEAK FLOW RATE(CFS) =      36.90

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



```
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.650
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.20      0.30     0.600    56
  PUBLIC PARK                B        2.70      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        7.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.674
  SUBAREA AREA(ACRES) =   12.00      SUBAREA RUNOFF(CFS) =   15.64
  EFFECTIVE AREA(ACRES) =     39.20   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       39.2       PEAK FLOW RATE(CFS) =      52.54

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.650
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  SCHOOL                     B        3.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.626
  SUBAREA AREA(ACRES) =    3.80      SUBAREA RUNOFF(CFS) =    5.00
  EFFECTIVE AREA(ACRES) =     43.00   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       43.0       PEAK FLOW RATE(CFS) =      57.54

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 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.) =   19.29
  RAINFALL INTENSITY(INCH/HR) =   1.65
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30
```

```
 AREA-AVERAGED Ap =  0.54
 EFFECTIVE STREAM AREA(ACRES) =      43.00
 TOTAL STREAM AREA(ACRES) =      43.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      57.54

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      246.81   18.29    1.705  0.30( 0.15) 0.51     176.8     327.00
     1      238.54   20.63    1.586  0.30( 0.15) 0.51     184.9     320.00
     2       57.54   19.29    1.650  0.30( 0.16) 0.54      43.0     350.00

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      303.36   18.29    1.705  0.30( 0.16) 0.52     217.5     327.00
     2      300.81   19.29    1.650  0.30( 0.15) 0.52     223.3     350.00
     3      293.60   20.63    1.586  0.30( 0.15) 0.52     227.9     320.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     303.36    Tc(MIN.) =    18.29
 EFFECTIVE AREA(ACRES) =     217.53   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
 TOTAL AREA(ACRES) =      227.9
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    334.00 =    5066.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    334.00 TO NODE    335.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   422.00
 FLOW LENGTH(FEET) =  1086.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  51.0 INCH PIPE IS  38.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  26.37
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     303.36
 PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   18.98
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    335.00 =    6152.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    335.00 TO NODE    335.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   18.98
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.667
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                B        3.00      0.30     0.100    56
 COMMERCIAL                B        4.20      0.30     0.100    56
 PUBLIC PARK               B        0.60      0.30     0.850    56
 PUBLIC PARK               B       10.80      0.30     0.850    56
```



```
 RESIDENTIAL
 ".4 DWELLING/ACRE"        B        1.00      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"        B        3.90      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.631
 SUBAREA AREA(ACRES) =   23.50      SUBAREA RUNOFF(CFS) =   31.26
 EFFECTIVE AREA(ACRES) =    241.03   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =      251.4       PEAK FLOW RATE(CFS) =     327.34

****************************************************************************
 FLOW PROCESS FROM NODE    335.00 TO NODE    335.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   18.98
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.667
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"      B        0.10      0.30     0.600    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"      B        0.10      0.30     0.600    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"      B        0.10      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"      B        9.20      0.30     0.500    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"     B        0.70      0.30     0.400    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"     B        2.90      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.474
 SUBAREA AREA(ACRES) =   13.10      SUBAREA RUNOFF(CFS) =   17.98
 EFFECTIVE AREA(ACRES) =    254.13   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =      264.5       PEAK FLOW RATE(CFS) =     345.32

****************************************************************************
 FLOW PROCESS FROM NODE    335.00 TO NODE    336.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   422.00  DOWNSTREAM(FEET) =   380.00
 FLOW LENGTH(FEET) =   780.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  51.0 INCH PIPE IS  38.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  29.76
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     345.32
 PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   19.41
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    336.00 =    6932.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   19.41
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.644
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.70      0.30     0.100    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  COMMERCIAL                 B        1.60      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.70      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.60      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.182
  SUBAREA AREA(ACRES) =   12.30      SUBAREA RUNOFF(CFS) =   17.59
  EFFECTIVE AREA(ACRES) =    266.43   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      276.8       PEAK FLOW RATE(CFS) =     357.50

********************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   19.41
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.644
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.40      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       16.80      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.611
  SUBAREA AREA(ACRES) =   22.20      SUBAREA RUNOFF(CFS) =   29.18
  EFFECTIVE AREA(ACRES) =    288.63   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      299.0       PEAK FLOW RATE(CFS) =     386.68

********************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   19.41
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.644
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        6.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    6.30      SUBAREA RUNOFF(CFS) =    8.64
  EFFECTIVE AREA(ACRES) =    294.93   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      305.3       PEAK FLOW RATE(CFS) =     395.31

********************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    337.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   380.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =   803.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  44.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.74
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     395.31
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   19.92
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    337.00 =    7735.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   19.92
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.617
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.40      0.30     0.200    56
  APARTMENTS                 B        3.00      0.30     0.200    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  COMMERCIAL                 B        2.70      0.30     0.100    56
  COMMERCIAL                 B        6.00      0.30     0.100    56
  PUBLIC PARK                B        1.30      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.189
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =   20.64
  EFFECTIVE AREA(ACRES) =    309.63   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      320.0       PEAK FLOW RATE(CFS) =     408.75

********************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   19.92
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.617
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        3.30      0.30      0.850    56
 PUBLIC PARK                B        1.50      0.30      0.850    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        2.50      0.30      0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        6.70      0.30      0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.20      0.30      0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.10      0.30      0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.488
 SUBAREA AREA(ACRES) =   16.30      SUBAREA RUNOFF(CFS) =   21.57
 EFFECTIVE AREA(ACRES) =    325.93   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =      336.3       PEAK FLOW RATE(CFS) =     430.32

****************************************************************************
 FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.92
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.617
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.60      0.30      0.600    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        4.60      0.30      0.400    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.90      0.30      0.400    56
 SCHOOL                     B        0.20      0.30      0.600    56
 SCHOOL                     B        5.90      0.30      0.600    56
 SCHOOL                     B        6.00      0.30      0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.526
 SUBAREA AREA(ACRES) =   20.20      SUBAREA RUNOFF(CFS) =   26.52
 EFFECTIVE AREA(ACRES) =    346.13   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =      356.5       PEAK FLOW RATE(CFS) =     456.84

****************************************************************************
 FLOW PROCESS FROM NODE    337.00 TO NODE    338.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   332.00
 FLOW LENGTH(FEET) =   838.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  66.0 INCH PIPE IS  52.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.40
 ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     456.84
 PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =   20.54
```



```
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    338.00 =    8573.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   20.54
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.590
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 APARTMENTS                 B        6.90      0.30      0.200    56
 COMMERCIAL                 B        2.80      0.30      0.100    56
 COMMERCIAL                 B       11.50      0.30      0.100    56
 COMMERCIAL                 B        4.70      0.30      0.100    56
 COMMERCIAL                 B        8.60      0.30      0.100    56
 PUBLIC PARK                B        2.60      0.30      0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.171
 SUBAREA AREA(ACRES) =   37.10      SUBAREA RUNOFF(CFS) =   51.37
 EFFECTIVE AREA(ACRES) =    383.23   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
 TOTAL AREA(ACRES) =      393.6       PEAK FLOW RATE(CFS) =     499.83

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   20.54
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.590
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.10      0.30      0.850    56
 PUBLIC PARK                B        0.60      0.30      0.850    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.30      0.30      0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        9.70      0.30      0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        1.20      0.30      0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        3.40      0.30      0.200    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.230
 SUBAREA AREA(ACRES) =   15.30      SUBAREA RUNOFF(CFS) =   20.94
 EFFECTIVE AREA(ACRES) =    398.53   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
 TOTAL AREA(ACRES) =      408.9       PEAK FLOW RATE(CFS) =     520.77

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   20.54
```

```
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.590
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        5.60      0.30     0.100    56
 COMMERCIAL                 B        3.60      0.30     0.100    56
 COMMERCIAL                 B        5.80      0.30     0.100    56
 SCHOOL                     B        0.80      0.30     0.600    56
 SCHOOL                     B        1.20      0.30     0.600    56
 SCHOOL                     B        4.50      0.30     0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.251
 SUBAREA AREA(ACRES) =   21.50      SUBAREA RUNOFF(CFS) =   29.30
 EFFECTIVE AREA(ACRES) =    420.03   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      430.4       PEAK FLOW RATE(CFS) =     550.07

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   20.54
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.590
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.36
 EFFECTIVE AREA(ACRES) =    420.33   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      430.7       PEAK FLOW RATE(CFS) =     550.42

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    339.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   332.00  DOWNSTREAM(FEET) =   301.00
 FLOW LENGTH(FEET) =  1956.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  75.0 INCH PIPE IS  59.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.95
 ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     550.42
 PIPE TRAVEL TIME(MIN.) =   1.56    Tc(MIN.) =   22.10
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
```



```
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      550.42   22.10    1.525  0.30( 0.13) 0.45     420.3     327.00
     2      541.92   23.10    1.484  0.30( 0.13) 0.45     426.1     350.00
     3      526.31   24.44    1.428  0.30( 0.13) 0.45     430.7     320.00
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      277.39   16.64    1.794  0.30( 0.11) 0.38     178.7     300.00
     2      213.94   28.39    1.307  0.30( 0.12) 0.39     195.4     306.00
 LONGEST FLOWPATH FROM NODE    306.00 TO NODE    339.00 =    9467.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      772.12   16.64    1.794  0.30( 0.13) 0.42     495.3     300.00
     2      798.36   22.10    1.525  0.30( 0.13) 0.43     606.8     327.00
     3      784.43   23.10    1.484  0.30( 0.13) 0.43     613.9     350.00
     4      761.57   24.44    1.428  0.30( 0.13) 0.43     620.5     320.00
     5      690.88   28.39    1.307  0.30( 0.13) 0.43     626.1     306.00
   TOTAL AREA(ACRES) =       626.1

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      798.36  Tc(MIN.) =   22.095
 EFFECTIVE AREA(ACRES) =    606.77  AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =      626.1
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    339.00 TO NODE    340.00 IS CODE =  56
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    301.00  DOWNSTREAM(FEET) =    300.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   196.00   CHANNEL SLOPE =  0.0051
 GIVEN CHANNEL BASE(FEET) =  300.00   CHANNEL FREEBOARD(FEET) =  1.0
 "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
 *ESTIMATED CHANNEL HEIGHT(FEET) =   1.86
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.483
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B       31.90      0.30     0.100    56
 COMMERCIAL                 B        2.30      0.30     0.100    56
 COMMERCIAL                 B        1.90      0.30     0.100    56
 COMMERCIAL                 B        1.00      0.30     0.100    56
 PUBLIC PARK                B        3.10      0.30     0.850    56
 PUBLIC PARK                B        0.80      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.171
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     824.77
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.17
 AVERAGE FLOW DEPTH(FEET) =   0.86   TRAVEL TIME(MIN.) =   1.03
 Tc(MIN.) =   23.12
```

```
  SUBAREA AREA(ACRES) =    41.00       SUBAREA RUNOFF(CFS) =   52.81
  EFFECTIVE AREA(ACRES) =    647.77     AREA-AVERAGED Fm(INCH/HR) =   0.12
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.41
  TOTAL AREA(ACRES) =      667.1         PEAK FLOW RATE(CFS) =     798.36
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
  GIVEN CHANNEL BASE(FEET) =  300.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   1.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =   3.13
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    340.00 =   10725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    340.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.12
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.483
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.00      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.80      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.899
  SUBAREA AREA(ACRES) =    8.40      SUBAREA RUNOFF(CFS) =    9.17
  EFFECTIVE AREA(ACRES) =    656.17   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      675.5       PEAK FLOW RATE(CFS) =     801.51

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    374.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   300.00  DOWNSTREAM(FEET) =   298.00
  FLOW LENGTH(FEET) =   221.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  96.0 INCH PIPE IS  76.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.66
  ESTIMATED PIPE DIAMETER(INCH) =  96.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     801.51
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   23.32
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    374.00 =   10946.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
```



```
  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      791.36   17.88    1.727  0.30( 0.12) 0.41     544.7     300.00
      2      801.51   23.32    1.474  0.30( 0.13) 0.42     656.2     327.00
      3      785.10   24.33    1.433  0.30( 0.13) 0.42     663.3     350.00
      4      762.62   25.69    1.385  0.30( 0.13) 0.42     669.9     320.00
      5      698.60   29.68    1.269  0.30( 0.13) 0.42     675.5     306.00
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    374.00 =   10946.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      161.65   38.64    1.104  0.30( 0.24) 0.79     195.1     390.00
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      919.94   17.88    1.727  0.30( 0.14) 0.47     635.0     300.00
      2      940.82   23.32    1.474  0.30( 0.14) 0.47     773.9     327.00
      3      925.53   24.33    1.433  0.30( 0.14) 0.48     786.2     350.00
      4      904.98   25.69    1.385  0.30( 0.14) 0.48     799.6     320.00
      5      846.49   29.68    1.269  0.30( 0.15) 0.49     825.3     306.00
      6      758.97   38.64    1.104  0.30( 0.15) 0.50     870.6     390.00
    TOTAL AREA(ACRES) =       870.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      940.82  Tc(MIN.) =   23.322
  EFFECTIVE AREA(ACRES) =    773.91  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =      870.6
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    380.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   298.00  DOWNSTREAM(FEET) =   261.00
  FLOW LENGTH(FEET) =  1402.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  84.0 INCH PIPE IS  65.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.12
  ESTIMATED PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     940.82
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   24.12
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    380.00 =   15238.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      870.6  TC(MIN.) =     24.12
```

EFFECTIVE AREA(ACRES) = 773.91 AREA-AVERAGED Fm(INCH/HR)= 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.475
PEAK FLOW RATE(CFS) = 940.82

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	919.94	18.68	1.683	0.30(0.14)	0.47	635.0	300.00
2	940.82	24.12	1.441	0.30(0.14)	0.47	773.9	327.00
3	925.53	25.14	1.401	0.30(0.14)	0.48	786.2	350.00
4	904.98	26.49	1.362	0.30(0.14)	0.48	799.6	320.00
5	846.49	30.50	1.251	0.30(0.15)	0.49	825.3	306.00
6	758.97	39.49	1.088	0.30(0.15)	0.50	870.6	390.00

==========
==========
END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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            Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:

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 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA C                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 25-YR EV DECEMBER 2018 ROKAMOTO                                      *
 **********************************************************************

  FILE NAME: 3C25EVRL.DAT
  TIME/DATE OF STUDY: 09:06 12/24/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  4.933
   2)   10.00;  3.214
   3)   15.00;  2.451
   4)   20.00;  2.024
   5)   25.00;  1.763
   6)   30.00;  1.547
   7)   40.00;  1.347
   8)   50.00;  1.194
   9)   60.00;  1.070
  10)   90.00;  0.902
  11)  120.00;  0.792
  12)  180.00;  0.662
  13)  360.00;  0.490
  14) 1200.00;  0.216
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   320.00
  ELEVATION DATA: UPSTREAM(FEET) =    640.00  DOWNSTREAM(FEET) =    634.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.766
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.326
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.20      0.30      0.100    56    6.77
  PUBLIC PARK                B        0.90      0.30      0.850    56   10.75
  COMMERCIAL                 B        0.30      0.30      0.100    56    6.77
  PUBLIC PARK                B        1.90      0.30      0.850    56   10.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.736
  SUBAREA RUNOFF(CFS) =     12.19
  TOTAL AREA(ACRES) =      3.30   PEAK FLOW RATE(CFS) =     12.19

**************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  634.00  DOWNSTREAM ELEVATION(FEET) =  630.00
  STREET LENGTH(FEET) =   503.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      26.62
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.55
    HALFSTREET FLOOD WIDTH(FEET) =   21.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.01
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.66
  STREET FLOW TRAVEL TIME(MIN.) =   2.78   Tc(MIN.) =    9.55
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.368
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      0.30     0.100    56
  PUBLIC PARK                B        2.10      0.30     0.850    56
  SCHOOL                     B        4.60      0.30     0.600    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  PUBLIC PARK                B        1.40      0.30     0.850    56
  SCHOOL                     B        1.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.647
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   28.57
  EFFECTIVE AREA(ACRES) =     13.30    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.67
  TOTAL AREA(ACRES) =       13.3        PEAK FLOW RATE(CFS) =      37.92

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.61   HALFSTREET FLOOD WIDTH(FEET) =  25.04
  FLOW VELOCITY(FEET/SEC.) =  3.27   DEPTH*VELOCITY(FT*FT/SEC.) =   2.00
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     823.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    302.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.55
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.368
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.00      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        9.30      0.30     0.200    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.276
  SUBAREA AREA(ACRES) =   12.00      SUBAREA RUNOFF(CFS) =   35.49
  EFFECTIVE AREA(ACRES) =     25.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       25.3       PEAK FLOW RATE(CFS) =      73.40

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   630.00  DOWNSTREAM(FEET) =   625.00
  FLOW LENGTH(FEET) =   651.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.81
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      73.40
  PIPE TRAVEL TIME(MIN.) =   1.11    Tc(MIN.) =   10.66
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =    1474.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.66
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.114
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.80      0.30     0.400    56
  SCHOOL                     B        1.30      0.30     0.600    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.480
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =   13.63
  EFFECTIVE AREA(ACRES) =     30.40   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       30.4       PEAK FLOW RATE(CFS) =      81.23

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.66
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.114
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.50      0.30     0.400    56
  SCHOOL                     B        5.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.520
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =   23.16
  EFFECTIVE AREA(ACRES) =     39.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       39.1       PEAK FLOW RATE(CFS) =     104.39

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.66
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.114
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.80      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
```

```
  "11+ DWELLINGS/ACRE"       B        7.40      0.30     0.200    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.50      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.215
  SUBAREA AREA(ACRES) =   11.40      SUBAREA RUNOFF(CFS) =   31.28
  EFFECTIVE AREA(ACRES) =     50.50   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       50.5       PEAK FLOW RATE(CFS) =     135.68

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.66
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.114
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        4.70      0.30     0.100    56
  PUBLIC PARK                B        2.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.90      0.30     0.200    56
  COMMERCIAL                 B        1.70      0.30     0.100    56
  PUBLIC PARK                B        1.80      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        6.20      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.294
  SUBAREA AREA(ACRES) =   21.60      SUBAREA RUNOFF(CFS) =   58.82
  EFFECTIVE AREA(ACRES) =     72.10   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       72.1       PEAK FLOW RATE(CFS) =     194.49

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   625.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =  1029.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.59
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     194.49
  PIPE TRAVEL TIME(MIN.) =   1.26    Tc(MIN.) =   11.92
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =    2503.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.92
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.921
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.10      0.30     0.100    56
  PUBLIC PARK                B        1.80      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.00      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        5.00      0.30     0.400    56
  COMMERCIAL                 B        2.80      0.30     0.100    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.367
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   34.41
  EFFECTIVE AREA(ACRES) =     85.70   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       85.7       PEAK FLOW RATE(CFS) =     216.41

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.92
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.921
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.80      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.20      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.280
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    7.66
  EFFECTIVE AREA(ACRES) =     88.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       88.7       PEAK FLOW RATE(CFS) =     224.07

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 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.) =   11.92
  RAINFALL INTENSITY(INCH/HR) =   2.92
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.38
  EFFECTIVE STREAM AREA(ACRES) =      88.70
  TOTAL STREAM AREA(ACRES) =      88.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     224.07

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    307.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   317.00
  ELEVATION DATA: UPSTREAM(FEET) =    646.00  DOWNSTREAM(FEET) =    645.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   15.296
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.426
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.40      0.30     0.850    56   15.30
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56   15.42
  PUBLIC PARK                B        1.50      0.30     0.850    56   15.30
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56   15.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.857
  SUBAREA RUNOFF(CFS) =      4.29
  TOTAL AREA(ACRES) =      2.20   PEAK FLOW RATE(CFS) =      4.29

********************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.10 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  645.00  DOWNSTREAM ELEVATION(FEET) =  641.00
  STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       8.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.54
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   2.46   Tc(MIN.) =   17.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.215
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
```



```
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.40      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.649
  SUBAREA AREA(ACRES) =    4.20      SUBAREA RUNOFF(CFS) =    7.64
  EFFECTIVE AREA(ACRES) =      6.40    AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =        6.4        PEAK FLOW RATE(CFS) =      11.52

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.57
  FLOW VELOCITY(FEET/SEC.) =  2.76   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    307.10 =     692.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    307.10 TO NODE    308.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  641.00  DOWNSTREAM ELEVATION(FEET) =  635.00
  STREET LENGTH(FEET) =   506.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      18.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   17.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.21
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.52
  STREET FLOW TRAVEL TIME(MIN.) =   2.63   Tc(MIN.) =   20.39
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.004
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.00      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.80      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.554
  SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =   14.06
  EFFECTIVE AREA(ACRES) =     14.90    AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.63
```

```
  TOTAL AREA(ACRES) =       14.9        PEAK FLOW RATE(CFS) =      24.36

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.41
  FLOW VELOCITY(FEET/SEC.) =  3.42   DEPTH*VELOCITY(FT*FT/SEC.) =   1.74
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    308.00 =    1198.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   635.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =  1516.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.95
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.36
  PIPE TRAVEL TIME(MIN.) =   2.82    Tc(MIN.) =   23.21
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    305.00 =    2714.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.21
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.856
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.20      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.20      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.80      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.50      0.30     0.400    56
  SCHOOL                     B        0.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.289
  SUBAREA AREA(ACRES) =    5.00      SUBAREA RUNOFF(CFS) =    7.96
  EFFECTIVE AREA(ACRES) =     19.90   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       19.9       PEAK FLOW RATE(CFS) =      30.34

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.21
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.856
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  COMMERCIAL                 B        1.20      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.00      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        6.60      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.415
  SUBAREA AREA(ACRES) =   14.60      SUBAREA RUNOFF(CFS) =   22.76
  EFFECTIVE AREA(ACRES) =     34.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       34.5       PEAK FLOW RATE(CFS) =      53.10

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.21
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.856
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  SCHOOL                     B        0.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.30
  EFFECTIVE AREA(ACRES) =     34.70   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       34.7       PEAK FLOW RATE(CFS) =      53.40

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 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.) =   23.21
  RAINFALL INTENSITY(INCH/HR) =   1.86
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =      34.70
  TOTAL STREAM AREA(ACRES) =      34.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      53.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      224.07   11.92    2.921  0.30( 0.11) 0.38      88.7     300.00
      2       53.40   23.21    1.856  0.30( 0.15) 0.49      34.7     306.00
```

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      268.57   11.92    2.921  0.30( 0.12) 0.40     106.5     300.00
      2      192.46   23.21    1.856  0.30( 0.12) 0.41     123.4     306.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     268.57    Tc(MIN.) =    11.92
  EFFECTIVE AREA(ACRES) =     106.52   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      123.4
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    305.00 =    2714.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    310.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   615.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =  2954.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  36.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.31
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     268.57
  PIPE TRAVEL TIME(MIN.) =   1.87    Tc(MIN.) =   13.79
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    310.00 =    5668.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.79
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.636
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        4.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.20      0.30     0.600    56
  COMMERCIAL                 B        2.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.164
  SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =   18.16
  EFFECTIVE AREA(ACRES) =    114.32   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      131.2       PEAK FLOW RATE(CFS) =     268.57
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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



```
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.79
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.636
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  PUBLIC PARK                B        2.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        6.40      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.60      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.371
  SUBAREA AREA(ACRES) =   12.30      SUBAREA RUNOFF(CFS) =   27.94
  EFFECTIVE AREA(ACRES) =    126.62   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      143.5       PEAK FLOW RATE(CFS) =     287.29

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.79
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.636
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.80      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B       10.20      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.50      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.514
  SUBAREA AREA(ACRES) =   19.50      SUBAREA RUNOFF(CFS) =   43.55
  EFFECTIVE AREA(ACRES) =    146.12   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      163.0       PEAK FLOW RATE(CFS) =     330.84

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =  1056.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  39.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.96
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     330.84
  PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   14.42
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    311.00 =    6724.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.42
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.540
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.60      0.30     0.100    56
  COMMERCIAL                 B        3.60      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.10      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.80      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.191
  SUBAREA AREA(ACRES) =   15.10      SUBAREA RUNOFF(CFS) =   33.73
  EFFECTIVE AREA(ACRES) =    161.22   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      178.1       PEAK FLOW RATE(CFS) =     351.94

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.42
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.540
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        6.70      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    6.70      SUBAREA RUNOFF(CFS) =   14.23
  EFFECTIVE AREA(ACRES) =    167.92   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =      184.8       PEAK FLOW RATE(CFS) =     366.17

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  31
```



```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   373.00
  FLOW LENGTH(FEET) =  1373.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  42.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.22
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     366.17
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   15.26
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    312.00 =    8097.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.26
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.429
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.50      0.30     0.100    56
  COMMERCIAL                 B        4.50      0.30     0.100    56
  APARTMENTS                 B        3.40      0.30     0.200    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.157
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   21.43
  EFFECTIVE AREA(ACRES) =    177.92   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      194.8       PEAK FLOW RATE(CFS) =     370.86

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.26
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.429
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.567
  SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    1.22
  EFFECTIVE AREA(ACRES) =    178.52   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
```

```
  TOTAL AREA(ACRES) =      195.4       PEAK FLOW RATE(CFS) =     372.08

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    339.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   373.00  DOWNSTREAM(FEET) =   301.00
  FLOW LENGTH(FEET) =  1370.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  39.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.29
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     372.08
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =   16.01
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    339.00 =    9467.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    390.00 TO NODE    391.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   317.00
  ELEVATION DATA: UPSTREAM(FEET) =    860.00  DOWNSTREAM(FEET) =    775.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.195
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.491
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.20      0.30     1.000    72    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.20      0.30     1.000    66    9.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.02
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      4.02

****************************************************************************
  FLOW PROCESS FROM NODE    391.00 TO NODE    392.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```



```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    775.00  DOWNSTREAM(FEET) =    700.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   545.00   CHANNEL SLOPE =  0.1376
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.110
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        1.70      0.30     1.000    72
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.60      0.30     1.000    72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.93
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.10
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   1.49
  Tc(MIN.) =   10.68
  SUBAREA AREA(ACRES) =     2.30       SUBAREA RUNOFF(CFS) =    5.82
  EFFECTIVE AREA(ACRES) =      3.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       9.36

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.69   FLOW VELOCITY(FEET/SEC.) =   6.56
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    392.00 =     862.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    392.00 TO NODE    393.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    700.00  DOWNSTREAM(FEET) =    635.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1093.00   CHANNEL SLOPE =  0.0595
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.688
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.40      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        8.40      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.70      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.40      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        9.20      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.60      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      33.87
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.58
```

```
  AVERAGE FLOW DEPTH(FEET) =   1.31   TRAVEL TIME(MIN.) =   2.77
  Tc(MIN.) =   13.45
  SUBAREA AREA(ACRES) =    22.70       SUBAREA RUNOFF(CFS) =   48.78
  EFFECTIVE AREA(ACRES) =     26.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       26.4         PEAK FLOW RATE(CFS) =      56.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.59   FLOW VELOCITY(FEET/SEC.) =   7.48
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    393.00 =    1955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    393.00 TO NODE    394.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    635.00  DOWNSTREAM(FEET) =    598.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   904.00   CHANNEL SLOPE =  0.0409
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.398
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.60      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        5.50      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.80      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.60      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.00      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        6.80      0.30     1.000    72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      73.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.95
  AVERAGE FLOW DEPTH(FEET) =   1.87   TRAVEL TIME(MIN.) =   2.17
  Tc(MIN.) =   15.62
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   32.67
  EFFECTIVE AREA(ACRES) =     43.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       43.7         PEAK FLOW RATE(CFS) =      82.52

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.96   FLOW VELOCITY(FEET/SEC.) =   7.18
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    394.00 =    2859.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    394.00 TO NODE    394.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.62
```



```
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.398
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.50      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =     2.60      SUBAREA RUNOFF(CFS) =    4.91
  EFFECTIVE AREA(ACRES) =     46.30   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       46.3       PEAK FLOW RATE(CFS) =      87.43

****************************************************************************
  FLOW PROCESS FROM NODE    394.00 TO NODE    395.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    598.00  DOWNSTREAM(FEET) =    573.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   664.00   CHANNEL SLOPE =  0.0377
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.270
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        6.30      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        5.90      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.80      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.50      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.20      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.996
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     105.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.38
  AVERAGE FLOW DEPTH(FEET) =   2.18   TRAVEL TIME(MIN.) =   1.50
  Tc(MIN.) =   17.12
  SUBAREA AREA(ACRES) =    20.60       SUBAREA RUNOFF(CFS) =   36.55
  EFFECTIVE AREA(ACRES) =     66.90     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       66.9         PEAK FLOW RATE(CFS) =     118.65

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.28   FLOW VELOCITY(FEET/SEC.) =   7.58
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    395.00 =    3523.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    395.00 IS CODE =  81
```

```
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   17.12
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.270
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B       12.60      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.10      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.987
  SUBAREA AREA(ACRES) =   18.20      SUBAREA RUNOFF(CFS) =   32.34
  EFFECTIVE AREA(ACRES) =     85.10   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       85.1       PEAK FLOW RATE(CFS) =     150.99

******************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    370.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   573.00  DOWNSTREAM(FEET) =   389.00
  FLOW LENGTH(FEET) =  5717.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.09
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     150.99
  PIPE TRAVEL TIME(MIN.) =   4.74    Tc(MIN.) =   21.86
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    370.00 =    9240.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    370.00 TO NODE    371.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    389.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1996.00   CHANNEL SLOPE =  0.0220
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.686
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                    B        2.90      0.30     1.000    69
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.40      0.30     1.000    63
  COMMERCIAL                 B        0.50      0.30     0.100    56
  NATURAL FAIR COVER
```



```
  "GRASS"                    B        6.60      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.60      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        6.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.956
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     166.19
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.75
  AVERAGE FLOW DEPTH(FEET) =   2.86   TRAVEL TIME(MIN.) =   4.93
  Tc(MIN.) =   26.79
  SUBAREA AREA(ACRES) =    24.10       SUBAREA RUNOFF(CFS) =   30.35
  EFFECTIVE AREA(ACRES) =    109.20     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.99
  TOTAL AREA(ACRES) =      109.2         PEAK FLOW RATE(CFS) =     150.99
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.76   FLOW VELOCITY(FEET/SEC.) =   6.61
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    371.00 =   11236.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   26.79
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.686
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.10      0.30     1.000    63
  COMMERCIAL                 B        1.10      0.30     0.100    56
  NATURAL FAIR COVER
  "GRASS"                    B        2.00      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.40      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.830
  SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =    9.18
  EFFECTIVE AREA(ACRES) =    116.30   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =      116.3       PEAK FLOW RATE(CFS) =     150.99
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

******************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   26.79
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.686
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.70      0.30      0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        0.20      0.30      1.000    65
  PUBLIC PARK                 B        0.10      0.30      0.850    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B        0.10      0.30      0.500    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        3.00      0.30      1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        1.40      0.30      1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.975
  SUBAREA AREA(ACRES) =    5.50      SUBAREA RUNOFF(CFS) =    6.90
  EFFECTIVE AREA(ACRES) =    121.80   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =      121.8       PEAK FLOW RATE(CFS) =     152.65

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   26.79
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.686
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        1.40      0.30      0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        0.10      0.30      1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.907
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    1.91
  EFFECTIVE AREA(ACRES) =    123.30   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =      123.3       PEAK FLOW RATE(CFS) =     154.56

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    372.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   345.00  DOWNSTREAM(FEET) =   301.00
  FLOW LENGTH(FEET) =   488.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.95
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     154.56
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   27.06
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    372.00 =   11724.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    372.00 TO NODE    373.00 IS CODE =  56
```



```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    301.00  DOWNSTREAM(FEET) =    300.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   924.00   CHANNEL SLOPE =  0.0011
  GIVEN CHANNEL BASE(FEET) =   30.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   3.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.478
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B       32.30      0.30      0.100    56
  COMMERCIAL                  B        2.70      0.30      0.100    56
  COMMERCIAL                  B        0.60      0.30      0.100    56
  COMMERCIAL                  B        1.80      0.30      0.100    56
  PUBLIC PARK                 B        7.20      0.30      0.850    56
  PUBLIC PARK                 B        9.80      0.30      0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.334
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     188.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.41
  AVERAGE FLOW DEPTH(FEET) =   2.15   TRAVEL TIME(MIN.) =   6.40
  Tc(MIN.) =   33.46
  SUBAREA AREA(ACRES) =    54.40       SUBAREA RUNOFF(CFS) =   67.45
  EFFECTIVE AREA(ACRES) =    177.70     AREA-AVERAGED Fm(INCH/HR) =   0.23
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.78
  TOTAL AREA(ACRES) =      177.7         PEAK FLOW RATE(CFS) =     198.93
  GIVEN CHANNEL BASE(FEET) =   30.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   3.22

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.22   FLOW VELOCITY(FEET/SEC.) =   2.45
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    373.00 =   12648.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    373.00 TO NODE    373.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   33.46
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.478
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 B        2.60      0.30      0.850    56
  PUBLIC PARK                 B        2.10      0.30      0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        3.50      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        4.80      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        3.60      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.80      0.30      0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.886
  SUBAREA AREA(ACRES) =   17.40      SUBAREA RUNOFF(CFS) =   18.98
  EFFECTIVE AREA(ACRES) =    195.10   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =      195.1       PEAK FLOW RATE(CFS) =     217.91

****************************************************************************
  FLOW PROCESS FROM NODE    373.00 TO NODE    374.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   300.00  DOWNSTREAM(FEET) =   298.00
  FLOW LENGTH(FEET) =  1188.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  81.0 INCH PIPE IS  64.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.18
  ESTIMATED PIPE DIAMETER(INCH) =  81.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     217.91
  PIPE TRAVEL TIME(MIN.) =   2.76    Tc(MIN.) =   36.21
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    321.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    622.00  DOWNSTREAM(FEET) =    621.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.511
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.136
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                B        1.50      0.30     0.200    56   10.51
  APARTMENTS                B        2.00      0.30     0.200    56   10.51
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      9.69
  TOTAL AREA(ACRES) =      3.50   PEAK FLOW RATE(CFS) =      9.69

****************************************************************************
  FLOW PROCESS FROM NODE    321.00 TO NODE    322.00 IS CODE =  62
----------------------------------------------------------------------------
```



```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  621.00  DOWNSTREAM ELEVATION(FEET) =  612.00
  STREET LENGTH(FEET) =   569.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      16.16
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.51
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.52
  STREET FLOW TRAVEL TIME(MIN.) =   2.75   Tc(MIN.) =   13.26
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.717
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        2.20      0.30     0.200    56
  APARTMENTS                B        3.20      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =   12.91
  EFFECTIVE AREA(ACRES) =      8.90    AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        8.9        PEAK FLOW RATE(CFS) =      21.28

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.38
  FLOW VELOCITY(FEET/SEC.) =  3.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.74
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    322.00 =     899.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    324.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  612.00  DOWNSTREAM ELEVATION(FEET) =  590.00
  STREET LENGTH(FEET) =   891.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      33.15
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   18.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.44
  STREET FLOW TRAVEL TIME(MIN.) =   3.04   Tc(MIN.) =   16.30
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.340
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.00      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        5.70      0.30     0.400    56
  CONDOMINIUMS               B        1.20      0.30     0.350    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.420
  SUBAREA AREA(ACRES) =   11.90      SUBAREA RUNOFF(CFS) =   23.71
  EFFECTIVE AREA(ACRES) =     20.80    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       20.8        PEAK FLOW RATE(CFS) =      41.97

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.82
  FLOW VELOCITY(FEET/SEC.) =  5.16   DEPTH*VELOCITY(FT*FT/SEC.) =   2.76
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    324.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.30
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.340
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.70      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    3.53
  EFFECTIVE AREA(ACRES) =     22.50   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      45.50

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    325.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   590.00  DOWNSTREAM(FEET) =   575.00
```



```
  FLOW LENGTH(FEET) =   529.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.12
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      45.50
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =   16.93
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    325.00 =    2319.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.93
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.286
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.30      0.30     0.600    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.544
  SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =   13.76
  EFFECTIVE AREA(ACRES) =     29.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =       29.7       PEAK FLOW RATE(CFS) =      58.18

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    325.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.93
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.286
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.80      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       10.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.606
  SUBAREA AREA(ACRES) =   15.30      SUBAREA RUNOFF(CFS) =   28.98
  EFFECTIVE AREA(ACRES) =     45.00   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       45.0       PEAK FLOW RATE(CFS) =      87.16

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    326.00 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) =   515.00
  FLOW LENGTH(FEET) =   284.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  35.45
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      87.16
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   17.06
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    326.00 =    2603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.06
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.275
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.70      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.80      0.30     0.900    56
  COMMERCIAL                 B        1.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.582
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =   10.21
  EFFECTIVE AREA(ACRES) =     50.40   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       50.4       PEAK FLOW RATE(CFS) =      96.90

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.06
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.275
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.80      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.557
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =    9.30
  EFFECTIVE AREA(ACRES) =     55.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       55.3       PEAK FLOW RATE(CFS) =     106.20
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    333.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   500.00
  FLOW LENGTH(FEET) =  1644.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  35.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.30
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     106.20
  PIPE TRAVEL TIME(MIN.) =   2.42    Tc(MIN.) =   19.49
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    333.00 =    4247.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.49
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.068
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
  COMMERCIAL                 B        1.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  COMMERCIAL                 B        5.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.467
  SUBAREA AREA(ACRES) =   14.40      SUBAREA RUNOFF(CFS) =   24.99
  EFFECTIVE AREA(ACRES) =     69.70   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       69.7       PEAK FLOW RATE(CFS) =     120.88

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.49
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.068
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.34
  EFFECTIVE AREA(ACRES) =     69.90   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
```

```
  TOTAL AREA(ACRES) =       69.9       PEAK FLOW RATE(CFS) =     121.22

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 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.) =   19.49
  RAINFALL INTENSITY(INCH/HR) =   2.07
  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      69.90
  TOTAL STREAM AREA(ACRES) =      69.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     121.22

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.50 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =    615.00  DOWNSTREAM(FEET) =    614.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.844
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.267
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.40      0.30     0.100    56    9.84
  PUBLIC PARK                B        0.20      0.30     0.850    56   15.64
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.10      0.30     0.400    56   12.11
  COMMERCIAL                 B        0.10      0.30     0.100    56    9.84
  PUBLIC PARK                B        0.10      0.30     0.850    56   15.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.383
  SUBAREA RUNOFF(CFS) =      2.55
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.55

****************************************************************************
  FLOW PROCESS FROM NODE    327.50 TO NODE    328.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  614.00  DOWNSTREAM ELEVATION(FEET) =  610.00
  STREET LENGTH(FEET) =   425.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```



```
  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) =       6.40
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   3.09   Tc(MIN.) =   12.93
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.766
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.00      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.348
  SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    7.67
  EFFECTIVE AREA(ACRES) =      4.10    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        4.1        PEAK FLOW RATE(CFS) =       9.81

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.02
  FLOW VELOCITY(FEET/SEC.) =  2.52   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    328.00 =     754.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    329.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  610.00  DOWNSTREAM ELEVATION(FEET) =  595.00
  STREET LENGTH(FEET) =   366.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      16.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
```

```
   HALFSTREET FLOOD WIDTH(FEET) =   12.85
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.03
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.97
 STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =   14.15
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.581
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.10      0.30     0.100    56
 PUBLIC PARK                B        0.20      0.30     0.850    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        3.10      0.30     0.400    56
 COMMERCIAL                 B        0.50      0.30     0.100    56
 PUBLIC PARK                B        0.30      0.30     0.850    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.10      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.407
 SUBAREA AREA(ACRES) =    6.30      SUBAREA RUNOFF(CFS) =   13.94
 EFFECTIVE AREA(ACRES) =     10.40    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
 TOTAL AREA(ACRES) =       10.4        PEAK FLOW RATE(CFS) =      23.08

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.73
 FLOW VELOCITY(FEET/SEC.) =  5.42   DEPTH*VELOCITY(FT*FT/SEC.) =   2.30
 LONGEST FLOWPATH FROM NODE    327.00 TO NODE    329.00 =    1120.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.15
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.581
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.80      0.30     0.400    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        6.10      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.402
 SUBAREA AREA(ACRES) =    9.00      SUBAREA RUNOFF(CFS) =   19.93
 EFFECTIVE AREA(ACRES) =     19.40   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
 TOTAL AREA(ACRES) =       19.4       PEAK FLOW RATE(CFS) =      43.01

****************************************************************************
 FLOW PROCESS FROM NODE    329.00 TO NODE    330.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   595.00  DOWNSTREAM(FEET) =   575.00
```



```
 FLOW LENGTH(FEET) =   378.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.71
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      43.01
 PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   14.50
 LONGEST FLOWPATH FROM NODE    327.00 TO NODE    330.00 =    1498.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.50
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.527
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.90      0.30     0.850    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        4.10      0.30     0.600    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.50      0.30     0.400    56
 COMMERCIAL                 B        0.60      0.30     0.100    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B       10.20      0.30     0.600    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        0.90      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.561
 SUBAREA AREA(ACRES) =   19.20      SUBAREA RUNOFF(CFS) =   40.76
 EFFECTIVE AREA(ACRES) =     38.60   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =       38.6       PEAK FLOW RATE(CFS) =      82.82

****************************************************************************
 FLOW PROCESS FROM NODE    330.00 TO NODE    331.00 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) =   555.00
 FLOW LENGTH(FEET) =   457.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.58
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      82.82
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   14.89
 LONGEST FLOWPATH FROM NODE    327.00 TO NODE    331.00 =    1955.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.89
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.468
 SUBAREA LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        1.10      0.30      0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.80      0.30      0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B       10.50      0.30      0.600    56
 COMMERCIAL                 B        0.30      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.50      0.30      0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B       13.70      0.30      0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.619
 SUBAREA AREA(ACRES) =   26.90      SUBAREA RUNOFF(CFS) =   55.25
 EFFECTIVE AREA(ACRES) =     65.50   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
 TOTAL AREA(ACRES) =       65.5       PEAK FLOW RATE(CFS) =     136.01

****************************************************************************
 FLOW PROCESS FROM NODE    331.00 TO NODE    332.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   555.00  DOWNSTREAM(FEET) =   520.00
 FLOW LENGTH(FEET) =   324.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  31.01
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     136.01
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   15.06
 LONGEST FLOWPATH FROM NODE    327.00 TO NODE    332.00 =    2279.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    332.00 TO NODE    332.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.06
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.446
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.10      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.10      0.30      0.900    56
 COMMERCIAL                 B        3.70      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        5.00      0.30      0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.621
 SUBAREA AREA(ACRES) =   10.90      SUBAREA RUNOFF(CFS) =   22.16
 EFFECTIVE AREA(ACRES) =     76.40   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =       76.4       PEAK FLOW RATE(CFS) =     156.86

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



```
 FLOW PROCESS FROM NODE    332.00 TO NODE    333.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   520.00  DOWNSTREAM(FEET) =   500.00
 FLOW LENGTH(FEET) =  1740.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  51.0 INCH PIPE IS  38.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.72
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     156.86
 PIPE TRAVEL TIME(MIN.) =   2.11    Tc(MIN.) =   17.18
 LONGEST FLOWPATH FROM NODE    327.00 TO NODE    333.00 =    4019.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.18
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.265
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.20      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        4.40      0.30      0.900    56
 COMMERCIAL                 B        3.90      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        9.80      0.30      0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.689
 SUBAREA AREA(ACRES) =   19.30      SUBAREA RUNOFF(CFS) =   35.76
 EFFECTIVE AREA(ACRES) =     95.70   AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.58
 TOTAL AREA(ACRES) =       95.7       PEAK FLOW RATE(CFS) =     180.20

****************************************************************************
 FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 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.) =   17.18
 RAINFALL INTENSITY(INCH/HR) =   2.27
 AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.58
 EFFECTIVE STREAM AREA(ACRES) =      95.70
 TOTAL STREAM AREA(ACRES) =      95.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     180.20

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      121.22   19.49    2.068  0.30( 0.14) 0.47      69.9     320.00
```

```
     2      180.20   17.18    2.265  0.30( 0.17) 0.58      95.7     327.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      298.00   17.18    2.265  0.30( 0.16) 0.53     157.3     327.00
      2      284.44   19.49    2.068  0.30( 0.16) 0.53     165.6     320.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     298.00    Tc(MIN.) =    17.18
  EFFECTIVE AREA(ACRES) =     157.32   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      165.6
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    333.00 =    4247.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    334.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   819.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  39.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.38
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     298.00
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   17.72
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    334.00 =    5066.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.72
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.219
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        4.00      0.30     0.200    56
  COMMERCIAL                 B        2.30      0.30     0.100    56
  COMMERCIAL                 B        1.00      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  PUBLIC PARK                B        2.40      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.50      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.310
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   26.03
  EFFECTIVE AREA(ACRES) =    170.92   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      179.2       PEAK FLOW RATE(CFS) =     317.52

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



```
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.72
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.219
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.00      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.60      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.10      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.330
  SUBAREA AREA(ACRES) =    5.70      SUBAREA RUNOFF(CFS) =   10.88
  EFFECTIVE AREA(ACRES) =    176.62   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      184.9       PEAK FLOW RATE(CFS) =     328.40

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 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.) =   17.72
  RAINFALL INTENSITY(INCH/HR) =   2.22
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =     176.62
  TOTAL STREAM AREA(ACRES) =     184.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     328.40

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    351.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    492.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.730
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.103
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.80      0.30     0.600    56   10.73
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.70      0.30     0.600    56   10.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      6.58
  TOTAL AREA(ACRES) =      2.50   PEAK FLOW RATE(CFS) =      6.58

****************************************************************************
  FLOW PROCESS FROM NODE    351.00 TO NODE    352.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  492.00  DOWNSTREAM ELEVATION(FEET) =  488.00
  STREET LENGTH(FEET) =   456.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      10.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.65
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.06
  STREET FLOW TRAVEL TIME(MIN.) =   3.03   Tc(MIN.) =   13.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.640
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.20      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.40      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    7.97
  EFFECTIVE AREA(ACRES) =      6.10    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        6.1        PEAK FLOW RATE(CFS) =      13.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.21
  FLOW VELOCITY(FEET/SEC.) =  2.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    352.00 =     786.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    352.00 TO NODE    353.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   488.00  DOWNSTREAM(FEET) =   485.00
  FLOW LENGTH(FEET) =   883.00   MANNING'S N =  0.013
```



```
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.77
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.50
  PIPE TRAVEL TIME(MIN.) =   3.08    Tc(MIN.) =   16.85
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    353.00 =    1669.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    353.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.85
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.293
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.50      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.10      0.30     0.400    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.60      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.50      0.30     0.400    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.70      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.471
  SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =   16.46
  EFFECTIVE AREA(ACRES) =     14.60   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       14.6       PEAK FLOW RATE(CFS) =      28.06

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    353.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.85
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.293
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.59
  EFFECTIVE AREA(ACRES) =     14.90   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       14.9       PEAK FLOW RATE(CFS) =      28.65

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    334.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =  1136.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.04
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.65
  PIPE TRAVEL TIME(MIN.) =   1.89    Tc(MIN.) =   18.73
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    334.00 =    2805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.73
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.132
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        2.00      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.40      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.50      0.30     0.400    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  PUBLIC PARK                B        1.50      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =   13.89
  EFFECTIVE AREA(ACRES) =     22.70   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       22.7       PEAK FLOW RATE(CFS) =      40.38

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.73
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.132
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.10      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.40      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.262
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    8.32
  EFFECTIVE AREA(ACRES) =     27.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       27.2       PEAK FLOW RATE(CFS) =      48.69

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



```
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.73
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.132
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.20      0.30     0.600    56
  PUBLIC PARK                B        2.70      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        7.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.674
  SUBAREA AREA(ACRES) =   12.00      SUBAREA RUNOFF(CFS) =   20.84
  EFFECTIVE AREA(ACRES) =     39.20   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       39.2       PEAK FLOW RATE(CFS) =      69.54

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.73
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.132
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  SCHOOL                     B        3.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.626
  SUBAREA AREA(ACRES) =    3.80      SUBAREA RUNOFF(CFS) =    6.65
  EFFECTIVE AREA(ACRES) =     43.00   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       43.0       PEAK FLOW RATE(CFS) =      76.19

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 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.) =   18.73
  RAINFALL INTENSITY(INCH/HR) =   2.13
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30
```

```
 AREA-AVERAGED Ap =  0.54
 EFFECTIVE STREAM AREA(ACRES) =      43.00
 TOTAL STREAM AREA(ACRES) =      43.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      76.19

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      328.40   17.72    2.219  0.30( 0.15) 0.51     176.6     327.00
     1      311.18   20.03    2.023  0.30( 0.15) 0.51     184.9     320.00
     2       76.19   18.73    2.132  0.30( 0.16) 0.54      43.0     350.00

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      403.62   17.72    2.219  0.30( 0.16) 0.52     217.3     327.00
     2      396.99   18.73    2.132  0.30( 0.15) 0.52     223.3     350.00
     3      383.13   20.03    2.023  0.30( 0.15) 0.52     227.9     320.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     403.62    Tc(MIN.) =    17.72
 EFFECTIVE AREA(ACRES) =     217.28   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
 TOTAL AREA(ACRES) =      227.9
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    334.00 =    5066.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    334.00 TO NODE    335.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   422.00
 FLOW LENGTH(FEET) =  1086.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  28.36
 ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     403.62
 PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   18.35
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    335.00 =    6152.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    335.00 TO NODE    335.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   18.35
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.165
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        3.00      0.30     0.100    56
 COMMERCIAL                 B        4.20      0.30     0.100    56
 PUBLIC PARK                B        0.60      0.30     0.850    56
 PUBLIC PARK                B       10.80      0.30     0.850    56
```



```
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.00      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        3.90      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.631
 SUBAREA AREA(ACRES) =   23.50      SUBAREA RUNOFF(CFS) =   41.78
 EFFECTIVE AREA(ACRES) =    240.78   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =      251.4       PEAK FLOW RATE(CFS) =     434.74

****************************************************************************
 FLOW PROCESS FROM NODE    335.00 TO NODE    335.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   18.35
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.165
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        9.20      0.30     0.500    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.90      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.474
 SUBAREA AREA(ACRES) =   13.10      SUBAREA RUNOFF(CFS) =   23.84
 EFFECTIVE AREA(ACRES) =    253.88   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =      264.5       PEAK FLOW RATE(CFS) =     458.59

****************************************************************************
 FLOW PROCESS FROM NODE    335.00 TO NODE    336.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   422.00  DOWNSTREAM(FEET) =   380.00
 FLOW LENGTH(FEET) =   780.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  57.0 INCH PIPE IS  43.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  32.00
 ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     458.59
 PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   18.76
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    336.00 =    6932.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   18.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.130
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.70      0.30     0.100    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  COMMERCIAL                 B        1.60      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.70      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.60      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.182
  SUBAREA AREA(ACRES) =   12.30      SUBAREA RUNOFF(CFS) =   22.97
  EFFECTIVE AREA(ACRES) =    266.18   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      276.8       PEAK FLOW RATE(CFS) =     473.64

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   18.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.130
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.40      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       16.80      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.611
  SUBAREA AREA(ACRES) =   22.20      SUBAREA RUNOFF(CFS) =   38.89
  EFFECTIVE AREA(ACRES) =    288.38   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      299.0       PEAK FLOW RATE(CFS) =     512.53

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   18.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.130
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        6.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    6.30      SUBAREA RUNOFF(CFS) =   11.40
  EFFECTIVE AREA(ACRES) =    294.68   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      305.3       PEAK FLOW RATE(CFS) =     523.92

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    337.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   380.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =   803.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  49.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.62
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     523.92
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   19.23
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    337.00 =    7735.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   19.23
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.090
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.40      0.30     0.200    56
  APARTMENTS                 B        3.00      0.30     0.200    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  COMMERCIAL                 B        2.70      0.30     0.100    56
  COMMERCIAL                 B        6.00      0.30     0.100    56
  PUBLIC PARK                B        1.30      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.189
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =   26.90
  EFFECTIVE AREA(ACRES) =    309.38   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      320.0       PEAK FLOW RATE(CFS) =     540.23

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   19.23
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.090
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        3.30      0.30      0.850    56
 PUBLIC PARK                B        1.50      0.30      0.850    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        2.50      0.30      0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        6.70      0.30      0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.20      0.30      0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.10      0.30      0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.488
 SUBAREA AREA(ACRES) =   16.30      SUBAREA RUNOFF(CFS) =   28.51
 EFFECTIVE AREA(ACRES) =    325.68   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =      336.3       PEAK FLOW RATE(CFS) =     568.74

****************************************************************************
 FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.23
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.090
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.60      0.30      0.600    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        4.60      0.30      0.400    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.90      0.30      0.400    56
 SCHOOL                     B        0.20      0.30      0.600    56
 SCHOOL                     B        5.90      0.30      0.600    56
 SCHOOL                     B        6.00      0.30      0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.526
 SUBAREA AREA(ACRES) =   20.20      SUBAREA RUNOFF(CFS) =   35.13
 EFFECTIVE AREA(ACRES) =    345.88   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =      356.5       PEAK FLOW RATE(CFS) =     603.87

****************************************************************************
 FLOW PROCESS FROM NODE    337.00 TO NODE    338.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   332.00
 FLOW LENGTH(FEET) =   838.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  75.0 INCH PIPE IS  56.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  24.28
 ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     603.87
 PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   19.80
```



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 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    338.00 =    8573.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.80
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.041
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 APARTMENTS                 B        6.90      0.30      0.200    56
 COMMERCIAL                 B        2.80      0.30      0.100    56
 COMMERCIAL                 B       11.50      0.30      0.100    56
 COMMERCIAL                 B        4.70      0.30      0.100    56
 COMMERCIAL                 B        8.60      0.30      0.100    56
 PUBLIC PARK                B        2.60      0.30      0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.171
 SUBAREA AREA(ACRES) =   37.10      SUBAREA RUNOFF(CFS) =   66.43
 EFFECTIVE AREA(ACRES) =    382.98   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
 TOTAL AREA(ACRES) =      393.6       PEAK FLOW RATE(CFS) =     655.01

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.80
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.041
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.10      0.30      0.850    56
 PUBLIC PARK                B        0.60      0.30      0.850    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.30      0.30      0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        9.70      0.30      0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        1.20      0.30      0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        3.40      0.30      0.200    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.230
 SUBAREA AREA(ACRES) =   15.30      SUBAREA RUNOFF(CFS) =   27.15
 EFFECTIVE AREA(ACRES) =    398.28   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
 TOTAL AREA(ACRES) =      408.9       PEAK FLOW RATE(CFS) =     682.16

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.80
```

```
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.041
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        5.60      0.30     0.100    56
 COMMERCIAL                 B        3.60      0.30     0.100    56
 COMMERCIAL                 B        5.80      0.30     0.100    56
 SCHOOL                     B        0.80      0.30     0.600    56
 SCHOOL                     B        1.20      0.30     0.600    56
 SCHOOL                     B        4.50      0.30     0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.251
 SUBAREA AREA(ACRES) =   21.50      SUBAREA RUNOFF(CFS) =   38.03
 EFFECTIVE AREA(ACRES) =    419.78   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      430.4       PEAK FLOW RATE(CFS) =     720.19

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.80
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.041
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.48
 EFFECTIVE AREA(ACRES) =    420.08   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      430.7       PEAK FLOW RATE(CFS) =     720.67

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    339.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   332.00  DOWNSTREAM(FEET) =   301.00
 FLOW LENGTH(FEET) =  1956.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  84.0 INCH PIPE IS  65.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.55
 ESTIMATED PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     720.67
 PIPE TRAVEL TIME(MIN.) =   1.45    Tc(MIN.) =   21.25
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
```



```
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      720.67   21.25    1.959  0.30( 0.13) 0.45     420.1     327.00
     2      707.86   22.27    1.905  0.30( 0.13) 0.45     426.1     350.00
     3      688.72   23.63    1.835  0.30( 0.13) 0.45     430.7     320.00
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      372.08   16.01    2.364  0.30( 0.11) 0.38     178.5     300.00
     2      275.65   27.66    1.648  0.30( 0.12) 0.39     195.4     306.00
 LONGEST FLOWPATH FROM NODE    306.00 TO NODE    339.00 =    9467.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1     1035.98   16.01    2.364  0.30( 0.13) 0.42     495.1     300.00
     2     1049.41   21.25    1.959  0.30( 0.13) 0.43     606.2     327.00
     3     1028.10   22.27    1.905  0.30( 0.13) 0.43     613.7     350.00
     4      997.74   23.63    1.835  0.30( 0.13) 0.43     620.3     320.00
     5      888.80   27.66    1.648  0.30( 0.13) 0.43     626.1     306.00
   TOTAL AREA(ACRES) =       626.1

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     1049.41  Tc(MIN.) =   21.248
 EFFECTIVE AREA(ACRES) =    606.18  AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =      626.1
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    339.00 TO NODE    340.00 IS CODE =  56
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    301.00  DOWNSTREAM(FEET) =    300.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   196.00   CHANNEL SLOPE =  0.0051
 GIVEN CHANNEL BASE(FEET) =  300.00   CHANNEL FREEBOARD(FEET) =  1.0
 "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
 *ESTIMATED CHANNEL HEIGHT(FEET) =   2.01
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.911
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B       31.90      0.30     0.100    56
 COMMERCIAL                 B        2.30      0.30     0.100    56
 COMMERCIAL                 B        1.90      0.30     0.100    56
 COMMERCIAL                 B        1.00      0.30     0.100    56
 PUBLIC PARK                B        3.10      0.30     0.850    56
 PUBLIC PARK                B        0.80      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.171
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    1083.71
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.53
 AVERAGE FLOW DEPTH(FEET) =   1.01   TRAVEL TIME(MIN.) =   0.92
 Tc(MIN.) =   22.17
```

```
  SUBAREA AREA(ACRES) =    41.00       SUBAREA RUNOFF(CFS) =   68.60
  EFFECTIVE AREA(ACRES) =    647.18     AREA-AVERAGED Fm(INCH/HR) =   0.12
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.41
  TOTAL AREA(ACRES) =      667.1         PEAK FLOW RATE(CFS) =    1049.41
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
  GIVEN CHANNEL BASE(FEET) =  300.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   1.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.99   FLOW VELOCITY(FEET/SEC.) =   3.50
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    340.00 =   10725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    340.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.17
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.911
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.00      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.80      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.899
  SUBAREA AREA(ACRES) =    8.40      SUBAREA RUNOFF(CFS) =   12.41
  EFFECTIVE AREA(ACRES) =    655.58   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      675.5       PEAK FLOW RATE(CFS) =    1053.31

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1059.41   16.94    2.285  0.30( 0.12) 0.41     544.5     300.00
      2     1053.31   22.17    1.911  0.30( 0.13) 0.42     655.6     327.00
      3     1033.04   23.20    1.857  0.30( 0.13) 0.42     663.1     350.00
      4     1000.16   24.57    1.785  0.30( 0.13) 0.42     669.7     320.00
      5      899.50   28.64    1.606  0.30( 0.13) 0.42     675.5     306.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =    1059.41  Tc(MIN.) =   16.94
  AREA-AVERAGED Fm(INCH/HR) =  0.12  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.41  EFFECTIVE AREA(ACRES) =     544.52

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    374.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   300.00  DOWNSTREAM(FEET) =   298.00
```



```
  FLOW LENGTH(FEET) =   221.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN 108.0 INCH PIPE IS  83.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.14
  ESTIMATED PIPE DIAMETER(INCH) = 108.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    1059.41
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   17.13
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    374.00 =   10946.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1059.41   17.13    2.270  0.30( 0.12) 0.41     544.5     300.00
      2     1053.31   22.36    1.901  0.30( 0.13) 0.42     655.6     327.00
      3     1033.04   23.39    1.847  0.30( 0.13) 0.42     663.1     350.00
      4     1000.16   24.76    1.776  0.30( 0.13) 0.42     669.7     320.00
      5      899.50   28.83    1.597  0.30( 0.13) 0.42     675.5     306.00
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    374.00 =   10946.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      217.91   36.21    1.423  0.30( 0.24) 0.79     195.1     390.00
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1236.05   17.13    2.270  0.30( 0.14) 0.47     636.8     300.00
      2     1242.10   22.36    1.901  0.30( 0.14) 0.48     776.0     327.00
      3     1224.15   23.39    1.847  0.30( 0.14) 0.48     789.1     350.00
      4     1193.48   24.76    1.776  0.30( 0.14) 0.48     803.0     320.00
      5     1098.56   28.83    1.597  0.30( 0.15) 0.49     830.9     306.00
      6     1010.67   36.21    1.423  0.30( 0.15) 0.50     870.6     390.00
    TOTAL AREA(ACRES) =       870.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     1242.10  Tc(MIN.) =   22.356
  EFFECTIVE AREA(ACRES) =    776.03  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      870.6
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    380.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 298.00 DOWNSTREAM(FEET) = 261.00
FLOW LENGTH(FEET) = 1402.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 93.0 INCH PIPE IS 73.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 31.18
ESTIMATED PIPE DIAMETER(INCH) = 93.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1242.10
PIPE TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 23.11
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 380.00 = 15238.00 FEET.

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 870.6 TC(MIN.) = 23.11
EFFECTIVE AREA(ACRES) = 776.03 AREA-AVERAGED Fm(INCH/HR)= 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.476
PEAK FLOW RATE(CFS) = 1242.10

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1236.05	17.87	2.205	0.30(0.14)	0.47	636.8	300.00
2	1242.10	23.11	1.862	0.30(0.14)	0.48	776.0	327.00
3	1224.15	24.14	1.808	0.30(0.14)	0.48	789.1	350.00
4	1193.48	25.51	1.741	0.30(0.14)	0.48	803.0	320.00
5	1098.56	29.60	1.564	0.30(0.15)	0.49	830.9	306.00
6	1010.67	37.00	1.407	0.30(0.15)	0.50	870.6	390.00

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:

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 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA C                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 50-YR EV DECEMBER 2018 CCHIU                                         *
 **********************************************************************

  FILE NAME: 3C50EVRL.DAT
  TIME/DATE OF STUDY: 09:04 12/24/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  5.453
   2)   10.00;  3.490
   3)   15.00;  2.670
   4)   20.00;  2.230
   5)   25.00;  1.926
   6)   30.00;  1.733
   7)   40.00;  1.467
   8)   50.00;  1.305
   9)   60.00;  1.202
  10)   90.00;  0.999
  11)  120.00;  0.869
  12)  180.00;  0.747
  13)  360.00;  0.555
  14) 1200.00;  0.244
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   320.00
  ELEVATION DATA: UPSTREAM(FEET) =    640.00  DOWNSTREAM(FEET) =    634.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.766
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.760
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.20      0.30      0.100    56    6.77
  PUBLIC PARK                B        0.90      0.30      0.850    56   10.75
  COMMERCIAL                 B        0.30      0.30      0.100    56    6.77
  PUBLIC PARK                B        1.90      0.30      0.850    56   10.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.736
  SUBAREA RUNOFF(CFS) =     13.48
  TOTAL AREA(ACRES) =      3.30   PEAK FLOW RATE(CFS) =     13.48

**************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  634.00  DOWNSTREAM ELEVATION(FEET) =  630.00
  STREET LENGTH(FEET) =   503.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      29.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.57
    HALFSTREET FLOOD WIDTH(FEET) =   22.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.74
  STREET FLOW TRAVEL TIME(MIN.) =   2.74   Tc(MIN.) =    9.50
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.686
```

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.50	0.30	0.100	56
PUBLIC PARK	B	2.10	0.30	0.850	56
SCHOOL	B	4.60	0.30	0.600	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.40	0.30	0.850	56
SCHOOL	B	1.10	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.647
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 31.42
EFFECTIVE AREA(ACRES) = 13.30 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67
TOTAL AREA(ACRES) = 13.3 PEAK FLOW RATE(CFS) = 41.71

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.63 HALFSTREET FLOOD WIDTH(FEET) = 25.98
FLOW VELOCITY(FEET/SEC.) = 3.35 DEPTH*VELOCITY(FT*FT/SEC.) = 2.10
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 823.00 FEET.

****
FLOW PROCESS FROM NODE 302.00 TO NODE 302.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 9.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.686
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	1.00	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	9.30	0.30	0.200	56
PUBLIC PARK	B	0.40	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.30	0.30	0.200	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.276
SUBAREA AREA(ACRES) = 12.00 SUBAREA RUNOFF(CFS) = 38.91
EFFECTIVE AREA(ACRES) = 25.30 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 25.3 PEAK FLOW RATE(CFS) = 80.63

****
FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 625.00
FLOW LENGTH(FEET) = 651.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.90
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 80.63
PIPE TRAVEL TIME(MIN.) = 1.10 Tc(MIN.) = 10.60
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1474.00 FEET.

****
FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 10.60
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.392
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56
PUBLIC PARK	B	0.40	0.30	0.850	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.80	0.30	0.400	56
SCHOOL	B	1.30	0.30	0.600	56
COMMERCIAL	B	0.60	0.30	0.100	56
PUBLIC PARK	B	0.60	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.480
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 14.91
EFFECTIVE AREA(ACRES) = 30.40 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 88.85

****
FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 10.60
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.392
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.50	0.30	0.400	56
SCHOOL	B	5.20	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.520
SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 25.34
EFFECTIVE AREA(ACRES) = 39.10 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 39.1 PEAK FLOW RATE(CFS) = 114.19

****
FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 10.60
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.392
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.80	0.30	0.100	56
PUBLIC PARK	B	0.40	0.30	0.850	56
RESIDENTIAL					

```
  "11+ DWELLINGS/ACRE"       B        7.40      0.30     0.200    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.50      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.215
  SUBAREA AREA(ACRES) =   11.40      SUBAREA RUNOFF(CFS) =   34.14
  EFFECTIVE AREA(ACRES) =     50.50   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       50.5       PEAK FLOW RATE(CFS) =     148.33

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.60
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.392
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        4.70      0.30     0.100    56
  PUBLIC PARK                B        2.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.90      0.30     0.200    56
  COMMERCIAL                 B        1.70      0.30     0.100    56
  PUBLIC PARK                B        1.80      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        6.20      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.294
  SUBAREA AREA(ACRES) =   21.60      SUBAREA RUNOFF(CFS) =   64.23
  EFFECTIVE AREA(ACRES) =     72.10   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       72.1       PEAK FLOW RATE(CFS) =     212.56

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   625.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =  1029.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  43.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.98
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     212.56
  PIPE TRAVEL TIME(MIN.) =   1.23    Tc(MIN.) =   11.82
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =    2503.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.82
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.191
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.10      0.30     0.100    56
  PUBLIC PARK                B        1.80      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.00      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        5.00      0.30     0.400    56
  COMMERCIAL                 B        2.80      0.30     0.100    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.367
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   37.71
  EFFECTIVE AREA(ACRES) =     85.70   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       85.7       PEAK FLOW RATE(CFS) =     237.21

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.82
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.191
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.80      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.20      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.280
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    8.39
  EFFECTIVE AREA(ACRES) =     88.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       88.7       PEAK FLOW RATE(CFS) =     245.60

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 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.) =   11.82
  RAINFALL INTENSITY(INCH/HR) =   3.19
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.38
  EFFECTIVE STREAM AREA(ACRES) =      88.70
  TOTAL STREAM AREA(ACRES) =      88.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     245.60

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    307.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   317.00
  ELEVATION DATA: UPSTREAM(FEET) =    646.00  DOWNSTREAM(FEET) =    645.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   15.296
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.644
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.40      0.30     0.850    56   15.30
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56   15.42
  PUBLIC PARK                B        1.50      0.30     0.850    56   15.30
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56   15.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.857
  SUBAREA RUNOFF(CFS) =      4.73
  TOTAL AREA(ACRES) =      2.20   PEAK FLOW RATE(CFS) =      4.73

********************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.10 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  645.00  DOWNSTREAM ELEVATION(FEET) =  641.00
  STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       8.96
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.09
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   2.40   Tc(MIN.) =   17.70
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.432
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
```



```
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.40      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.649
  SUBAREA AREA(ACRES) =    4.20      SUBAREA RUNOFF(CFS) =    8.46
  EFFECTIVE AREA(ACRES) =      6.40    AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =        6.4        PEAK FLOW RATE(CFS) =      12.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.27
  FLOW VELOCITY(FEET/SEC.) =  2.80   DEPTH*VELOCITY(FT*FT/SEC.) =   1.22
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    307.10 =     692.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    307.10 TO NODE    308.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  641.00  DOWNSTREAM ELEVATION(FEET) =  635.00
  STREET LENGTH(FEET) =   506.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      20.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.49
    HALFSTREET FLOOD WIDTH(FEET) =   18.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.60
  STREET FLOW TRAVEL TIME(MIN.) =   2.57   Tc(MIN.) =   20.27
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.214
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.00      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.80      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.554
  SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =   15.66
  EFFECTIVE AREA(ACRES) =     14.90    AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.63
```

```
  TOTAL AREA(ACRES) =       14.9        PEAK FLOW RATE(CFS) =      27.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  20.27
  FLOW VELOCITY(FEET/SEC.) =  3.52   DEPTH*VELOCITY(FT*FT/SEC.) =   1.84
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    308.00 =    1198.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   635.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =  1516.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.44
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.17
  PIPE TRAVEL TIME(MIN.) =   2.68    Tc(MIN.) =   22.95
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    305.00 =    2714.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.95
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.051
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.20      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.20      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.80      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.50      0.30     0.400    56
  SCHOOL                     B        0.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.289
  SUBAREA AREA(ACRES) =    5.00      SUBAREA RUNOFF(CFS) =    8.84
  EFFECTIVE AREA(ACRES) =     19.90   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       19.9       PEAK FLOW RATE(CFS) =      33.82

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.95
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.051
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  COMMERCIAL                 B        1.20      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.00      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        6.60      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.415
  SUBAREA AREA(ACRES) =   14.60      SUBAREA RUNOFF(CFS) =   25.31
  EFFECTIVE AREA(ACRES) =     34.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       34.5       PEAK FLOW RATE(CFS) =      59.14

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.95
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.051
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  SCHOOL                     B        0.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.34
  EFFECTIVE AREA(ACRES) =     34.70   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       34.7       PEAK FLOW RATE(CFS) =      59.47

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 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.) =   22.95
  RAINFALL INTENSITY(INCH/HR) =   2.05
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =      34.70
  TOTAL STREAM AREA(ACRES) =      34.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      59.47

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      245.60   11.82    3.191  0.30( 0.11) 0.38      88.7     300.00
      2       59.47   22.95    2.051  0.30( 0.15) 0.49      34.7     306.00
```

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      294.59   11.82    3.191  0.30( 0.12) 0.40     106.6     300.00
     2      214.06   22.95    2.051  0.30( 0.12) 0.41     123.4     306.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     294.59    Tc(MIN.) =    11.82
 EFFECTIVE AREA(ACRES) =     106.58   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
 TOTAL AREA(ACRES) =      123.4
 LONGEST FLOWPATH FROM NODE    306.00 TO NODE    305.00 =    2714.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    310.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   615.00  DOWNSTREAM(FEET) =   480.00
 FLOW LENGTH(FEET) =  2954.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  51.0 INCH PIPE IS  36.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  27.15
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     294.59
 PIPE TRAVEL TIME(MIN.) =   1.81    Tc(MIN.) =   13.64
 LONGEST FLOWPATH FROM NODE    306.00 TO NODE    310.00 =    5668.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.64
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.893
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        4.80      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.20      0.30     0.600    56
 COMMERCIAL                 B        2.30      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.164
 SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =   19.97
 EFFECTIVE AREA(ACRES) =    114.38   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
 TOTAL AREA(ACRES) =      131.2       PEAK FLOW RATE(CFS) =     294.59
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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



```
 FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.64
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.893
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.10      0.30     0.100    56
 PUBLIC PARK                B        0.20      0.30     0.850    56
 PUBLIC PARK                B        2.30      0.30     0.850    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        6.40      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        2.60      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.371
 SUBAREA AREA(ACRES) =   12.30      SUBAREA RUNOFF(CFS) =   30.80
 EFFECTIVE AREA(ACRES) =    126.68   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
 TOTAL AREA(ACRES) =      143.5       PEAK FLOW RATE(CFS) =     316.82

****************************************************************************
 FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.64
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.893
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.80      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B       10.20      0.30     0.500    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.50      0.30     0.400    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        3.70      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.514
 SUBAREA AREA(ACRES) =   19.50      SUBAREA RUNOFF(CFS) =   48.07
 EFFECTIVE AREA(ACRES) =    146.18   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
 TOTAL AREA(ACRES) =      163.0       PEAK FLOW RATE(CFS) =     364.90

****************************************************************************
 FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =  1056.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.88
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     364.90
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =   14.25
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    311.00 =    6724.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.25
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.794
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.60      0.30     0.100    56
  COMMERCIAL                 B        3.60      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.10      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.80      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.191
  SUBAREA AREA(ACRES) =   15.10      SUBAREA RUNOFF(CFS) =   37.18
  EFFECTIVE AREA(ACRES) =    161.28   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      178.1       PEAK FLOW RATE(CFS) =     388.93

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.25
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.794
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        6.70      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    6.70      SUBAREA RUNOFF(CFS) =   15.76
  EFFECTIVE AREA(ACRES) =    167.98   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =      184.8       PEAK FLOW RATE(CFS) =     404.69

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  31
```



```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   373.00
  FLOW LENGTH(FEET) =  1373.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  43.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.12
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     404.69
  PIPE TRAVEL TIME(MIN.) =   0.81    Tc(MIN.) =   15.06
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    312.00 =    8097.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.06
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.665
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.50      0.30     0.100    56
  COMMERCIAL                 B        4.50      0.30     0.100    56
  APARTMENTS                 B        3.40      0.30     0.200    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.157
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   23.56
  EFFECTIVE AREA(ACRES) =    177.98   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      194.8       PEAK FLOW RATE(CFS) =     408.77

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.06
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.665
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.567
  SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    1.35
  EFFECTIVE AREA(ACRES) =    178.58   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
```

```
  TOTAL AREA(ACRES) =      195.4       PEAK FLOW RATE(CFS) =     410.12

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    339.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   373.00  DOWNSTREAM(FEET) =   301.00
  FLOW LENGTH(FEET) =  1370.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  42.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.62
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     410.12
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =   15.81
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    339.00 =    9467.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    390.00 TO NODE    391.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   317.00
  ELEVATION DATA: UPSTREAM(FEET) =    860.00  DOWNSTREAM(FEET) =    775.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.195
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.806
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.20      0.30     1.000    72    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.20      0.30     1.000    66    9.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.42
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      4.42

****************************************************************************
  FLOW PROCESS FROM NODE    391.00 TO NODE    392.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```



```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    775.00  DOWNSTREAM(FEET) =    700.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   545.00   CHANNEL SLOPE =  0.1376
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.383
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        1.70      0.30     1.000    72
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.60      0.30     1.000    72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.61
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.23
  AVERAGE FLOW DEPTH(FEET) =   0.64   TRAVEL TIME(MIN.) =   1.46
  Tc(MIN.) =   10.65
  SUBAREA AREA(ACRES) =     2.30       SUBAREA RUNOFF(CFS) =    6.38
  EFFECTIVE AREA(ACRES) =      3.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.7          PEAK FLOW RATE(CFS) =      10.27

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.71   FLOW VELOCITY(FEET/SEC.) =   6.71
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    392.00 =     862.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    392.00 TO NODE    393.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    700.00  DOWNSTREAM(FEET) =    635.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1093.00   CHANNEL SLOPE =  0.0595
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.942
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.40      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        8.40      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.70      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.40      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        9.20      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.60      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      37.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.78
```

```
  AVERAGE FLOW DEPTH(FEET) =   1.36   TRAVEL TIME(MIN.) =   2.69
  Tc(MIN.) =   13.34
  SUBAREA AREA(ACRES) =    22.70       SUBAREA RUNOFF(CFS) =   53.99
  EFFECTIVE AREA(ACRES) =     26.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       26.4         PEAK FLOW RATE(CFS) =      62.79

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.65   FLOW VELOCITY(FEET/SEC.) =   7.68
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    393.00 =    1955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    393.00 TO NODE    394.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    635.00  DOWNSTREAM(FEET) =    598.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   904.00   CHANNEL SLOPE =  0.0409
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.630
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.60      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        5.50      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.80      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.60      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.00      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        6.80      0.30     1.000    72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      80.94
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.11
  AVERAGE FLOW DEPTH(FEET) =   1.95   TRAVEL TIME(MIN.) =   2.12
  Tc(MIN.) =   15.46
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   36.27
  EFFECTIVE AREA(ACRES) =     43.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       43.7         PEAK FLOW RATE(CFS) =      91.63

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.04   FLOW VELOCITY(FEET/SEC.) =   7.34
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    394.00 =    2859.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    394.00 TO NODE    394.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.46
```



```
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.630
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.50      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =     2.60      SUBAREA RUNOFF(CFS) =    5.45
  EFFECTIVE AREA(ACRES) =     46.30   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       46.3       PEAK FLOW RATE(CFS) =      97.08

****************************************************************************
  FLOW PROCESS FROM NODE    394.00 TO NODE    395.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    598.00  DOWNSTREAM(FEET) =    573.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   664.00   CHANNEL SLOPE =  0.0377
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.501
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        6.30      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        5.90      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.80      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.50      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.20      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.996
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     117.49
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.60
  AVERAGE FLOW DEPTH(FEET) =   2.27   TRAVEL TIME(MIN.) =   1.46
  Tc(MIN.) =   16.92
  SUBAREA AREA(ACRES) =    20.60       SUBAREA RUNOFF(CFS) =   40.84
  EFFECTIVE AREA(ACRES) =     66.90     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       66.9         PEAK FLOW RATE(CFS) =     132.57

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.38   FLOW VELOCITY(FEET/SEC.) =   7.82
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    395.00 =    3523.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    395.00 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.92
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.501
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B       12.60      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.10      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.987
  SUBAREA AREA(ACRES) =   18.20      SUBAREA RUNOFF(CFS) =   36.12
  EFFECTIVE AREA(ACRES) =     85.10   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       85.1       PEAK FLOW RATE(CFS) =     168.70

****************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    370.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   573.00  DOWNSTREAM(FEET) =   389.00
  FLOW LENGTH(FEET) =  5717.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  33.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.29
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     168.70
  PIPE TRAVEL TIME(MIN.) =   4.70    Tc(MIN.) =   21.61
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    370.00 =    9240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    370.00 TO NODE    371.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    389.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1996.00   CHANNEL SLOPE =  0.0220
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  1.872
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                    B        2.90      0.30     1.000    69
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.40      0.30     1.000    63
  COMMERCIAL                 B        0.50      0.30     0.100    56
  NATURAL FAIR COVER
```



```
  "GRASS"                    B        6.60      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.60      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        6.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.956
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     185.91
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.95
  AVERAGE FLOW DEPTH(FEET) =   2.99   TRAVEL TIME(MIN.) =   4.79
  Tc(MIN.) =   26.40
  SUBAREA AREA(ACRES) =    24.10       SUBAREA RUNOFF(CFS) =   34.38
  EFFECTIVE AREA(ACRES) =    109.20     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.99
  TOTAL AREA(ACRES) =      109.2         PEAK FLOW RATE(CFS) =     168.70
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.88   FLOW VELOCITY(FEET/SEC.) =   6.78
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    371.00 =   11236.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   26.40
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  1.872
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.10      0.30     1.000    63
  COMMERCIAL                 B        1.10      0.30     0.100    56
  NATURAL FAIR COVER
  "GRASS"                    B        2.00      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.40      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.830
  SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =   10.37
  EFFECTIVE AREA(ACRES) =    116.30   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =      116.3       PEAK FLOW RATE(CFS) =     168.70
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   26.40
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  1.872
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.70      0.30      0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        0.20      0.30      1.000    65
  PUBLIC PARK                 B        0.10      0.30      0.850    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B        0.10      0.30      0.500    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        3.00      0.30      1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        1.40      0.30      1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.975
  SUBAREA AREA(ACRES) =    5.50      SUBAREA RUNOFF(CFS) =    7.82
  EFFECTIVE AREA(ACRES) =    121.80   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =      121.8       PEAK FLOW RATE(CFS) =     173.06

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   26.40
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  1.872
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        1.40      0.30      0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        0.10      0.30      1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.907
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    2.16
  EFFECTIVE AREA(ACRES) =    123.30   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =      123.3       PEAK FLOW RATE(CFS) =     175.22

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    372.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   345.00  DOWNSTREAM(FEET) =   301.00
  FLOW LENGTH(FEET) =   488.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.50
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     175.22
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   26.66
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    372.00 =   11724.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    372.00 TO NODE    373.00 IS CODE =  56
```



```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    301.00  DOWNSTREAM(FEET) =    300.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   924.00   CHANNEL SLOPE =  0.0011
  GIVEN CHANNEL BASE(FEET) =   30.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   3.31
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  1.658
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B       32.30      0.30      0.100    56
  COMMERCIAL                  B        2.70      0.30      0.100    56
  COMMERCIAL                  B        0.60      0.30      0.100    56
  COMMERCIAL                  B        1.80      0.30      0.100    56
  PUBLIC PARK                 B        7.20      0.30      0.850    56
  PUBLIC PARK                 B        9.80      0.30      0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.334
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     213.37
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.51
  AVERAGE FLOW DEPTH(FEET) =   2.31   TRAVEL TIME(MIN.) =   6.15
  Tc(MIN.) =   32.81
  SUBAREA AREA(ACRES) =    54.40       SUBAREA RUNOFF(CFS) =   76.27
  EFFECTIVE AREA(ACRES) =    177.70     AREA-AVERAGED Fm(INCH/HR) =   0.23
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.78
  TOTAL AREA(ACRES) =      177.7         PEAK FLOW RATE(CFS) =     227.77
  GIVEN CHANNEL BASE(FEET) =   30.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   3.39

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.39   FLOW VELOCITY(FEET/SEC.) =   2.56
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    373.00 =   12648.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    373.00 TO NODE    373.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   32.81
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  1.658
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 B        2.60      0.30      0.850    56
  PUBLIC PARK                 B        2.10      0.30      0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        3.50      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        4.80      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        3.60      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.80      0.30      0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.886
  SUBAREA AREA(ACRES) =   17.40      SUBAREA RUNOFF(CFS) =   21.80
  EFFECTIVE AREA(ACRES) =    195.10   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =      195.1       PEAK FLOW RATE(CFS) =     249.57

****************************************************************************
  FLOW PROCESS FROM NODE    373.00 TO NODE    374.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   300.00  DOWNSTREAM(FEET) =   298.00
  FLOW LENGTH(FEET) =  1188.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  87.0 INCH PIPE IS  65.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.50
  ESTIMATED PIPE DIAMETER(INCH) =  87.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     249.57
  PIPE TRAVEL TIME(MIN.) =   2.64    Tc(MIN.) =   35.45
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    321.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    622.00  DOWNSTREAM(FEET) =    621.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.511
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.406
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                B        1.50      0.30     0.200    56   10.51
  APARTMENTS                B        2.00      0.30     0.200    56   10.51
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =     10.54
  TOTAL AREA(ACRES) =      3.50   PEAK FLOW RATE(CFS) =     10.54

****************************************************************************
  FLOW PROCESS FROM NODE    321.00 TO NODE    322.00 IS CODE =  62
----------------------------------------------------------------------------
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```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  621.00  DOWNSTREAM ELEVATION(FEET) =  612.00
  STREET LENGTH(FEET) =   569.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      17.62
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   16.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.53
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.59
  STREET FLOW TRAVEL TIME(MIN.) =   2.69   Tc(MIN.) =   13.20
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.965
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        2.20      0.30     0.200    56
  APARTMENTS                B        3.20      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =   14.12
  EFFECTIVE AREA(ACRES) =      8.90    AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        8.9        PEAK FLOW RATE(CFS) =      23.27

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  18.01
  FLOW VELOCITY(FEET/SEC.) =  3.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    322.00 =     899.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    324.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  612.00  DOWNSTREAM ELEVATION(FEET) =  590.00
  STREET LENGTH(FEET) =   891.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      36.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.96
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.55
  STREET FLOW TRAVEL TIME(MIN.) =   3.00   Tc(MIN.) =   16.19
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.565
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.00      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        5.70      0.30     0.400    56
  CONDOMINIUMS               B        1.20      0.30     0.350    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.420
  SUBAREA AREA(ACRES) =   11.90      SUBAREA RUNOFF(CFS) =   26.12
  EFFECTIVE AREA(ACRES) =     20.80    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       20.8        PEAK FLOW RATE(CFS) =      46.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.68
  FLOW VELOCITY(FEET/SEC.) =  5.26   DEPTH*VELOCITY(FT*FT/SEC.) =   2.89
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    324.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.19
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.565
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.70      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    3.88
  EFFECTIVE AREA(ACRES) =     22.50   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      50.06

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    325.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   590.00  DOWNSTREAM(FEET) =   575.00
```



```
  FLOW LENGTH(FEET) =   529.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.70
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.06
  PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =   16.79
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    325.00 =    2319.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.79
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.512
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.30      0.30     0.600    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.544
  SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =   15.22
  EFFECTIVE AREA(ACRES) =     29.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =       29.7       PEAK FLOW RATE(CFS) =      64.21

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    325.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.79
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.512
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.80      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       10.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.606
  SUBAREA AREA(ACRES) =   15.30      SUBAREA RUNOFF(CFS) =   32.09
  EFFECTIVE AREA(ACRES) =     45.00   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       45.0       PEAK FLOW RATE(CFS) =      96.30

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    326.00 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) =   515.00
  FLOW LENGTH(FEET) =   284.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  35.78
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      96.30
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   16.93
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    326.00 =    2603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.93
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.500
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.70      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.80      0.30     0.900    56
  COMMERCIAL                 B        1.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.582
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =   11.30
  EFFECTIVE AREA(ACRES) =     50.40   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       50.4       PEAK FLOW RATE(CFS) =     107.13

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.93
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.500
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.80      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.557
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =   10.29
  EFFECTIVE AREA(ACRES) =     55.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       55.3       PEAK FLOW RATE(CFS) =     117.42
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    333.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   500.00
  FLOW LENGTH(FEET) =  1644.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.73
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     117.42
  PIPE TRAVEL TIME(MIN.) =   2.34    Tc(MIN.) =   19.26
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    333.00 =    4247.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.26
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.295
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
  COMMERCIAL                 B        1.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  COMMERCIAL                 B        5.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.467
  SUBAREA AREA(ACRES) =   14.40      SUBAREA RUNOFF(CFS) =   27.93
  EFFECTIVE AREA(ACRES) =     69.70   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       69.7       PEAK FLOW RATE(CFS) =     135.12

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.26
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.295
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.38
  EFFECTIVE AREA(ACRES) =     69.90   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
```

```
  TOTAL AREA(ACRES) =       69.9       PEAK FLOW RATE(CFS) =     135.50

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 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.) =   19.26
  RAINFALL INTENSITY(INCH/HR) =   2.29
  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      69.90
  TOTAL STREAM AREA(ACRES) =      69.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     135.50

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.50 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =    615.00  DOWNSTREAM(FEET) =    614.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.844
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.551
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.40      0.30     0.100    56    9.84
  PUBLIC PARK                B        0.20      0.30     0.850    56   15.64
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.10      0.30     0.400    56   12.11
  COMMERCIAL                 B        0.10      0.30     0.100    56    9.84
  PUBLIC PARK                B        0.10      0.30     0.850    56   15.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.383
  SUBAREA RUNOFF(CFS) =      2.78
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.78

****************************************************************************
  FLOW PROCESS FROM NODE    327.50 TO NODE    328.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  614.00  DOWNSTREAM ELEVATION(FEET) =  610.00
  STREET LENGTH(FEET) =   425.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```



```
  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) =       7.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.07
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.34
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
  STREET FLOW TRAVEL TIME(MIN.) =   3.03   Tc(MIN.) =   12.87
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.019
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.00      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.348
  SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    8.39
  EFFECTIVE AREA(ACRES) =      4.10    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        4.1        PEAK FLOW RATE(CFS) =      10.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.57
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    328.00 =     754.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    329.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  610.00  DOWNSTREAM ELEVATION(FEET) =  595.00
  STREET LENGTH(FEET) =   366.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      18.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
```

```
    HALFSTREET FLOOD WIDTH(FEET) =   13.40
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.06
  STREET FLOW TRAVEL TIME(MIN.) =   1.19   Tc(MIN.) =   14.06
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.824
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.10      0.30     0.400    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.10      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.407
  SUBAREA AREA(ACRES) =    6.30      SUBAREA RUNOFF(CFS) =   15.32
  EFFECTIVE AREA(ACRES) =     10.40    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       10.4        PEAK FLOW RATE(CFS) =      25.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.35
  FLOW VELOCITY(FEET/SEC.) =  5.51   DEPTH*VELOCITY(FT*FT/SEC.) =   2.41
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    329.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.06
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.824
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.80      0.30     0.400    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        6.10      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.402
  SUBAREA AREA(ACRES) =    9.00      SUBAREA RUNOFF(CFS) =   21.90
  EFFECTIVE AREA(ACRES) =     19.40   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       19.4       PEAK FLOW RATE(CFS) =      47.24

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    330.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   595.00  DOWNSTREAM(FEET) =   575.00
```



```
  FLOW LENGTH(FEET) =   378.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.89
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.24
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   14.41
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    330.00 =    1498.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.41
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.766
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.90      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.10      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.50      0.30     0.400    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       10.20      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.90      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.561
  SUBAREA AREA(ACRES) =   19.20      SUBAREA RUNOFF(CFS) =   44.89
  EFFECTIVE AREA(ACRES) =     38.60   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       38.6       PEAK FLOW RATE(CFS) =      91.12

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    331.00 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) =   555.00
  FLOW LENGTH(FEET) =   457.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.90
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      91.12
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   14.80
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    331.00 =    1955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.80
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.703
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        1.10      0.30      0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.80      0.30      0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B       10.50      0.30      0.600    56
 COMMERCIAL                 B        0.30      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.50      0.30      0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B       13.70      0.30      0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.619
 SUBAREA AREA(ACRES) =   26.90      SUBAREA RUNOFF(CFS) =   60.95
 EFFECTIVE AREA(ACRES) =     65.50   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
 TOTAL AREA(ACRES) =       65.5       PEAK FLOW RATE(CFS) =     149.89

****************************************************************************
 FLOW PROCESS FROM NODE    331.00 TO NODE    332.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   555.00  DOWNSTREAM(FEET) =   520.00
 FLOW LENGTH(FEET) =   324.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  31.46
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     149.89
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   14.97
 LONGEST FLOWPATH FROM NODE    327.00 TO NODE    332.00 =    2279.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    332.00 TO NODE    332.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.97
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.675
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.10      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.10      0.30      0.900    56
 COMMERCIAL                 B        3.70      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        5.00      0.30      0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.621
 SUBAREA AREA(ACRES) =   10.90      SUBAREA RUNOFF(CFS) =   24.42
 EFFECTIVE AREA(ACRES) =     76.40   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =       76.4       PEAK FLOW RATE(CFS) =     172.65

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



```
 FLOW PROCESS FROM NODE    332.00 TO NODE    333.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   520.00  DOWNSTREAM(FEET) =   500.00
 FLOW LENGTH(FEET) =  1740.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  54.0 INCH PIPE IS  38.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.15
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     172.65
 PIPE TRAVEL TIME(MIN.) =   2.05    Tc(MIN.) =   17.02
 LONGEST FLOWPATH FROM NODE    327.00 TO NODE    333.00 =    4019.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.02
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.492
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.20      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        4.40      0.30      0.900    56
 COMMERCIAL                 B        3.90      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        9.80      0.30      0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.689
 SUBAREA AREA(ACRES) =   19.30      SUBAREA RUNOFF(CFS) =   39.70
 EFFECTIVE AREA(ACRES) =     95.70   AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.58
 TOTAL AREA(ACRES) =       95.7       PEAK FLOW RATE(CFS) =     199.79

****************************************************************************
 FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 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.) =   17.02
 RAINFALL INTENSITY(INCH/HR) =   2.49
 AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.58
 EFFECTIVE STREAM AREA(ACRES) =      95.70
 TOTAL STREAM AREA(ACRES) =      95.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     199.79

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      135.50   19.26    2.295  0.30( 0.14) 0.47      69.9     320.00
```

```
     2      199.79   17.02    2.492  0.30( 0.17) 0.58      95.7     327.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      330.47   17.02    2.492  0.30( 0.16) 0.53     157.5     327.00
      2      318.27   19.26    2.295  0.30( 0.16) 0.53     165.6     320.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     330.47    Tc(MIN.) =    17.02
  EFFECTIVE AREA(ACRES) =     157.45   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      165.6
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    333.00 =    4247.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    334.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   819.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  39.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.23
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     330.47
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   17.54
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    334.00 =    5066.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.54
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.447
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        4.00      0.30     0.200    56
  COMMERCIAL                 B        2.30      0.30     0.100    56
  COMMERCIAL                 B        1.00      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  PUBLIC PARK                B        2.40      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.50      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.310
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   28.81
  EFFECTIVE AREA(ACRES) =    171.05   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      179.2       PEAK FLOW RATE(CFS) =     352.79

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



```
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.54
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.447
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.00      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.60      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.10      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.330
  SUBAREA AREA(ACRES) =    5.70      SUBAREA RUNOFF(CFS) =   12.04
  EFFECTIVE AREA(ACRES) =    176.75   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      184.9       PEAK FLOW RATE(CFS) =     364.83

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 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.) =   17.54
  RAINFALL INTENSITY(INCH/HR) =   2.45
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =     176.75
  TOTAL STREAM AREA(ACRES) =     184.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     364.83

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    351.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    492.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.730
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.370
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.80      0.30     0.600    56   10.73
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.70      0.30     0.600    56   10.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      7.18
  TOTAL AREA(ACRES) =      2.50   PEAK FLOW RATE(CFS) =      7.18

****************************************************************************
  FLOW PROCESS FROM NODE    351.00 TO NODE    352.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  492.00  DOWNSTREAM ELEVATION(FEET) =  488.00
  STREET LENGTH(FEET) =   456.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      11.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   2.96   Tc(MIN.) =   13.69
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.884
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.20      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.40      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    8.76
  EFFECTIVE AREA(ACRES) =      6.10    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        6.1        PEAK FLOW RATE(CFS) =      14.85

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.91
  FLOW VELOCITY(FEET/SEC.) =  2.70   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    352.00 =     786.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    352.00 TO NODE    353.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   488.00  DOWNSTREAM(FEET) =   485.00
  FLOW LENGTH(FEET) =   883.00   MANNING'S N =  0.013
```



```
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.85
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.85
  PIPE TRAVEL TIME(MIN.) =   3.03    Tc(MIN.) =   16.73
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    353.00 =    1669.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    353.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.73
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.518
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.50      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.10      0.30     0.400    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.60      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.50      0.30     0.400    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.70      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.471
  SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =   18.18
  EFFECTIVE AREA(ACRES) =     14.60   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       14.6       PEAK FLOW RATE(CFS) =      31.02

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    353.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.73
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.518
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.65
  EFFECTIVE AREA(ACRES) =     14.90   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       14.9       PEAK FLOW RATE(CFS) =      31.66

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    334.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =  1136.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.20
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.66
  PIPE TRAVEL TIME(MIN.) =   1.86    Tc(MIN.) =   18.58
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    334.00 =    2805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.58
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.355
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        2.00      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.40      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.50      0.30     0.400    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  PUBLIC PARK                B        1.50      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =   15.45
  EFFECTIVE AREA(ACRES) =     22.70   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       22.7       PEAK FLOW RATE(CFS) =      44.92

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.58
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.355
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.10      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.40      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.262
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    9.22
  EFFECTIVE AREA(ACRES) =     27.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       27.2       PEAK FLOW RATE(CFS) =      54.14

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



```
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.58
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.355
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.20      0.30     0.600    56
  PUBLIC PARK                B        2.70      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        7.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.674
  SUBAREA AREA(ACRES) =   12.00      SUBAREA RUNOFF(CFS) =   23.25
  EFFECTIVE AREA(ACRES) =     39.20   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       39.2       PEAK FLOW RATE(CFS) =      77.39

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.58
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.355
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  SCHOOL                     B        3.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.626
  SUBAREA AREA(ACRES) =    3.80      SUBAREA RUNOFF(CFS) =    7.41
  EFFECTIVE AREA(ACRES) =     43.00   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       43.0       PEAK FLOW RATE(CFS) =      84.80

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 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.) =   18.58
  RAINFALL INTENSITY(INCH/HR) =   2.35
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30
```

```
 AREA-AVERAGED Ap =  0.54
 EFFECTIVE STREAM AREA(ACRES) =      43.00
 TOTAL STREAM AREA(ACRES) =      43.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      84.80

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      364.83   17.54    2.447  0.30( 0.15) 0.51     176.8     327.00
     1      348.82   19.79    2.249  0.30( 0.15) 0.51     184.9     320.00
     2       84.80   18.58    2.355  0.30( 0.16) 0.54      43.0     350.00

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      448.22   17.54    2.447  0.30( 0.16) 0.52     217.3     327.00
     2      442.18   18.58    2.355  0.30( 0.15) 0.52     223.5     350.00
     3      429.52   19.79    2.249  0.30( 0.15) 0.52     227.9     320.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     448.22    Tc(MIN.) =    17.54
 EFFECTIVE AREA(ACRES) =     217.33   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
 TOTAL AREA(ACRES) =      227.9
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    334.00 =    5066.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    334.00 TO NODE    335.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   422.00
 FLOW LENGTH(FEET) =  1086.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  60.0 INCH PIPE IS  43.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  29.23
 ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     448.22
 PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =   18.16
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    335.00 =    6152.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    335.00 TO NODE    335.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   18.16
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.392
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                B        3.00      0.30     0.100    56
 COMMERCIAL                B        4.20      0.30     0.100    56
 PUBLIC PARK               B        0.60      0.30     0.850    56
 PUBLIC PARK               B       10.80      0.30     0.850    56
```



```
 RESIDENTIAL
 ".4 DWELLING/ACRE"        B        1.00      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"        B        3.90      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.631
 SUBAREA AREA(ACRES) =   23.50      SUBAREA RUNOFF(CFS) =   46.59
 EFFECTIVE AREA(ACRES) =    240.83   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =      251.4       PEAK FLOW RATE(CFS) =     484.15

****************************************************************************
 FLOW PROCESS FROM NODE    335.00 TO NODE    335.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   18.16
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.392
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"      B        0.10      0.30     0.600    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"      B        0.10      0.30     0.600    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"      B        0.10      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"      B        9.20      0.30     0.500    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"     B        0.70      0.30     0.400    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"     B        2.90      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.474
 SUBAREA AREA(ACRES) =   13.10      SUBAREA RUNOFF(CFS) =   26.53
 EFFECTIVE AREA(ACRES) =    253.93   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =      264.5       PEAK FLOW RATE(CFS) =     510.68

****************************************************************************
 FLOW PROCESS FROM NODE    335.00 TO NODE    336.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   422.00  DOWNSTREAM(FEET) =   380.00
 FLOW LENGTH(FEET) =   780.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  60.0 INCH PIPE IS  44.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  33.00
 ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     510.68
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   18.55
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    336.00 =    6932.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   18.55
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.357
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.70      0.30     0.100    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  COMMERCIAL                 B        1.60      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.70      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.60      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.182
  SUBAREA AREA(ACRES) =   12.30      SUBAREA RUNOFF(CFS) =   25.49
  EFFECTIVE AREA(ACRES) =    266.23   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      276.8       PEAK FLOW RATE(CFS) =     528.25

********************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   18.55
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.357
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.40      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       16.80      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.611
  SUBAREA AREA(ACRES) =   22.20      SUBAREA RUNOFF(CFS) =   43.44
  EFFECTIVE AREA(ACRES) =    288.43   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      299.0       PEAK FLOW RATE(CFS) =     571.69

********************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   18.55
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.357
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        6.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    6.30      SUBAREA RUNOFF(CFS) =   12.69
  EFFECTIVE AREA(ACRES) =    294.73   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      305.3       PEAK FLOW RATE(CFS) =     584.37

********************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    337.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   380.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =   803.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  51.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.49
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     584.37
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   19.01
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    337.00 =    7735.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   19.01
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.317
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.40      0.30     0.200    56
  APARTMENTS                 B        3.00      0.30     0.200    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  COMMERCIAL                 B        2.70      0.30     0.100    56
  COMMERCIAL                 B        6.00      0.30     0.100    56
  PUBLIC PARK                B        1.30      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.189
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =   29.91
  EFFECTIVE AREA(ACRES) =    309.43   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      320.0       PEAK FLOW RATE(CFS) =     603.69

********************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   19.01
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.317
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        3.30      0.30      0.850    56
 PUBLIC PARK                B        1.50      0.30      0.850    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        2.50      0.30      0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        6.70      0.30      0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.20      0.30      0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.10      0.30      0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.488
 SUBAREA AREA(ACRES) =   16.30      SUBAREA RUNOFF(CFS) =   31.85
 EFFECTIVE AREA(ACRES) =    325.73   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =      336.3       PEAK FLOW RATE(CFS) =     635.54

****************************************************************************
 FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.01
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.317
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.60      0.30      0.600    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        4.60      0.30      0.400    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.90      0.30      0.400    56
 SCHOOL                     B        0.20      0.30      0.600    56
 SCHOOL                     B        5.90      0.30      0.600    56
 SCHOOL                     B        6.00      0.30      0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.526
 SUBAREA AREA(ACRES) =   20.20      SUBAREA RUNOFF(CFS) =   39.26
 EFFECTIVE AREA(ACRES) =    345.93   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =      356.5       PEAK FLOW RATE(CFS) =     674.80

****************************************************************************
 FLOW PROCESS FROM NODE    337.00 TO NODE    338.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   332.00
 FLOW LENGTH(FEET) =   838.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  78.0 INCH PIPE IS  59.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  24.94
 ESTIMATED PIPE DIAMETER(INCH) =  78.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     674.80
 PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   19.57
```



```
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    338.00 =    8573.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.57
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.268
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 APARTMENTS                 B        6.90      0.30      0.200    56
 COMMERCIAL                 B        2.80      0.30      0.100    56
 COMMERCIAL                 B       11.50      0.30      0.100    56
 COMMERCIAL                 B        4.70      0.30      0.100    56
 COMMERCIAL                 B        8.60      0.30      0.100    56
 PUBLIC PARK                B        2.60      0.30      0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.171
 SUBAREA AREA(ACRES) =   37.10      SUBAREA RUNOFF(CFS) =   74.02
 EFFECTIVE AREA(ACRES) =    383.03   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
 TOTAL AREA(ACRES) =      393.6       PEAK FLOW RATE(CFS) =     733.48

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.57
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.268
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.10      0.30      0.850    56
 PUBLIC PARK                B        0.60      0.30      0.850    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.30      0.30      0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        9.70      0.30      0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        1.20      0.30      0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        3.40      0.30      0.200    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.230
 SUBAREA AREA(ACRES) =   15.30      SUBAREA RUNOFF(CFS) =   30.28
 EFFECTIVE AREA(ACRES) =    398.33   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
 TOTAL AREA(ACRES) =      408.9       PEAK FLOW RATE(CFS) =     763.76

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.57
```

```
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.268
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        5.60      0.30     0.100    56
 COMMERCIAL                 B        3.60      0.30     0.100    56
 COMMERCIAL                 B        5.80      0.30     0.100    56
 SCHOOL                     B        0.80      0.30     0.600    56
 SCHOOL                     B        1.20      0.30     0.600    56
 SCHOOL                     B        4.50      0.30     0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.251
 SUBAREA AREA(ACRES) =   21.50      SUBAREA RUNOFF(CFS) =   42.43
 EFFECTIVE AREA(ACRES) =    419.83   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      430.4       PEAK FLOW RATE(CFS) =     806.19

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.57
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.268
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.54
 EFFECTIVE AREA(ACRES) =    420.13   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      430.7       PEAK FLOW RATE(CFS) =     806.73

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    339.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   332.00  DOWNSTREAM(FEET) =   301.00
 FLOW LENGTH(FEET) =  1956.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  87.0 INCH PIPE IS  68.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  23.11
 ESTIMATED PIPE DIAMETER(INCH) =  87.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     806.73
 PIPE TRAVEL TIME(MIN.) =   1.41    Tc(MIN.) =   20.98
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
```



```
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      806.73   20.98    2.171  0.30( 0.13) 0.45     420.1     327.00
     2      789.21   22.04    2.106  0.30( 0.13) 0.45     426.3     350.00
     3      768.40   23.27    2.031  0.30( 0.13) 0.45     430.7     320.00
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      410.12   15.81    2.599  0.30( 0.11) 0.38     178.6     300.00
     2      308.48   27.26    1.839  0.30( 0.12) 0.39     195.4     306.00
 LONGEST FLOWPATH FROM NODE    306.00 TO NODE    339.00 =    9467.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1     1145.93   15.81    2.599  0.30( 0.13) 0.42     495.2     300.00
     2     1170.97   20.98    2.171  0.30( 0.13) 0.43     606.3     327.00
     3     1143.98   22.04    2.106  0.30( 0.13) 0.43     614.1     350.00
     4     1112.27   23.27    2.031  0.30( 0.13) 0.43     620.2     320.00
     5      998.96   27.26    1.839  0.30( 0.13) 0.43     626.1     306.00
   TOTAL AREA(ACRES) =       626.1

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     1170.97  Tc(MIN.) =   20.976
 EFFECTIVE AREA(ACRES) =    606.31  AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =      626.1
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    339.00 TO NODE    340.00 IS CODE =  56
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    301.00  DOWNSTREAM(FEET) =    300.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   196.00   CHANNEL SLOPE =  0.0051
 GIVEN CHANNEL BASE(FEET) =  300.00   CHANNEL FREEBOARD(FEET) =  1.0
 "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
 *ESTIMATED CHANNEL HEIGHT(FEET) =   2.08
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.117
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B       31.90      0.30     0.100    56
 COMMERCIAL                 B        2.30      0.30     0.100    56
 COMMERCIAL                 B        1.90      0.30     0.100    56
 COMMERCIAL                 B        1.00      0.30     0.100    56
 PUBLIC PARK                B        3.10      0.30     0.850    56
 PUBLIC PARK                B        0.80      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.171
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    1209.08
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.70
 AVERAGE FLOW DEPTH(FEET) =   1.08   TRAVEL TIME(MIN.) =   0.88
 Tc(MIN.) =   21.86
```

```
  SUBAREA AREA(ACRES) =    41.00       SUBAREA RUNOFF(CFS) =   76.22
  EFFECTIVE AREA(ACRES) =    647.31     AREA-AVERAGED Fm(INCH/HR) =   0.12
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.41
  TOTAL AREA(ACRES) =      667.1         PEAK FLOW RATE(CFS) =    1170.97
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
  GIVEN CHANNEL BASE(FEET) =  300.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   2.06

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.06   FLOW VELOCITY(FEET/SEC.) =   3.65
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    340.00 =   10725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    340.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.86
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.117
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.00      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.80      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.899
  SUBAREA AREA(ACRES) =    8.40      SUBAREA RUNOFF(CFS) =   13.97
  EFFECTIVE AREA(ACRES) =    655.71   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      675.5       PEAK FLOW RATE(CFS) =    1175.27

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    374.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   300.00  DOWNSTREAM(FEET) =   298.00
  FLOW LENGTH(FEET) =   221.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN 114.0 INCH PIPE IS  84.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.79
  ESTIMATED PIPE DIAMETER(INCH) = 114.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    1175.27
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   22.04
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    374.00 =   10946.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
```



```
  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1     1174.96   16.87    2.505  0.30( 0.12) 0.41     544.6     300.00
      2     1175.27   22.04    2.106  0.30( 0.13) 0.42     655.7     327.00
      3     1150.03   23.11    2.041  0.30( 0.13) 0.42     663.5     350.00
      4     1115.16   24.36    1.965  0.30( 0.13) 0.42     669.6     320.00
      5     1019.21   28.38    1.795  0.30( 0.13) 0.42     675.5     306.00
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    374.00 =   10946.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      249.57   35.45    1.588  0.30( 0.24) 0.79     195.1     390.00
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1     1374.38   16.87    2.505  0.30( 0.14) 0.47     637.4     300.00
      2     1389.90   22.04    2.106  0.30( 0.14) 0.48     777.0     327.00
      3     1367.26   23.11    2.041  0.30( 0.14) 0.48     790.7     350.00
      4     1334.48   24.36    1.965  0.30( 0.14) 0.48     803.7     320.00
      5     1249.70   28.38    1.795  0.30( 0.15) 0.49     831.7     306.00
      6     1142.13   35.45    1.588  0.30( 0.15) 0.50     870.6     390.00
    TOTAL AREA(ACRES) =       870.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     1389.90  Tc(MIN.) =   22.037
  EFFECTIVE AREA(ACRES) =    776.98  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      870.6
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    380.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   298.00  DOWNSTREAM(FEET) =   261.00
  FLOW LENGTH(FEET) =  1402.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  96.0 INCH PIPE IS  77.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  31.88
  ESTIMATED PIPE DIAMETER(INCH) =  96.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    1389.90
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   22.77
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    380.00 =   15238.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      870.6  TC(MIN.) =     22.77
```

EFFECTIVE AREA(ACRES) = 776.98 AREA-AVERAGED Fm(INCH/HR)= 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.476
PEAK FLOW RATE(CFS) = 1389.90

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1374.38	17.61	2.441	0.30(0.14)	0.47	637.4	300.00
2	1389.90	22.77	2.062	0.30(0.14)	0.48	777.0	327.00
3	1367.26	23.85	1.996	0.30(0.14)	0.48	790.7	350.00
4	1334.48	25.09	1.922	0.30(0.14)	0.48	803.7	320.00
5	1249.70	29.13	1.766	0.30(0.15)	0.49	831.7	306.00
6	1142.13	36.22	1.568	0.30(0.15)	0.50	870.6	390.00

END OF RATIONAL METHOD ANALYSIS

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA C                                                    *
* RATIONAL METHOD - REGIONAL RAINFALL                                   *
* 100-YR EV DECEMBER 2018 CCHIU                                         *
 ************************************************************************

  FILE NAME: 3C00EVRL.DAT
  TIME/DATE OF STUDY: 09:02 12/24/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  6.027
   2)   10.00;  3.864
   3)   15.00;  2.981
   4)   20.00;  2.449
   5)   25.00;  2.118
   6)   30.00;  1.891
   7)   40.00;  1.635
   8)   50.00;  1.412
   9)   60.00;  1.310
  10)   90.00;  1.109
  11)  120.00;  0.972
  12)  180.00;  0.816
  13)  360.00;  0.607
  14) 1200.00;  0.266
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   320.00
  ELEVATION DATA: UPSTREAM(FEET) =    640.00  DOWNSTREAM(FEET) =    634.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.766
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.263
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.20      0.30      0.100    56    6.77
  PUBLIC PARK                B        0.90      0.30      0.850    56   10.75
  COMMERCIAL                 B        0.30      0.30      0.100    56    6.77
  PUBLIC PARK                B        1.90      0.30      0.850    56   10.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.736
  SUBAREA RUNOFF(CFS) =     14.98
  TOTAL AREA(ACRES) =      3.30   PEAK FLOW RATE(CFS) =     14.98

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  634.00  DOWNSTREAM ELEVATION(FEET) =  630.00
  STREET LENGTH(FEET) =   503.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      32.80
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.58
    HALFSTREET FLOOD WIDTH(FEET) =   23.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.16
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.85
  STREET FLOW TRAVEL TIME(MIN.) =   2.65   Tc(MIN.) =    9.41
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.117
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      0.30     0.100    56
  PUBLIC PARK                B        2.10      0.30     0.850    56
  SCHOOL                     B        4.60      0.30     0.600    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  PUBLIC PARK                B        1.40      0.30     0.850    56
  SCHOOL                     B        1.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.647
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   35.31
  EFFECTIVE AREA(ACRES) =     13.30    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.67
  TOTAL AREA(ACRES) =       13.3        PEAK FLOW RATE(CFS) =      46.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.65   HALFSTREET FLOOD WIDTH(FEET) =  27.23
  FLOW VELOCITY(FEET/SEC.) =  3.44   DEPTH*VELOCITY(FT*FT/SEC.) =   2.23
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     823.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    302.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.41
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.117
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.00      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        9.30      0.30     0.200    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.276
  SUBAREA AREA(ACRES) =   12.00      SUBAREA RUNOFF(CFS) =   43.57
  EFFECTIVE AREA(ACRES) =     25.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       25.3       PEAK FLOW RATE(CFS) =      90.45

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   630.00  DOWNSTREAM(FEET) =   625.00
  FLOW LENGTH(FEET) =   651.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.30
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.45
  PIPE TRAVEL TIME(MIN.) =   1.05    Tc(MIN.) =   10.47
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =    1474.00 FEET.
```



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****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.781
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.80      0.30     0.400    56
  SCHOOL                     B        1.30      0.30     0.600    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.480
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =   16.69
  EFFECTIVE AREA(ACRES) =     30.40   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       30.4       PEAK FLOW RATE(CFS) =      99.50

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.781
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.50      0.30     0.400    56
  SCHOOL                     B        5.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.520
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =   28.39
  EFFECTIVE AREA(ACRES) =     39.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       39.1       PEAK FLOW RATE(CFS) =     127.88

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.781
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.80      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
```

```
  "11+ DWELLINGS/ACRE"       B        7.40      0.30     0.200    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.50      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.215
  SUBAREA AREA(ACRES) =   11.40      SUBAREA RUNOFF(CFS) =   38.13
  EFFECTIVE AREA(ACRES) =     50.50   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       50.5       PEAK FLOW RATE(CFS) =     166.02

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.781
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        4.70      0.30     0.100    56
  PUBLIC PARK                B        2.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.90      0.30     0.200    56
  COMMERCIAL                 B        1.70      0.30     0.100    56
  PUBLIC PARK                B        1.80      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        6.20      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.294
  SUBAREA AREA(ACRES) =   21.60      SUBAREA RUNOFF(CFS) =   71.80
  EFFECTIVE AREA(ACRES) =     72.10   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       72.1       PEAK FLOW RATE(CFS) =     237.81

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   625.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =  1029.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  47.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.14
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     237.81
  PIPE TRAVEL TIME(MIN.) =   1.21    Tc(MIN.) =   11.68
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =    2503.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.68
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.567
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.10      0.30     0.100    56
  PUBLIC PARK                B        1.80      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.00      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        5.00      0.30     0.400    56
  COMMERCIAL                 B        2.80      0.30     0.100    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.367
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   42.32
  EFFECTIVE AREA(ACRES) =     85.70   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       85.7       PEAK FLOW RATE(CFS) =     266.23

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.68
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.567
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.80      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.20      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.280
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    9.40
  EFFECTIVE AREA(ACRES) =     88.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       88.7       PEAK FLOW RATE(CFS) =     275.63

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 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.) =   11.68
  RAINFALL INTENSITY(INCH/HR) =   3.57
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.38
  EFFECTIVE STREAM AREA(ACRES) =      88.70
  TOTAL STREAM AREA(ACRES) =      88.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     275.63

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    307.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   317.00
  ELEVATION DATA: UPSTREAM(FEET) =    646.00  DOWNSTREAM(FEET) =    645.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   15.296
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.949
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.40      0.30     0.850    56   15.30
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56   15.42
  PUBLIC PARK                B        1.50      0.30     0.850    56   15.30
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56   15.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.857
  SUBAREA RUNOFF(CFS) =      5.33
  TOTAL AREA(ACRES) =      2.20   PEAK FLOW RATE(CFS) =      5.33

********************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.10 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  645.00  DOWNSTREAM ELEVATION(FEET) =  641.00
  STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      10.07
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.66
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.09
  STREET FLOW TRAVEL TIME(MIN.) =   2.35   Tc(MIN.) =   17.65
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.700
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
```



```
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.40      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.649
  SUBAREA AREA(ACRES) =    4.20      SUBAREA RUNOFF(CFS) =    9.47
  EFFECTIVE AREA(ACRES) =      6.40    AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =        6.4        PEAK FLOW RATE(CFS) =      14.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  15.98
  FLOW VELOCITY(FEET/SEC.) =  2.89   DEPTH*VELOCITY(FT*FT/SEC.) =   1.30
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    307.10 =     692.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    307.10 TO NODE    308.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  641.00  DOWNSTREAM ELEVATION(FEET) =  635.00
  STREET LENGTH(FEET) =   506.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      23.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   18.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.70
  STREET FLOW TRAVEL TIME(MIN.) =   2.49   Tc(MIN.) =   20.14
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.440
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.00      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.80      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.554
  SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =   17.40
  EFFECTIVE AREA(ACRES) =     14.90    AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.63
```

```
  TOTAL AREA(ACRES) =       14.9        PEAK FLOW RATE(CFS) =      30.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.54   HALFSTREET FLOOD WIDTH(FEET) =  21.13
  FLOW VELOCITY(FEET/SEC.) =  3.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.95
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    308.00 =    1198.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   635.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =  1516.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.60
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.20
  PIPE TRAVEL TIME(MIN.) =   2.63    Tc(MIN.) =   22.77
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    305.00 =    2714.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.77
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.266
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.20      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.20      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.80      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.50      0.30     0.400    56
  SCHOOL                     B        0.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.289
  SUBAREA AREA(ACRES) =    5.00      SUBAREA RUNOFF(CFS) =    9.81
  EFFECTIVE AREA(ACRES) =     19.90   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       19.9       PEAK FLOW RATE(CFS) =      37.67

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.77
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.266
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  COMMERCIAL                 B        1.20      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.00      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        6.60      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.415
  SUBAREA AREA(ACRES) =   14.60      SUBAREA RUNOFF(CFS) =   28.13
  EFFECTIVE AREA(ACRES) =     34.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       34.5       PEAK FLOW RATE(CFS) =      65.81

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.77
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.266
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  SCHOOL                     B        0.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.38
  EFFECTIVE AREA(ACRES) =     34.70   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       34.7       PEAK FLOW RATE(CFS) =      66.18

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 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.) =   22.77
  RAINFALL INTENSITY(INCH/HR) =   2.27
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =      34.70
  TOTAL STREAM AREA(ACRES) =      34.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      66.18

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      275.63   11.68    3.567  0.30( 0.11) 0.38      88.7     300.00
      2       66.18   22.77    2.266  0.30( 0.15) 0.49      34.7     306.00
```

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      330.44   11.68    3.567  0.30( 0.12) 0.40     106.5     300.00
      2      237.92   22.77    2.266  0.30( 0.12) 0.41     123.4     306.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     330.44    Tc(MIN.) =    11.68
  EFFECTIVE AREA(ACRES) =     106.50   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      123.4
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    305.00 =    2714.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    310.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   615.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =  2954.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  40.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.50
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     330.44
  PIPE TRAVEL TIME(MIN.) =   1.79    Tc(MIN.) =   13.47
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    310.00 =    5668.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.251
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        4.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.20      0.30     0.600    56
  COMMERCIAL                 B        2.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.164
  SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =   22.48
  EFFECTIVE AREA(ACRES) =    114.30   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      131.2       PEAK FLOW RATE(CFS) =     330.44
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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



```
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.251
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  PUBLIC PARK                B        2.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        6.40      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.60      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.371
  SUBAREA AREA(ACRES) =   12.30      SUBAREA RUNOFF(CFS) =   34.75
  EFFECTIVE AREA(ACRES) =    126.60   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      143.5       PEAK FLOW RATE(CFS) =     357.36

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.251
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.80      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B       10.20      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.50      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.514
  SUBAREA AREA(ACRES) =   19.50      SUBAREA RUNOFF(CFS) =   54.35
  EFFECTIVE AREA(ACRES) =    146.10   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      163.0       PEAK FLOW RATE(CFS) =     411.70

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =  1056.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  41.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.85
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     411.70
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   14.06
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    311.00 =    6724.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.147
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.60      0.30     0.100    56
  COMMERCIAL                 B        3.60      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.10      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.80      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.191
  SUBAREA AREA(ACRES) =   15.10      SUBAREA RUNOFF(CFS) =   41.99
  EFFECTIVE AREA(ACRES) =    161.20   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      178.1       PEAK FLOW RATE(CFS) =     440.00

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    311.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.147
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        6.70      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    6.70      SUBAREA RUNOFF(CFS) =   17.89
  EFFECTIVE AREA(ACRES) =    167.90   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =      184.8       PEAK FLOW RATE(CFS) =     457.89

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  31
```



```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   373.00
  FLOW LENGTH(FEET) =  1373.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  44.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.05
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     457.89
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =   14.85
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    312.00 =    8097.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.85
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.008
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.50      0.30     0.100    56
  COMMERCIAL                 B        4.50      0.30     0.100    56
  APARTMENTS                 B        3.40      0.30     0.200    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.157
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   26.64
  EFFECTIVE AREA(ACRES) =    177.90   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =      194.8       PEAK FLOW RATE(CFS) =     463.51

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    312.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.85
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.008
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.567
  SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    1.53
  EFFECTIVE AREA(ACRES) =    178.50   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
```

```
  TOTAL AREA(ACRES) =      195.4       PEAK FLOW RATE(CFS) =     465.04

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    339.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   373.00  DOWNSTREAM(FEET) =   301.00
  FLOW LENGTH(FEET) =  1370.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  44.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  31.70
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     465.04
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   15.57
  LONGEST FLOWPATH FROM NODE    306.00 TO NODE    339.00 =    9467.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    390.00 TO NODE    391.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   317.00
  ELEVATION DATA: UPSTREAM(FEET) =    860.00  DOWNSTREAM(FEET) =    775.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.195
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.212
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.20      0.30     1.000    72    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.20      0.30     1.000    66    9.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.93
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      4.93

****************************************************************************
  FLOW PROCESS FROM NODE    391.00 TO NODE    392.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```



```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    775.00  DOWNSTREAM(FEET) =    700.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   545.00   CHANNEL SLOPE =  0.1376
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.755
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        1.70      0.30     1.000    72
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.60      0.30     1.000    72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.38
  AVERAGE FLOW DEPTH(FEET) =   0.67   TRAVEL TIME(MIN.) =   1.42
  Tc(MIN.) =   10.62
  SUBAREA AREA(ACRES) =     2.30       SUBAREA RUNOFF(CFS) =    7.15
  EFFECTIVE AREA(ACRES) =      3.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =      11.50

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   6.91
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    392.00 =     862.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    392.00 TO NODE    393.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    700.00  DOWNSTREAM(FEET) =    635.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1093.00   CHANNEL SLOPE =  0.0595
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.292
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.40      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        8.40      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.70      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.40      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        9.20      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.60      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      42.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.96
```

```
  AVERAGE FLOW DEPTH(FEET) =   1.42   TRAVEL TIME(MIN.) =   2.62
  Tc(MIN.) =   13.24
  SUBAREA AREA(ACRES) =    22.70       SUBAREA RUNOFF(CFS) =   61.13
  EFFECTIVE AREA(ACRES) =     26.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       26.4         PEAK FLOW RATE(CFS) =      71.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.73   FLOW VELOCITY(FEET/SEC.) =   7.93
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    393.00 =    1955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    393.00 TO NODE    394.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    635.00  DOWNSTREAM(FEET) =    598.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   904.00   CHANNEL SLOPE =  0.0409
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.950
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.60      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        5.50      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.80      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.60      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.00      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        6.80      0.30     1.000    72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      91.74
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.35
  AVERAGE FLOW DEPTH(FEET) =   2.04   TRAVEL TIME(MIN.) =   2.05
  Tc(MIN.) =   15.29
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   41.27
  EFFECTIVE AREA(ACRES) =     43.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       43.7         PEAK FLOW RATE(CFS) =     104.24

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.14   FLOW VELOCITY(FEET/SEC.) =   7.59
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    394.00 =    2859.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    394.00 TO NODE    394.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.29
```



```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.950
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.50      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =     2.60      SUBAREA RUNOFF(CFS) =     6.20
  EFFECTIVE AREA(ACRES) =     46.30   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       46.3       PEAK FLOW RATE(CFS) =     110.44

****************************************************************************
  FLOW PROCESS FROM NODE    394.00 TO NODE    395.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    598.00  DOWNSTREAM(FEET) =    573.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   664.00   CHANNEL SLOPE =  0.0377
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.800
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        6.30      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        5.90      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.80      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.50      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.20      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.996
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     133.64
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.83
  AVERAGE FLOW DEPTH(FEET) =   2.39   TRAVEL TIME(MIN.) =   1.41
  Tc(MIN.) =   16.70
  SUBAREA AREA(ACRES) =    20.60       SUBAREA RUNOFF(CFS) =   46.38
  EFFECTIVE AREA(ACRES) =     66.90     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       66.9         PEAK FLOW RATE(CFS) =     150.55

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.49   FLOW VELOCITY(FEET/SEC.) =   8.08
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    395.00 =    3523.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    395.00 IS CODE =  81
```

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--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   16.70
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.800
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B       12.60      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.10      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.987
  SUBAREA AREA(ACRES) =   18.20      SUBAREA RUNOFF(CFS) =   41.02
  EFFECTIVE AREA(ACRES) =     85.10   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       85.1       PEAK FLOW RATE(CFS) =     191.57

********************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    370.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   573.00  DOWNSTREAM(FEET) =   389.00
  FLOW LENGTH(FEET) =  5717.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.17
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     191.57
  PIPE TRAVEL TIME(MIN.) =   4.50    Tc(MIN.) =   21.20
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    370.00 =    9240.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    370.00 TO NODE    371.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    389.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1996.00   CHANNEL SLOPE =  0.0220
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.080
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                    B        2.90      0.30     1.000    69
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.40      0.30     1.000    63
  COMMERCIAL                 B        0.50      0.30     0.100    56
  NATURAL FAIR COVER
```



```
  "GRASS"                    B        6.60      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.60      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        6.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.956
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     211.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.18
  AVERAGE FLOW DEPTH(FEET) =   3.13   TRAVEL TIME(MIN.) =   4.64
  Tc(MIN.) =   25.84
  SUBAREA AREA(ACRES) =    24.10       SUBAREA RUNOFF(CFS) =   38.89
  EFFECTIVE AREA(ACRES) =    109.20     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.99
  TOTAL AREA(ACRES) =      109.2         PEAK FLOW RATE(CFS) =     191.57
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  3.02   FLOW VELOCITY(FEET/SEC.) =   7.01
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    371.00 =   11236.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   25.84
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.080
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.10      0.30     1.000    63
  COMMERCIAL                 B        1.10      0.30     0.100    56
  NATURAL FAIR COVER
  "GRASS"                    B        2.00      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.40      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.830
  SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =   11.70
  EFFECTIVE AREA(ACRES) =    116.30   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =      116.3       PEAK FLOW RATE(CFS) =     191.57
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

********************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   25.84
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.080
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.70      0.30      0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        0.20      0.30      1.000    65
  PUBLIC PARK                 B        0.10      0.30      0.850    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B        0.10      0.30      0.500    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        3.00      0.30      1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        1.40      0.30      1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.975
  SUBAREA AREA(ACRES) =    5.50      SUBAREA RUNOFF(CFS) =    8.85
  EFFECTIVE AREA(ACRES) =    121.80   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =      121.8       PEAK FLOW RATE(CFS) =     195.86

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   25.84
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.080
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        1.40      0.30      0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        0.10      0.30      1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.907
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    2.44
  EFFECTIVE AREA(ACRES) =    123.30   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =      123.3       PEAK FLOW RATE(CFS) =     198.30

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    372.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   345.00  DOWNSTREAM(FEET) =   301.00
  FLOW LENGTH(FEET) =   488.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  31.78
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     198.30
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   26.09
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    372.00 =   11724.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    372.00 TO NODE    373.00 IS CODE =  56
```



```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    301.00  DOWNSTREAM(FEET) =    300.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   924.00   CHANNEL SLOPE =  0.0011
  GIVEN CHANNEL BASE(FEET) =   30.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   3.48
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  1.840
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B       32.30      0.30      0.100    56
  COMMERCIAL                  B        2.70      0.30      0.100    56
  COMMERCIAL                  B        0.60      0.30      0.100    56
  COMMERCIAL                  B        1.80      0.30      0.100    56
  PUBLIC PARK                 B        7.20      0.30      0.850    56
  PUBLIC PARK                 B        9.80      0.30      0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.334
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     240.89
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.61
  AVERAGE FLOW DEPTH(FEET) =   2.47   TRAVEL TIME(MIN.) =   5.90
  Tc(MIN.) =   32.00
  SUBAREA AREA(ACRES) =    54.40       SUBAREA RUNOFF(CFS) =   85.17
  EFFECTIVE AREA(ACRES) =    177.70     AREA-AVERAGED Fm(INCH/HR) =   0.23
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.78
  TOTAL AREA(ACRES) =      177.7         PEAK FLOW RATE(CFS) =     256.82
  GIVEN CHANNEL BASE(FEET) =   30.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   3.56

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.56   FLOW VELOCITY(FEET/SEC.) =   2.66
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    373.00 =   12648.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    373.00 TO NODE    373.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   32.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  1.840
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 B        2.60      0.30      0.850    56
  PUBLIC PARK                 B        2.10      0.30      0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        3.50      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        4.80      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        3.60      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.80      0.30      0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.886
  SUBAREA AREA(ACRES) =   17.40      SUBAREA RUNOFF(CFS) =   24.65
  EFFECTIVE AREA(ACRES) =    195.10   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =      195.1       PEAK FLOW RATE(CFS) =     281.47

****************************************************************************
  FLOW PROCESS FROM NODE    373.00 TO NODE    374.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   300.00  DOWNSTREAM(FEET) =   298.00
  FLOW LENGTH(FEET) =  1188.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  90.0 INCH PIPE IS  69.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.69
  ESTIMATED PIPE DIAMETER(INCH) =  90.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     281.47
  PIPE TRAVEL TIME(MIN.) =   2.57    Tc(MIN.) =   34.57
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    321.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    622.00  DOWNSTREAM(FEET) =    621.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.511
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.774
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                B        1.50      0.30     0.200    56   10.51
  APARTMENTS                B        2.00      0.30     0.200    56   10.51
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =     11.70
  TOTAL AREA(ACRES) =      3.50   PEAK FLOW RATE(CFS) =     11.70

****************************************************************************
  FLOW PROCESS FROM NODE    321.00 TO NODE    322.00 IS CODE =  62
----------------------------------------------------------------------------
```



```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  621.00  DOWNSTREAM ELEVATION(FEET) =  612.00
  STREET LENGTH(FEET) =   569.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      19.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.68
  STREET FLOW TRAVEL TIME(MIN.) =   2.61   Tc(MIN.) =   13.12
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.312
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        2.20      0.30     0.200    56
  APARTMENTS                B        3.20      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =   15.81
  EFFECTIVE AREA(ACRES) =      8.90    AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        8.9        PEAK FLOW RATE(CFS) =      26.05

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  18.87
  FLOW VELOCITY(FEET/SEC.) =  3.86   DEPTH*VELOCITY(FT*FT/SEC.) =   1.93
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    322.00 =     899.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    324.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  612.00  DOWNSTREAM ELEVATION(FEET) =  590.00
  STREET LENGTH(FEET) =   891.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      40.78
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   20.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.13
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.72
  STREET FLOW TRAVEL TIME(MIN.) =   2.90   Tc(MIN.) =   16.02
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.872
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.00      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        5.70      0.30     0.400    56
  CONDOMINIUMS               B        1.20      0.30     0.350    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.420
  SUBAREA AREA(ACRES) =   11.90      SUBAREA RUNOFF(CFS) =   29.41
  EFFECTIVE AREA(ACRES) =     20.80    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       20.8        PEAK FLOW RATE(CFS) =      51.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.57   HALFSTREET FLOOD WIDTH(FEET) =  22.70
  FLOW VELOCITY(FEET/SEC.) =  5.42   DEPTH*VELOCITY(FT*FT/SEC.) =   3.08
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    324.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.02
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.872
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.70      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    4.35
  EFFECTIVE AREA(ACRES) =     22.50   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       22.5       PEAK FLOW RATE(CFS) =      56.29

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    325.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   590.00  DOWNSTREAM(FEET) =   575.00
```



```
  FLOW LENGTH(FEET) =   529.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.01
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      56.29
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   16.61
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    325.00 =    2319.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.810
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.30      0.30     0.600    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.544
  SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =   17.15
  EFFECTIVE AREA(ACRES) =     29.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =       29.7       PEAK FLOW RATE(CFS) =      72.17

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    325.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.810
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.80      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       10.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.606
  SUBAREA AREA(ACRES) =   15.30      SUBAREA RUNOFF(CFS) =   36.19
  EFFECTIVE AREA(ACRES) =     45.00   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       45.0       PEAK FLOW RATE(CFS) =     108.36

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    326.00 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) =   515.00
  FLOW LENGTH(FEET) =   284.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  37.75
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     108.36
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   16.73
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    326.00 =    2603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.73
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.797
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        0.70      0.30     0.100    56
  PUBLIC PARK               B        0.10      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.80      0.30     0.900    56
  COMMERCIAL                B        1.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        2.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        0.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.582
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =   12.74
  EFFECTIVE AREA(ACRES) =     50.40   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       50.4       PEAK FLOW RATE(CFS) =     120.57

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.73
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.797
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        2.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        2.80      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.557
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =   11.60
  EFFECTIVE AREA(ACRES) =     55.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       55.3       PEAK FLOW RATE(CFS) =     132.16
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    333.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   500.00
  FLOW LENGTH(FEET) =  1644.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  36.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.14
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     132.16
  PIPE TRAVEL TIME(MIN.) =   2.26    Tc(MIN.) =   18.99
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    333.00 =    4247.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.99
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.556
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        0.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        2.20      0.30     0.900    56
  COMMERCIAL                B        1.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.30      0.30     0.900    56
  COMMERCIAL                B        5.60      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        4.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.467
  SUBAREA AREA(ACRES) =   14.40      SUBAREA RUNOFF(CFS) =   31.32
  EFFECTIVE AREA(ACRES) =     69.70   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       69.7       PEAK FLOW RATE(CFS) =     151.52

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.99
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.556
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        0.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.43
  EFFECTIVE AREA(ACRES) =     69.90   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
```

```
  TOTAL AREA(ACRES) =       69.9       PEAK FLOW RATE(CFS) =     151.95

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 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.) =   18.99
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      69.90
  TOTAL STREAM AREA(ACRES) =      69.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     151.95

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.50 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =    615.00  DOWNSTREAM(FEET) =    614.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.844
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.931
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.40      0.30     0.100    56    9.84
  PUBLIC PARK                B        0.20      0.30     0.850    56   15.64
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.10      0.30     0.400    56   12.11
  COMMERCIAL                 B        0.10      0.30     0.100    56    9.84
  PUBLIC PARK                B        0.10      0.30     0.850    56   15.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.383
  SUBAREA RUNOFF(CFS) =      3.09
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      3.09

****************************************************************************
  FLOW PROCESS FROM NODE    327.50 TO NODE    328.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  614.00  DOWNSTREAM ELEVATION(FEET) =  610.00
  STREET LENGTH(FEET) =   425.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```



```
  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) =       7.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.39
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
  STREET FLOW TRAVEL TIME(MIN.) =   2.96   Tc(MIN.) =   12.81
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.368
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.00      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.348
  SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    9.40
  EFFECTIVE AREA(ACRES) =      4.10    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        4.1        PEAK FLOW RATE(CFS) =      12.03

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.27
  FLOW VELOCITY(FEET/SEC.) =  2.64   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    328.00 =     754.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    329.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  610.00  DOWNSTREAM ELEVATION(FEET) =  595.00
  STREET LENGTH(FEET) =   366.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      20.66
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
```

```
    HALFSTREET FLOOD WIDTH(FEET) =   14.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.30
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.19
  STREET FLOW TRAVEL TIME(MIN.) =   1.15   Tc(MIN.) =   13.96
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.165
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.10      0.30     0.400    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.10      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.407
  SUBAREA AREA(ACRES) =    6.30      SUBAREA RUNOFF(CFS) =   17.25
  EFFECTIVE AREA(ACRES) =     10.40    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       10.4        PEAK FLOW RATE(CFS) =      28.54

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.13
  FLOW VELOCITY(FEET/SEC.) =  5.67   DEPTH*VELOCITY(FT*FT/SEC.) =   2.55
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    329.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.96
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.165
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.80      0.30     0.400    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        6.10      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.402
  SUBAREA AREA(ACRES) =    9.00      SUBAREA RUNOFF(CFS) =   24.66
  EFFECTIVE AREA(ACRES) =     19.40   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       19.4       PEAK FLOW RATE(CFS) =      53.19

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    330.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   595.00  DOWNSTREAM(FEET) =   575.00
```



```
  FLOW LENGTH(FEET) =   378.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.83
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.19
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   14.29
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    330.00 =    1498.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.29
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.106
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.90      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.10      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.50      0.30     0.400    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       10.20      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.90      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.561
  SUBAREA AREA(ACRES) =   19.20      SUBAREA RUNOFF(CFS) =   50.76
  EFFECTIVE AREA(ACRES) =     38.60   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       38.6       PEAK FLOW RATE(CFS) =     102.92

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    331.00 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) =   555.00
  FLOW LENGTH(FEET) =   457.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.14
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     102.92
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   14.67
  LONGEST FLOWPATH FROM NODE    327.00 TO NODE    331.00 =    1955.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.67
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.039
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        1.10      0.30      0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.80      0.30      0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B       10.50      0.30      0.600    56
 COMMERCIAL                 B        0.30      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.50      0.30      0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B       13.70      0.30      0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.619
 SUBAREA AREA(ACRES) =   26.90      SUBAREA RUNOFF(CFS) =   69.07
 EFFECTIVE AREA(ACRES) =     65.50   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
 TOTAL AREA(ACRES) =       65.5       PEAK FLOW RATE(CFS) =     169.67

****************************************************************************
 FLOW PROCESS FROM NODE    331.00 TO NODE    332.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   555.00  DOWNSTREAM(FEET) =   520.00
 FLOW LENGTH(FEET) =   324.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  32.80
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     169.67
 PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   14.84
 LONGEST FLOWPATH FROM NODE    327.00 TO NODE    332.00 =    2279.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    332.00 TO NODE    332.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.84
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.010
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.10      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.10      0.30      0.900    56
 COMMERCIAL                 B        3.70      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        5.00      0.30      0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.621
 SUBAREA AREA(ACRES) =   10.90      SUBAREA RUNOFF(CFS) =   27.70
 EFFECTIVE AREA(ACRES) =     76.40   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =       76.4       PEAK FLOW RATE(CFS) =     195.66

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



```
 FLOW PROCESS FROM NODE    332.00 TO NODE    333.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   520.00  DOWNSTREAM(FEET) =   500.00
 FLOW LENGTH(FEET) =  1740.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  54.0 INCH PIPE IS  43.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.33
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     195.66
 PIPE TRAVEL TIME(MIN.) =   2.02    Tc(MIN.) =   16.86
 LONGEST FLOWPATH FROM NODE    327.00 TO NODE    333.00 =    4019.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.86
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.783
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.20      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        4.40      0.30      0.900    56
 COMMERCIAL                 B        3.90      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        9.80      0.30      0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.689
 SUBAREA AREA(ACRES) =   19.30      SUBAREA RUNOFF(CFS) =   44.75
 EFFECTIVE AREA(ACRES) =     95.70   AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.58
 TOTAL AREA(ACRES) =       95.7       PEAK FLOW RATE(CFS) =     224.82

****************************************************************************
 FLOW PROCESS FROM NODE    333.00 TO NODE    333.00 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.) =   16.86
 RAINFALL INTENSITY(INCH/HR) =   2.78
 AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.58
 EFFECTIVE STREAM AREA(ACRES) =      95.70
 TOTAL STREAM AREA(ACRES) =      95.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     224.82

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      151.95   18.99    2.556  0.30( 0.14) 0.47      69.9     320.00
```

```
     2      224.82   16.86    2.783  0.30( 0.17) 0.58      95.7     327.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      372.38   16.86    2.783  0.30( 0.16) 0.53     157.8     327.00
      2      357.24   18.99    2.556  0.30( 0.16) 0.53     165.6     320.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     372.38    Tc(MIN.) =    16.86
  EFFECTIVE AREA(ACRES) =     157.76   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      165.6
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    333.00 =    4247.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    333.00 TO NODE    334.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   819.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  41.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.10
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     372.38
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   17.36
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    334.00 =    5066.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.36
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.729
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        4.00      0.30     0.200    56
  COMMERCIAL                 B        2.30      0.30     0.100    56
  COMMERCIAL                 B        1.00      0.30     0.100    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  PUBLIC PARK                B        2.40      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.50      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.310
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   32.27
  EFFECTIVE AREA(ACRES) =    171.36   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      179.2       PEAK FLOW RATE(CFS) =     397.05

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



```
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.36
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.729
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.00      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.60      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.10      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.330
  SUBAREA AREA(ACRES) =    5.70      SUBAREA RUNOFF(CFS) =   13.49
  EFFECTIVE AREA(ACRES) =    177.06   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      184.9       PEAK FLOW RATE(CFS) =     410.54

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 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.) =   17.36
  RAINFALL INTENSITY(INCH/HR) =   2.73
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =     177.06
  TOTAL STREAM AREA(ACRES) =     184.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     410.54

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    351.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    492.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.730
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.735
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.80      0.30     0.600    56   10.73
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.70      0.30     0.600    56   10.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      8.00
  TOTAL AREA(ACRES) =      2.50   PEAK FLOW RATE(CFS) =      8.00

****************************************************************************
  FLOW PROCESS FROM NODE    351.00 TO NODE    352.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  492.00  DOWNSTREAM ELEVATION(FEET) =  488.00
  STREET LENGTH(FEET) =   456.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      12.94
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   15.98
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
  STREET FLOW TRAVEL TIME(MIN.) =   2.90   Tc(MIN.) =   13.63
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.222
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.20      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.40      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    9.86
  EFFECTIVE AREA(ACRES) =      6.10    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        6.1        PEAK FLOW RATE(CFS) =      16.70

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.70
  FLOW VELOCITY(FEET/SEC.) =  2.79   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    352.00 =     786.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    352.00 TO NODE    353.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   488.00  DOWNSTREAM(FEET) =   485.00
  FLOW LENGTH(FEET) =   883.00   MANNING'S N =  0.013
```



```
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.91
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.70
  PIPE TRAVEL TIME(MIN.) =   3.00    Tc(MIN.) =   16.63
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    353.00 =    1669.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    353.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.63
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.807
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.50      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.10      0.30     0.400    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.60      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.50      0.30     0.400    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.70      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.471
  SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =   20.39
  EFFECTIVE AREA(ACRES) =     14.60   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       14.6       PEAK FLOW RATE(CFS) =      34.82

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    353.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.63
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.807
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.73
  EFFECTIVE AREA(ACRES) =     14.90   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       14.9       PEAK FLOW RATE(CFS) =      35.54

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    334.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =  1136.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.30
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.54
  PIPE TRAVEL TIME(MIN.) =   1.84    Tc(MIN.) =   18.47
  LONGEST FLOWPATH FROM NODE    350.00 TO NODE    334.00 =    2805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.612
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        2.00      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.40      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.50      0.30     0.400    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  PUBLIC PARK                B        1.50      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =   17.26
  EFFECTIVE AREA(ACRES) =     22.70   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       22.7       PEAK FLOW RATE(CFS) =      50.18

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.612
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.10      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.40      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.262
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =   10.26
  EFFECTIVE AREA(ACRES) =     27.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       27.2       PEAK FLOW RATE(CFS) =      60.44

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



```
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.612
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.20      0.30     0.600    56
  PUBLIC PARK                B        2.70      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        7.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.674
  SUBAREA AREA(ACRES) =   12.00      SUBAREA RUNOFF(CFS) =   26.02
  EFFECTIVE AREA(ACRES) =     39.20   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       39.2       PEAK FLOW RATE(CFS) =      86.46

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.612
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.60      0.30     0.850    56
  SCHOOL                     B        3.10      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.626
  SUBAREA AREA(ACRES) =    3.80      SUBAREA RUNOFF(CFS) =    8.29
  EFFECTIVE AREA(ACRES) =     43.00   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       43.0       PEAK FLOW RATE(CFS) =      94.75

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    334.00 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.) =   18.47
  RAINFALL INTENSITY(INCH/HR) =   2.61
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30
```

```
 AREA-AVERAGED Ap =  0.54
 EFFECTIVE STREAM AREA(ACRES) =      43.00
 TOTAL STREAM AREA(ACRES) =      43.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      94.75

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      410.54   17.36    2.729  0.30( 0.15) 0.51     177.1     327.00
     1      390.85   19.51    2.501  0.30( 0.15) 0.51     184.9     320.00
     2       94.75   18.47    2.612  0.30( 0.16) 0.54      43.0     350.00

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      503.90   17.36    2.729  0.30( 0.16) 0.52     217.5     327.00
     2      495.13   18.47    2.612  0.30( 0.15) 0.52     224.1     350.00
     3      481.33   19.51    2.501  0.30( 0.15) 0.52     227.9     320.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     503.90    Tc(MIN.) =    17.36
 EFFECTIVE AREA(ACRES) =     217.48   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
 TOTAL AREA(ACRES) =      227.9
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    334.00 =    5066.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    334.00 TO NODE    335.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   422.00
 FLOW LENGTH(FEET) =  1086.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  60.0 INCH PIPE IS  48.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  29.52
 ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     503.90
 PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =   17.98
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    335.00 =    6152.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    335.00 TO NODE    335.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.98
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.664
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                B        3.00      0.30     0.100    56
 COMMERCIAL                B        4.20      0.30     0.100    56
 PUBLIC PARK               B        0.60      0.30     0.850    56
 PUBLIC PARK               B       10.80      0.30     0.850    56
```



```
 RESIDENTIAL
 ".4 DWELLING/ACRE"        B        1.00      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"        B        3.90      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.631
 SUBAREA AREA(ACRES) =   23.50      SUBAREA RUNOFF(CFS) =   52.35
 EFFECTIVE AREA(ACRES) =    240.98   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =      251.4       PEAK FLOW RATE(CFS) =     543.47

****************************************************************************
 FLOW PROCESS FROM NODE    335.00 TO NODE    335.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.98
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.664
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"      B        0.10      0.30     0.600    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"      B        0.10      0.30     0.600    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"      B        0.10      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"      B        9.20      0.30     0.500    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"     B        0.70      0.30     0.400    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"     B        2.90      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.474
 SUBAREA AREA(ACRES) =   13.10      SUBAREA RUNOFF(CFS) =   29.73
 EFFECTIVE AREA(ACRES) =    254.08   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =      264.5       PEAK FLOW RATE(CFS) =     573.21

****************************************************************************
 FLOW PROCESS FROM NODE    335.00 TO NODE    336.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   422.00  DOWNSTREAM(FEET) =   380.00
 FLOW LENGTH(FEET) =   780.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  60.0 INCH PIPE IS  49.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  33.29
 ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     573.21
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   18.37
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    336.00 =    6932.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   18.37
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.623
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.70      0.30     0.100    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  COMMERCIAL                 B        1.60      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.70      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.60      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.182
  SUBAREA AREA(ACRES) =   12.30      SUBAREA RUNOFF(CFS) =   28.43
  EFFECTIVE AREA(ACRES) =    266.38   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      276.8       PEAK FLOW RATE(CFS) =     592.14

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   18.37
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.623
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.40      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       16.80      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.611
  SUBAREA AREA(ACRES) =   22.20      SUBAREA RUNOFF(CFS) =   48.74
  EFFECTIVE AREA(ACRES) =    288.58   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      299.0       PEAK FLOW RATE(CFS) =     640.87

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   18.37
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.623
```



```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        6.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    6.30      SUBAREA RUNOFF(CFS) =   14.19
  EFFECTIVE AREA(ACRES) =    294.88   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      305.3       PEAK FLOW RATE(CFS) =     655.06

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    337.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   380.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =   803.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  69.0 INCH PIPE IS  53.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.37
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     655.06
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   18.81
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    337.00 =    7735.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   18.81
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.576
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.40      0.30     0.200    56
  APARTMENTS                 B        3.00      0.30     0.200    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  COMMERCIAL                 B        2.70      0.30     0.100    56
  COMMERCIAL                 B        6.00      0.30     0.100    56
  PUBLIC PARK                B        1.30      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.189
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =   33.33
  EFFECTIVE AREA(ACRES) =    309.58   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      320.0       PEAK FLOW RATE(CFS) =     675.94

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   18.81
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.576
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 B        3.30      0.30      0.850    56
  PUBLIC PARK                 B        1.50      0.30      0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        2.50      0.30      0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        6.70      0.30      0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        2.20      0.30      0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        0.10      0.30      0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.488
  SUBAREA AREA(ACRES) =   16.30      SUBAREA RUNOFF(CFS) =   35.64
  EFFECTIVE AREA(ACRES) =    325.88   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      336.3       PEAK FLOW RATE(CFS) =     711.58

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    337.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.81
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.576
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        0.60      0.30      0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        4.60      0.30      0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        2.90      0.30      0.400    56
  SCHOOL                      B        0.20      0.30      0.600    56
  SCHOOL                      B        5.90      0.30      0.600    56
  SCHOOL                      B        6.00      0.30      0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.526
  SUBAREA AREA(ACRES) =   20.20      SUBAREA RUNOFF(CFS) =   43.96
  EFFECTIVE AREA(ACRES) =    346.08   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      356.5       PEAK FLOW RATE(CFS) =     755.54

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    338.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.00  DOWNSTREAM(FEET) =   332.00
  FLOW LENGTH(FEET) =   838.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  81.0 INCH PIPE IS  62.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.61
  ESTIMATED PIPE DIAMETER(INCH) =  81.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     755.54
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   19.35
```



```
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    338.00 =    8573.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.518
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                  B        6.90      0.30      0.200    56
  COMMERCIAL                  B        2.80      0.30      0.100    56
  COMMERCIAL                  B       11.50      0.30      0.100    56
  COMMERCIAL                  B        4.70      0.30      0.100    56
  COMMERCIAL                  B        8.60      0.30      0.100    56
  PUBLIC PARK                 B        2.60      0.30      0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.171
  SUBAREA AREA(ACRES) =   37.10      SUBAREA RUNOFF(CFS) =   82.35
  EFFECTIVE AREA(ACRES) =    383.18   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =      393.6       PEAK FLOW RATE(CFS) =     819.82

****************************************************************************
  FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.518
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 B        0.10      0.30      0.850    56
  PUBLIC PARK                 B        0.60      0.30      0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        0.30      0.30      0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        9.70      0.30      0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        1.20      0.30      0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        3.40      0.30      0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.230
  SUBAREA AREA(ACRES) =   15.30      SUBAREA RUNOFF(CFS) =   33.72
  EFFECTIVE AREA(ACRES) =    398.48   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      408.9       PEAK FLOW RATE(CFS) =     853.54

****************************************************************************
  FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.35
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.518
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        5.60      0.30     0.100    56
 COMMERCIAL                 B        3.60      0.30     0.100    56
 COMMERCIAL                 B        5.80      0.30     0.100    56
 SCHOOL                     B        0.80      0.30     0.600    56
 SCHOOL                     B        1.20      0.30     0.600    56
 SCHOOL                     B        4.50      0.30     0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.251
 SUBAREA AREA(ACRES) =   21.50      SUBAREA RUNOFF(CFS) =   47.26
 EFFECTIVE AREA(ACRES) =    419.98   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      430.4       PEAK FLOW RATE(CFS) =     900.80

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    338.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.35
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.518
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.61
 EFFECTIVE AREA(ACRES) =    420.28   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      430.7       PEAK FLOW RATE(CFS) =     901.40

****************************************************************************
 FLOW PROCESS FROM NODE    338.00 TO NODE    339.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   332.00  DOWNSTREAM(FEET) =   301.00
 FLOW LENGTH(FEET) =  1956.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  90.0 INCH PIPE IS  72.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  23.66
 ESTIMATED PIPE DIAMETER(INCH) =  90.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     901.40
 PIPE TRAVEL TIME(MIN.) =   1.38    Tc(MIN.) =   20.73
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    339.00 TO NODE    339.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
```



```
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      901.40   20.73    2.401  0.30( 0.13) 0.45     420.3     327.00
     2      877.32   21.84    2.327  0.30( 0.13) 0.45     426.9     350.00
     3      858.13   22.90    2.257  0.30( 0.13) 0.45     430.7     320.00
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      465.04   15.57    2.920  0.30( 0.11) 0.38     178.5     300.00
     2      342.36   27.00    2.027  0.30( 0.12) 0.39     195.4     306.00
 LONGEST FLOWPATH FROM NODE    306.00 TO NODE    339.00 =    9467.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1     1297.30   15.57    2.920  0.30( 0.13) 0.42     494.1     300.00
     2     1311.03   20.73    2.401  0.30( 0.13) 0.43     606.4     327.00
     3     1275.01   21.84    2.327  0.30( 0.13) 0.43     614.7     350.00
     4     1244.51   22.90    2.257  0.30( 0.13) 0.43     620.0     320.00
     5     1107.53   27.00    2.027  0.30( 0.13) 0.43     626.1     306.00
   TOTAL AREA(ACRES) =       626.1

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     1311.03  Tc(MIN.) =   20.732
 EFFECTIVE AREA(ACRES) =    606.42  AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =      626.1
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    339.00 =   10529.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    339.00 TO NODE    340.00 IS CODE =  56
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    301.00  DOWNSTREAM(FEET) =    300.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   196.00   CHANNEL SLOPE =  0.0051
 GIVEN CHANNEL BASE(FEET) =  300.00   CHANNEL FREEBOARD(FEET) =  1.0
 "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
 *ESTIMATED CHANNEL HEIGHT(FEET) =   2.15
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.345
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B       31.90      0.30     0.100    56
 COMMERCIAL                 B        2.30      0.30     0.100    56
 COMMERCIAL                 B        1.90      0.30     0.100    56
 COMMERCIAL                 B        1.00      0.30     0.100    56
 PUBLIC PARK                B        3.10      0.30     0.850    56
 PUBLIC PARK                B        0.80      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.171
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    1353.34
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.86
 AVERAGE FLOW DEPTH(FEET) =   1.15   TRAVEL TIME(MIN.) =   0.85
 Tc(MIN.) =   21.58
```

```
  SUBAREA AREA(ACRES) =    41.00       SUBAREA RUNOFF(CFS) =   84.62
  EFFECTIVE AREA(ACRES) =    647.42     AREA-AVERAGED Fm(INCH/HR) =   0.12
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.41
  TOTAL AREA(ACRES) =      667.1         PEAK FLOW RATE(CFS) =    1311.03
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
  GIVEN CHANNEL BASE(FEET) =  300.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   2.13

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.13   FLOW VELOCITY(FEET/SEC.) =   3.81
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    340.00 =   10725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    340.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.58
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.345
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.00      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.80      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.899
  SUBAREA AREA(ACRES) =    8.40      SUBAREA RUNOFF(CFS) =   15.69
  EFFECTIVE AREA(ACRES) =    655.82   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      675.5       PEAK FLOW RATE(CFS) =    1311.03
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1     1324.09   16.42    2.830  0.30( 0.12) 0.41     543.5     300.00
      2     1311.03   21.58    2.345  0.30( 0.13) 0.42     655.8     327.00
      3     1281.88   22.70    2.270  0.30( 0.13) 0.42     664.1     350.00
      4     1249.75   23.76    2.200  0.30( 0.13) 0.42     669.4     320.00
      5     1130.99   27.90    1.986  0.30( 0.13) 0.42     675.5     306.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =    1324.09  Tc(MIN.) =   16.42
  AREA-AVERAGED Fm(INCH/HR) =  0.12  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.41  EFFECTIVE AREA(ACRES) =     543.53

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    374.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```



```
  ELEVATION DATA: UPSTREAM(FEET) =   300.00  DOWNSTREAM(FEET) =   298.00
  FLOW LENGTH(FEET) =   221.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN 120.0 INCH PIPE IS  87.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.46
  ESTIMATED PIPE DIAMETER(INCH) = 120.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    1324.09
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   16.59
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    374.00 =   10946.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1     1324.09   16.59    2.812  0.30( 0.12) 0.41     543.5     300.00
      2     1311.03   21.75    2.333  0.30( 0.13) 0.42     655.8     327.00
      3     1281.88   22.87    2.259  0.30( 0.13) 0.42     664.1     350.00
      4     1249.75   23.94    2.188  0.30( 0.13) 0.42     669.4     320.00
      5     1130.99   28.08    1.978  0.30( 0.13) 0.42     675.5     306.00
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    374.00 =   10946.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      281.47   34.57    1.774  0.30( 0.24) 0.79     195.1     390.00
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1     1550.35   16.59    2.812  0.30( 0.14) 0.47     637.2     300.00
      2     1552.52   21.75    2.333  0.30( 0.14) 0.48     778.6     327.00
      3     1526.84   22.87    2.259  0.30( 0.14) 0.48     793.2     350.00
      4     1497.17   23.94    2.188  0.30( 0.14) 0.48     804.5     320.00
      5     1389.98   28.08    1.978  0.30( 0.15) 0.49     834.0     306.00
      6     1287.71   34.57    1.774  0.30( 0.15) 0.50     870.6     390.00
    TOTAL AREA(ACRES) =       870.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     1552.52  Tc(MIN.) =   21.749
  EFFECTIVE AREA(ACRES) =    778.56  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      870.6
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    374.00 =   13836.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    374.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    374.00 TO NODE    380.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   298.00  DOWNSTREAM(FEET) =   261.00
  FLOW LENGTH(FEET) =  1402.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN 102.0 INCH PIPE IS  78.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.10
  ESTIMATED PIPE DIAMETER(INCH) = 102.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    1552.52
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   22.46
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    380.00 =   15238.00 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      870.6  TC(MIN.) =     22.46
  EFFECTIVE AREA(ACRES) =    778.56  AREA-AVERAGED Fm(INCH/HR)=  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.477
  PEAK FLOW RATE(CFS)   =    1552.52

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1     1550.35   17.30    2.737  0.30( 0.14) 0.47     637.2     300.00
      2     1552.52   22.46    2.286  0.30( 0.14) 0.48     778.6     327.00
      3     1526.84   23.58    2.212  0.30( 0.14) 0.48     793.2     350.00
      4     1497.17   24.64    2.142  0.30( 0.14) 0.48     804.5     320.00
      5     1389.98   28.81    1.945  0.30( 0.15) 0.49     834.0     306.00
      6     1287.71   35.32    1.755  0.30( 0.15) 0.50     870.6     390.00
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2013 Advanced Engineering Software (aes)
             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:

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 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA D ROMP 2018                                         *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 2-YR EV NOVEMBER 2018 FKAZI                                          *
 ************************************************************************

  FILE NAME: 3D02EVRL.DAT
  TIME/DATE OF STUDY: 09:51 01/17/2019
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  1.857
   2)   10.00;  1.238
   3)   15.00;  0.945
   4)   20.00;  0.774
   5)   25.00;  0.667
   6)   30.00;  0.591
   7)   40.00;  0.510
   8)   50.00;  0.453
   9)   60.00;  0.390
  10)   90.00;  0.330
  11)  120.00;  0.270
  12)  180.00;  0.210
  13)  360.00;  0.150
  14) 1200.00;  0.083
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    605.00  DOWNSTREAM(FEET) =    586.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.417
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.558
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          -        1.20      0.60     0.900    56    8.77
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        -        1.30      0.60     0.600    56    7.42
  PUBLIC PARK                 -        2.40      0.60     0.850    56    8.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.796
  SUBAREA RUNOFF(CFS) =      4.76
  TOTAL AREA(ACRES) =      4.90   PEAK FLOW RATE(CFS) =      4.76

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  586.00  DOWNSTREAM ELEVATION(FEET) =  583.00
  STREET LENGTH(FEET) =   333.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       7.74
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.34
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.92
  STREET FLOW TRAVEL TIME(MIN.) =   2.37   Tc(MIN.) =    9.79
```

```
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.265
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.10      0.60     0.900     -
USER-DEFINED               -        0.40      0.60     0.850     -
USER-DEFINED               -        1.90      0.60     0.400     -
USER-DEFINED               -        4.70      0.60     0.600     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.565
SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =    5.92
EFFECTIVE AREA(ACRES) =     12.00    AREA-AVERAGED Fm(INCH/HR) =  0.40
AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.66
TOTAL AREA(ACRES) =       12.0        PEAK FLOW RATE(CFS) =       9.39

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.87
FLOW VELOCITY(FEET/SEC.) =  2.46   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     663.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    402.00 TO NODE    402.50 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  583.00  DOWNSTREAM ELEVATION(FEET) =  580.00
STREET LENGTH(FEET) =   315.00   CURB HEIGHT(INCHES) =  8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.018
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

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) =      11.11
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.43
  HALFSTREET FLOOD WIDTH(FEET) =   14.73
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.61
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
STREET FLOW TRAVEL TIME(MIN.) =   2.01   Tc(MIN.) =   11.80
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.133
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.50      0.60     0.850     -
USER-DEFINED               -        1.80      0.60     0.600     -
USER-DEFINED               -        0.10      0.60     0.500     -
USER-DEFINED               -        2.30      0.60     0.400     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
SUBAREA AREA(ACRES) =    4.70      SUBAREA RUNOFF(CFS) =    3.45
EFFECTIVE AREA(ACRES) =     16.70    AREA-AVERAGED Fm(INCH/HR) =  0.37
```



```
AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.62
TOTAL AREA(ACRES) =       16.7        PEAK FLOW RATE(CFS) =      11.42

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.88
FLOW VELOCITY(FEET/SEC.) =  2.63   DEPTH*VELOCITY(FT*FT/SEC.) =   1.13
LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.50 =     978.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    402.50 TO NODE    403.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  580.00  DOWNSTREAM ELEVATION(FEET) =  579.00
STREET LENGTH(FEET) =   394.00   CURB HEIGHT(INCHES) =  8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.018
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

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) =      12.33
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.52
  HALFSTREET FLOOD WIDTH(FEET) =   20.12
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.62
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
STREET FLOW TRAVEL TIME(MIN.) =   4.06   Tc(MIN.) =   15.85
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.916
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.20      0.60     0.850     -
USER-DEFINED               -        0.10      0.60     0.600     -
USER-DEFINED               -        2.80      0.60     0.400     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.435
SUBAREA AREA(ACRES) =    3.10      SUBAREA RUNOFF(CFS) =    1.83
EFFECTIVE AREA(ACRES) =     19.80    AREA-AVERAGED Fm(INCH/HR) =  0.36
AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.59
TOTAL AREA(ACRES) =       19.8        PEAK FLOW RATE(CFS) =      11.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.49
FLOW VELOCITY(FEET/SEC.) =  1.59   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1372.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  579.00  DOWNSTREAM ELEVATION(FEET) =  560.00
  STREET LENGTH(FEET) =   974.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      13.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.48
  STREET FLOW TRAVEL TIME(MIN.) =   4.50   Tc(MIN.) =   20.35
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.766
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.80      0.60     0.100     -
  USER-DEFINED               -        0.70      0.60     0.100     -
  USER-DEFINED               -        1.10      0.60     0.850     -
  USER-DEFINED               -        0.70      0.60     0.850     -
  USER-DEFINED               -        0.10      0.60     0.200     -
  USER-DEFINED               -        0.30      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.267
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =    4.75
  EFFECTIVE AREA(ACRES) =     28.50    AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       28.5        PEAK FLOW RATE(CFS) =      12.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.09
  FLOW VELOCITY(FEET/SEC.) =  3.50   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =    2346.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.35
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.766
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     1.000     -
  USER-DEFINED               -        0.10      0.60     0.600     -
  USER-DEFINED               -        2.30      0.60     0.900     -
  USER-DEFINED               -        2.70      0.60     0.500     -
```



```
  USER-DEFINED               -        3.40      0.60     0.400     -
  USER-DEFINED               -        5.30      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.432
  SUBAREA AREA(ACRES) =   13.90      SUBAREA RUNOFF(CFS) =    6.35
  EFFECTIVE AREA(ACRES) =     42.40   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       42.4       PEAK FLOW RATE(CFS) =      18.42

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.35
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.766
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.04
  EFFECTIVE AREA(ACRES) =     42.60   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       42.6       PEAK FLOW RATE(CFS) =      18.46

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.35
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.766
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.200     -
  USER-DEFINED               -        0.10      0.60     0.200     -
  USER-DEFINED               -        0.20      0.60     0.400     -
  USER-DEFINED               -        1.50      0.60     0.850     -
  USER-DEFINED               -        2.50      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.590
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    1.67
  EFFECTIVE AREA(ACRES) =     47.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       47.1       PEAK FLOW RATE(CFS) =      20.13

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.35
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.766
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        2.80      0.60      0.850     -
  USER-DEFINED                -        3.00      0.60      0.900     -
  USER-DEFINED                -        6.40      0.60      0.500     -
  USER-DEFINED                -        6.70      0.60      0.600     -
  USER-DEFINED                -        4.30      0.60      0.900     -
  USER-DEFINED                -        8.70      0.60      0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.671
  SUBAREA AREA(ACRES) =   31.90      SUBAREA RUNOFF(CFS) =   10.46
  EFFECTIVE AREA(ACRES) =     79.00   AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       79.0       PEAK FLOW RATE(CFS) =      30.59

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 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.) =   20.35
  RAINFALL INTENSITY(INCH/HR) =   0.77
  AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =      79.00
  TOTAL STREAM AREA(ACRES) =      79.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.59

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    431.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =    729.00  DOWNSTREAM(FEET) =    630.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.120
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.347
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"      -        0.10      0.60      1.000    56    9.12
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        1.30      0.60      1.000    56    9.12
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        0.10      0.60      1.000    56    9.12
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.01
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      1.01

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



```
  FLOW PROCESS FROM NODE    431.00 TO NODE    432.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    630.00  DOWNSTREAM(FEET) =    597.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   196.00   CHANNEL SLOPE =  0.1684
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.257
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        1.70      0.60      1.000     -
  USER-DEFINED                -        0.10      0.60      1.000     -
  USER-DEFINED                -        0.10      0.60      1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.57
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.52
  AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =   0.72
  Tc(MIN.) =    9.84
  SUBAREA AREA(ACRES) =     1.90      SUBAREA RUNOFF(CFS) =    1.12
  EFFECTIVE AREA(ACRES) =      3.40     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.4         PEAK FLOW RATE(CFS) =       2.01

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   4.87
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    432.00 =     525.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    432.00 TO NODE    433.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    597.00  DOWNSTREAM(FEET) =    570.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   243.00   CHANNEL SLOPE =  0.1111
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.196
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.10      0.60      0.900     -
  USER-DEFINED                -        3.80      0.60      1.000     -
  USER-DEFINED                -        0.30      0.60      1.000     -
  USER-DEFINED                -        0.10      0.60      1.000     -
  USER-DEFINED                -        0.20      0.60      1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.998
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.22
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.59
  AVERAGE FLOW DEPTH(FEET) =   0.48   TRAVEL TIME(MIN.) =   0.88
  Tc(MIN.) =   10.72
  SUBAREA AREA(ACRES) =     4.50      SUBAREA RUNOFF(CFS) =    2.42
  EFFECTIVE AREA(ACRES) =      7.90     AREA-AVERAGED Fm(INCH/HR) =   0.60
```

```
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        7.9         PEAK FLOW RATE(CFS) =       4.24

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.53   FLOW VELOCITY(FEET/SEC.) =   5.01
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.00 =     768.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    433.00 TO NODE    433.10 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) =   564.00
  FLOW LENGTH(FEET) =  1076.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.24
  PIPE TRAVEL TIME(MIN.) =   4.12    Tc(MIN.) =   14.85
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.10 =    1844.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    433.10 TO NODE    433.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.85
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.954
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.50      0.60     0.850     -
  USER-DEFINED               -        1.70      0.60     0.900     -
  USER-DEFINED               -        5.40      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.613
  SUBAREA AREA(ACRES) =    7.60      SUBAREA RUNOFF(CFS) =    4.01
  EFFECTIVE AREA(ACRES) =     15.50   AREA-AVERAGED Fm(INCH/HR) =  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.81
  TOTAL AREA(ACRES) =       15.5       PEAK FLOW RATE(CFS) =       6.54

****************************************************************************
  FLOW PROCESS FROM NODE    433.10 TO NODE    404.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   564.00  DOWNSTREAM(FEET) =   560.00
  FLOW LENGTH(FEET) =   830.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.45
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.54
  PIPE TRAVEL TIME(MIN.) =   3.11    Tc(MIN.) =   17.95
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    404.00 =    2674.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 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.) =   17.95
  RAINFALL INTENSITY(INCH/HR) =   0.84
  AREA-AVERAGED Fm(INCH/HR) =  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.81
  EFFECTIVE STREAM AREA(ACRES) =      15.50
  TOTAL STREAM AREA(ACRES) =      15.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.54

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.59   20.35    0.766  0.60( 0.34) 0.56      79.0     400.00
      2        6.54   17.95    0.844  0.60( 0.49) 0.81      15.5     430.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       37.12   17.95    0.844  0.60( 0.36) 0.61      85.2     430.00
      2       35.71   20.35    0.766  0.60( 0.36) 0.60      94.5     400.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      37.12    Tc(MIN.) =    17.95
  EFFECTIVE AREA(ACRES) =      85.18   AREA-AVERAGED Fm(INCH/HR) =  0.36
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       94.5
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    404.00 =    2674.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    405.00 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) =   557.00
  FLOW LENGTH(FEET) =   377.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.42
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.12
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =   18.70
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    405.00 =    3051.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
  MAINLINE Tc(MIN.) =   18.70
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.818
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.30      0.60     0.100     -
  USER-DEFINED               -        0.90      0.60     0.850     -
  USER-DEFINED               -        0.20      0.60     0.200     -
  USER-DEFINED               -        4.50      0.60     0.500     -
  USER-DEFINED               -        3.20      0.60     0.400     -
  USER-DEFINED               -        1.20      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.406
  SUBAREA AREA(ACRES) =   11.30      SUBAREA RUNOFF(CFS) =    5.85
  EFFECTIVE AREA(ACRES) =     96.48   AREA-AVERAGED Fm(INCH/HR) =  0.35
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =      105.8       PEAK FLOW RATE(CFS) =      40.74

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.70
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.818
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.60     0.850     -
  USER-DEFINED               -        0.10      0.60     0.200     -
  USER-DEFINED               -        4.20      0.60     0.500     -
  USER-DEFINED               -        3.80      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.459
  SUBAREA AREA(ACRES) =    8.30      SUBAREA RUNOFF(CFS) =    4.06
  EFFECTIVE AREA(ACRES) =    104.78   AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =      114.1       PEAK FLOW RATE(CFS) =      44.80

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.70
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.818
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.80      0.60     0.200     -
  USER-DEFINED               -        0.10      0.60     0.600     -
  USER-DEFINED               -        5.20      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.307
  SUBAREA AREA(ACRES) =   10.10      SUBAREA RUNOFF(CFS) =    5.77
  EFFECTIVE AREA(ACRES) =    114.88   AREA-AVERAGED Fm(INCH/HR) =  0.33
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.55
```



```
  TOTAL AREA(ACRES) =      124.2       PEAK FLOW RATE(CFS) =      50.56

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    406.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   557.00  DOWNSTREAM(FEET) =   535.00
  FLOW LENGTH(FEET) =   525.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.95
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.56
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   19.22
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    406.00 =    3576.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.22
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.801
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.30      0.60     0.900     -
  USER-DEFINED               -        0.90      0.60     0.850     -
  USER-DEFINED               -        8.70      0.60     0.200     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  USER-DEFINED               -        0.10      0.60     0.600     -
  USER-DEFINED               -        0.40      0.60     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.311
  SUBAREA AREA(ACRES) =   10.50      SUBAREA RUNOFF(CFS) =    5.81
  EFFECTIVE AREA(ACRES) =    125.38   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      134.7       PEAK FLOW RATE(CFS) =      54.54

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.22
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.801
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        9.00      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.00      SUBAREA RUNOFF(CFS) =    5.52
  EFFECTIVE AREA(ACRES) =    134.38   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      143.7       PEAK FLOW RATE(CFS) =      60.06
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.22
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.801
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.30      0.60     0.600     -
  USER-DEFINED               -        0.50      0.60     0.900     -
  USER-DEFINED               -       18.70      0.60     0.600     -
  USER-DEFINED               -        1.00      0.60     0.600     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.609
  SUBAREA AREA(ACRES) =   20.60      SUBAREA RUNOFF(CFS) =    8.08
  EFFECTIVE AREA(ACRES) =    154.98   AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      164.3       PEAK FLOW RATE(CFS) =      68.14

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   535.00  DOWNSTREAM(FEET) =   510.00
  FLOW LENGTH(FEET) =   311.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.37
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.14
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   19.44
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    407.00 =    3887.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.44
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.793
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     0.500     -
  USER-DEFINED               -        1.10      0.60     0.900     -
  USER-DEFINED               -        2.20      0.60     0.100     -
  USER-DEFINED               -        0.40      0.60     0.900     -
  USER-DEFINED               -        1.10      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.353
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =    2.56
  EFFECTIVE AREA(ACRES) =    159.88   AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      169.2       PEAK FLOW RATE(CFS) =      69.64
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    408.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   510.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   624.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.38
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      69.64
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   19.97
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    408.00 =    4511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    408.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.97
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.775
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.70      0.60     0.900     -
  USER-DEFINED               -        1.60      0.60     0.600     -
  USER-DEFINED               -        1.40      0.60     0.100     -
  USER-DEFINED               -        4.80      0.60     0.900     -
  USER-DEFINED               -        4.20      0.60     0.600     -
  USER-DEFINED               -        2.20      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.649
  SUBAREA AREA(ACRES) =   14.90      SUBAREA RUNOFF(CFS) =    5.17
  EFFECTIVE AREA(ACRES) =    174.78   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      184.1       PEAK FLOW RATE(CFS) =      72.17

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    408.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.97
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.775
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.30      0.60     0.100     -
  USER-DEFINED               -        2.10      0.60     0.900     -
  USER-DEFINED               -        6.60      0.60     0.600     -
  USER-DEFINED               -        2.00      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.625
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =    3.96
  EFFECTIVE AREA(ACRES) =    185.78   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.53
```

```
  TOTAL AREA(ACRES) =      195.1       PEAK FLOW RATE(CFS) =      76.13

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    409.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   460.00
  FLOW LENGTH(FEET) =   368.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.70
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      76.13
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   20.27
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    409.00 =    4879.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.27
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.768
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.70      0.60     0.850     -
  USER-DEFINED               -        0.30      0.60     0.900     -
  USER-DEFINED               -        2.20      0.60     0.600     -
  USER-DEFINED               -        0.20      0.60     0.200     -
  USER-DEFINED               -        0.60      0.60     0.100     -
  USER-DEFINED               -        1.80      0.60     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.658
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =    1.95
  EFFECTIVE AREA(ACRES) =    191.58   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      200.9       PEAK FLOW RATE(CFS) =      76.96

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.27
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.768
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.20      0.60     0.900     -
  USER-DEFINED               -        2.90      0.60     0.600     -
  USER-DEFINED               -        3.30      0.60     0.500     -
  USER-DEFINED               -        0.10      0.60     0.200     -
  USER-DEFINED               -        0.40      0.60     0.100     -
  USER-DEFINED               -        1.20      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.616
```



```
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =    3.26
  EFFECTIVE AREA(ACRES) =    200.68   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      210.0       PEAK FLOW RATE(CFS) =      80.23

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.27
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.768
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.80      0.60     0.600     -
  USER-DEFINED               -        2.00      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.566
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =    2.24
  EFFECTIVE AREA(ACRES) =    206.48   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      215.8       PEAK FLOW RATE(CFS) =      82.47

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    410.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =   291.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.45
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      82.47
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   20.51
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    410.00 =    5170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.51
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.763
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.90      0.60     0.850     -
  USER-DEFINED               -        1.50      0.60     0.200     -
  USER-DEFINED               -        0.80      0.60     0.100     -
  USER-DEFINED               -        2.30      0.60     0.850     -
  USER-DEFINED               -        1.40      0.60     0.600     -
  USER-DEFINED               -        3.10      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.456
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =    4.41
```

```
  EFFECTIVE AREA(ACRES) =    216.48   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      225.8       PEAK FLOW RATE(CFS) =      85.93

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.51
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.763
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.10      0.60     0.850     -
  USER-DEFINED               -        0.10      0.60     0.200     -
  USER-DEFINED               -        4.00      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.645
  SUBAREA AREA(ACRES) =    5.20      SUBAREA RUNOFF(CFS) =    1.76
  EFFECTIVE AREA(ACRES) =    221.68   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      231.0       PEAK FLOW RATE(CFS) =      87.69

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.51
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.763
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.10      0.60     0.200     -
  USER-DEFINED               -        8.90      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =    6.37
  EFFECTIVE AREA(ACRES) =    232.68   AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      242.0       PEAK FLOW RATE(CFS) =      94.06

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    411.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   445.00  DOWNSTREAM(FEET) =   425.00
  FLOW LENGTH(FEET) =   324.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.44
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      94.06
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   20.75
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    411.00 =    5494.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.75
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.758
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     0.200     -
  USER-DEFINED               -        0.20      0.60     0.100     -
  USER-DEFINED               -        1.70      0.60     0.850     -
  USER-DEFINED               -        0.70      0.60     0.200     -
  USER-DEFINED               -        0.20      0.60     0.600     -
  USER-DEFINED               -        0.70      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.504
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    1.48
  EFFECTIVE AREA(ACRES) =    236.28   AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      245.6       PEAK FLOW RATE(CFS) =      94.45

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.75
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.758
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.90      0.60     0.850     -
  USER-DEFINED               -        8.80      0.60     0.200     -
  USER-DEFINED               -        0.20      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.267
  SUBAREA AREA(ACRES) =    9.90      SUBAREA RUNOFF(CFS) =    5.33
  EFFECTIVE AREA(ACRES) =    246.18   AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      255.5       PEAK FLOW RATE(CFS) =      99.78

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.75
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.758
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.50      0.60     0.200     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  USER-DEFINED               -        2.10      0.60     0.600     -
  USER-DEFINED               -        0.70      0.60     0.200     -
  USER-DEFINED               -        0.10      0.60     0.900     -
```

```
  USER-DEFINED               -        4.30      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.546
  SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =    3.02
  EFFECTIVE AREA(ACRES) =    253.98   AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      263.3       PEAK FLOW RATE(CFS) =     102.80

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    412.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   425.00  DOWNSTREAM(FEET) =   392.00
  FLOW LENGTH(FEET) =   641.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.70
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     102.80
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   21.24
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    412.00 =    6135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.24
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.747
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.60      0.60     0.100     -
  USER-DEFINED                -        5.30      0.60     0.200     -
  USER-DEFINED                -        0.10      0.60     0.900     -
  USER-DEFINED                -        1.10      0.60     0.100     -
  USER-DEFINED                -        7.30      0.60     0.200     -
  USER-DEFINED                -        0.10      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.198
  SUBAREA AREA(ACRES) =   14.50      SUBAREA RUNOFF(CFS) =    8.20
  EFFECTIVE AREA(ACRES) =    268.48   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      277.8       PEAK FLOW RATE(CFS) =     108.60

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.24
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.747
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.20      0.60     0.200     -
  USER-DEFINED                -        0.20      0.60     0.100     -
```



```
  USER-DEFINED               -        4.10      0.60     0.200     -
  USER-DEFINED               -        0.60      0.60     0.900     -
  USER-DEFINED               -        3.10      0.60     0.400     -
  USER-DEFINED               -        0.50      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.317
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =    4.36
  EFFECTIVE AREA(ACRES) =    277.18   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      286.5       PEAK FLOW RATE(CFS) =     112.96

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.24
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.747
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.50      0.60     0.900     -
  USER-DEFINED                -        4.00      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.456
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    1.92
  EFFECTIVE AREA(ACRES) =    281.68   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      291.0       PEAK FLOW RATE(CFS) =     114.88

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    420.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   392.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =  1358.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.58
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     114.88
  PIPE TRAVEL TIME(MIN.) =   1.22    Tc(MIN.) =   22.46
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    420.00 =    7493.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    420.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.46
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.721
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.50      0.60     0.100     -
  USER-DEFINED                -        1.30      0.60     0.100     -
  USER-DEFINED                -        0.10      0.60     0.200     -
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.105
  SUBAREA AREA(ACRES) =    1.90      SUBAREA RUNOFF(CFS) =    1.13
  EFFECTIVE AREA(ACRES) =    283.58   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      292.9       PEAK FLOW RATE(CFS) =     114.88
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    421.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    346.00  DOWNSTREAM(FEET) =    320.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1617.00   CHANNEL SLOPE =  0.0161
  CHANNEL BASE(FEET) =  200.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  20.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.562
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        6.90      0.60     0.100     -
  USER-DEFINED               -        3.60      0.60     0.100     -
  USER-DEFINED               -        2.20      0.60     0.100     -
  USER-DEFINED               -        0.70      0.60     0.900     -
  USER-DEFINED               -        0.40      0.60     0.900     -
  USER-DEFINED               -        1.30      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.227
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     117.84
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.43
  AVERAGE FLOW DEPTH(FEET) =   0.24   TRAVEL TIME(MIN.) =  11.08
  Tc(MIN.) =   33.53
  SUBAREA AREA(ACRES) =    15.10       SUBAREA RUNOFF(CFS) =    5.91
  EFFECTIVE AREA(ACRES) =    298.68     AREA-AVERAGED Fm(INCH/HR) =   0.28
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   0.47
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TOTAL AREA(ACRES) =      308.0         PEAK FLOW RATE(CFS) =     114.88
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   2.39
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    421.00 =    9110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    421.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   33.53
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.562
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  USER-DEFINED               -        1.10      0.60     0.850     -
  USER-DEFINED               -        2.50      0.60     0.850     -
  USER-DEFINED               -        3.60      0.60     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =    0.55
  EFFECTIVE AREA(ACRES) =    305.88   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.48
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TOTAL AREA(ACRES) =      315.2       PEAK FLOW RATE(CFS) =     114.88
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    427.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   320.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =  1453.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  36.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.54
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     114.88
  PIPE TRAVEL TIME(MIN.) =   2.30    Tc(MIN.) =   35.83
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    427.00 =   10563.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    427.00 TO NODE    427.00 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.) =   35.83
  RAINFALL INTENSITY(INCH/HR) =   0.54
  AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.48
  EFFECTIVE STREAM AREA(ACRES) =     305.88
  TOTAL STREAM AREA(ACRES) =     315.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     114.88

****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    414.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    497.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.533
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.791
```

```
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  -        0.10      0.60      0.100    56    5.53
 PUBLIC PARK                 -        1.10      0.60      0.850    56    8.79
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"        -        0.10      0.60      0.600    56    7.50
 COMMERCIAL                  -        0.10      0.60      0.100    56    5.53
 PUBLIC PARK                 -        0.30      0.60      0.850    56    8.79
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"        -        1.50      0.60      0.600    56    7.50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.678
 SUBAREA RUNOFF(CFS) =      3.99
 TOTAL AREA(ACRES) =      3.20   PEAK FLOW RATE(CFS) =      3.99

****************************************************************************
 FLOW PROCESS FROM NODE    414.00 TO NODE    414.10 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  497.00  DOWNSTREAM ELEVATION(FEET) =  493.00
 STREET LENGTH(FEET) =   371.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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) =       6.31
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.21
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.40
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
 STREET FLOW TRAVEL TIME(MIN.) =   2.58   Tc(MIN.) =    8.11
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.472
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED                -        1.40      0.60      0.850     -
 USER-DEFINED                -        1.40      0.60      0.600     -
 USER-DEFINED                -        2.00      0.60      0.600     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.673
 SUBAREA AREA(ACRES) =    4.80      SUBAREA RUNOFF(CFS) =    4.61
 EFFECTIVE AREA(ACRES) =      8.00    AREA-AVERAGED Fm(INCH/HR) =  0.40
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.68
 TOTAL AREA(ACRES) =        8.0        PEAK FLOW RATE(CFS) =       7.68

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.23
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 FLOW VELOCITY(FEET/SEC.) =  2.51   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
 LONGEST FLOWPATH FROM NODE    413.00 TO NODE    414.10 =     701.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    414.10 TO NODE    414.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  493.00  DOWNSTREAM ELEVATION(FEET) =  490.00
 STREET LENGTH(FEET) =   476.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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) =       9.77
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.43
   HALFSTREET FLOOD WIDTH(FEET) =   15.20
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.17
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
 STREET FLOW TRAVEL TIME(MIN.) =   3.66   Tc(MIN.) =   11.77
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.134
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED                -        0.10      0.60      0.200     -
 USER-DEFINED                -        0.50      0.60      0.100     -
 USER-DEFINED                -        3.40      0.60      0.600     -
 USER-DEFINED                -        0.40      0.60      0.100     -
 USER-DEFINED                -        1.20      0.60      0.600     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.513
 SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =    4.17
 EFFECTIVE AREA(ACRES) =     13.60    AREA-AVERAGED Fm(INCH/HR) =  0.36
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.61
 TOTAL AREA(ACRES) =       13.6        PEAK FLOW RATE(CFS) =       9.42

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.96
 FLOW VELOCITY(FEET/SEC.) =  2.15   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
 LONGEST FLOWPATH FROM NODE    413.00 TO NODE    414.20 =    1177.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    414.20 TO NODE    415.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   490.00  DOWNSTREAM(FEET) =   465.00
 FLOW LENGTH(FEET) =   488.00   MANNING'S N =  0.013
```

```
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.19
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.42
 PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =   12.44
 LONGEST FLOWPATH FROM NODE    413.00 TO NODE    415.00 =    1665.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    415.00 TO NODE    415.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.44
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.095
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.10      0.60     0.900     -
 USER-DEFINED               -        2.30      0.60     0.600     -
 USER-DEFINED               -        0.10      0.60     0.200     -
 USER-DEFINED               -        0.80      0.60     0.100     -
 USER-DEFINED               -        3.20      0.60     0.600     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.537
 SUBAREA AREA(ACRES) =    6.50      SUBAREA RUNOFF(CFS) =    4.52
 EFFECTIVE AREA(ACRES) =     20.10   AREA-AVERAGED Fm(INCH/HR) =  0.35
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.59
 TOTAL AREA(ACRES) =       20.1       PEAK FLOW RATE(CFS) =      13.46

****************************************************************************
 FLOW PROCESS FROM NODE    415.00 TO NODE    416.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   465.00  DOWNSTREAM(FEET) =   440.00
 FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.23
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      13.46
 PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   13.07
 LONGEST FLOWPATH FROM NODE    413.00 TO NODE    416.00 =    2162.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.07
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.058
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.80      0.60     0.100     -
 USER-DEFINED               -        0.40      0.60     0.900     -
```



```
 USER-DEFINED               -        3.70      0.60     0.400     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.392
 SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =    3.63
 EFFECTIVE AREA(ACRES) =     25.00   AREA-AVERAGED Fm(INCH/HR) =  0.33
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =       25.0       PEAK FLOW RATE(CFS) =      16.43

****************************************************************************
 FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.07
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.058
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        1.80      0.60     0.200     -
 USER-DEFINED               -        0.10      0.60     0.900     -
 USER-DEFINED               -        1.60      0.60     0.600     -
 USER-DEFINED               -        3.60      0.60     0.200     -
 USER-DEFINED               -        3.00      0.60     0.600     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.389
 SUBAREA AREA(ACRES) =   10.10      SUBAREA RUNOFF(CFS) =    7.50
 EFFECTIVE AREA(ACRES) =     35.10   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =       35.1       PEAK FLOW RATE(CFS) =      23.93

****************************************************************************
 FLOW PROCESS FROM NODE    416.00 TO NODE    417.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   420.00
 FLOW LENGTH(FEET) =   437.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.65
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.93
 PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   13.56
 LONGEST FLOWPATH FROM NODE    413.00 TO NODE    417.00 =    2599.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.56
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.029
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        1.50      0.60     0.200     -
 USER-DEFINED               -        0.70      0.60     0.100     -
 USER-DEFINED               -        3.40      0.60     0.200     -
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.187
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =    4.62
  EFFECTIVE AREA(ACRES) =     40.70   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       40.7       PEAK FLOW RATE(CFS) =      27.63

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.56
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.029
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.60      0.60     0.100     -
  USER-DEFINED               -        4.00      0.60     0.200     -
  USER-DEFINED               -        0.20      0.60     0.900     -
  USER-DEFINED               -        1.50      0.60     0.100     -
  USER-DEFINED               -        2.10      0.60     0.850     -
  USER-DEFINED               -        1.60      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.264
  SUBAREA AREA(ACRES) =   14.00      SUBAREA RUNOFF(CFS) =   10.97
  EFFECTIVE AREA(ACRES) =     54.70   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       54.7       PEAK FLOW RATE(CFS) =      38.60

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    418.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   619.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.50
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.60
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   14.27
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    418.00 =    3218.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.27
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.988
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.70      0.60     0.100     -
  USER-DEFINED               -        2.10      0.60     0.100     -
  USER-DEFINED               -        3.90      0.60     0.100     -
```



```
  USER-DEFINED               -        0.20      0.60     0.900     -
  USER-DEFINED               -        5.50      0.60     0.500     -
  USER-DEFINED               -        3.20      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.333
  SUBAREA AREA(ACRES) =   15.60      SUBAREA RUNOFF(CFS) =   11.06
  EFFECTIVE AREA(ACRES) =     70.30   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       70.3       PEAK FLOW RATE(CFS) =      47.60

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.27
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.988
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.30      0.60     0.500     -
  USER-DEFINED               -        0.40      0.60     0.400     -
  USER-DEFINED               -        3.10      0.60     0.400     -
  USER-DEFINED               -        0.20      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.407
  SUBAREA AREA(ACRES) =    4.00      SUBAREA RUNOFF(CFS) =    2.68
  EFFECTIVE AREA(ACRES) =     74.30   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       74.3       PEAK FLOW RATE(CFS) =      50.28

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.27
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.988
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.60      0.60     0.100     -
  USER-DEFINED               -        2.20      0.60     0.200     -
  USER-DEFINED               -        3.70      0.60     0.100     -
  USER-DEFINED               -        3.50      0.60     0.200     -
  USER-DEFINED               -        0.70      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.154
  SUBAREA AREA(ACRES) =   10.80      SUBAREA RUNOFF(CFS) =    8.70
  EFFECTIVE AREA(ACRES) =     85.10   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       85.1       PEAK FLOW RATE(CFS) =      58.98

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    425.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   320.00
  FLOW LENGTH(FEET) =  1179.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.24
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.98
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =   15.20
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    425.00 =    4397.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    425.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.20
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.938
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.60      0.60     0.100     -
  USER-DEFINED               -        0.40      0.60     0.100     -
  USER-DEFINED               -        0.90      0.60     0.100     -
  USER-DEFINED               -        5.30      0.60     0.850     -
  USER-DEFINED               -        3.10      0.60     0.850     -
  USER-DEFINED               -        9.10      0.60     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.777
  SUBAREA AREA(ACRES) =   19.40      SUBAREA RUNOFF(CFS) =    8.25
  EFFECTIVE AREA(ACRES) =    104.50   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      104.5       PEAK FLOW RATE(CFS) =      63.45

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    425.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.20
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.938
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.30      0.60     0.900     -
  USER-DEFINED               -        1.90      0.60     0.900     -
  USER-DEFINED               -        1.90      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =    1.83
  EFFECTIVE AREA(ACRES) =    109.60   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      109.6       PEAK FLOW RATE(CFS) =      65.28

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    426.00 IS CODE =  56
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```



```
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    320.00  DOWNSTREAM(FEET) =    316.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   870.00   CHANNEL SLOPE =  0.0046
  GIVEN CHANNEL BASE(FEET) =  200.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   1.25
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.652
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.40      0.60     0.100     -
  USER-DEFINED               -        3.30      0.60     0.100     -
  USER-DEFINED               -        0.80      0.60     0.850     -
  USER-DEFINED               -        0.30      0.60     0.850     -
  USER-DEFINED               -        0.90      0.60     0.900     -
  USER-DEFINED               -        2.30      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.408
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      67.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.35
  AVERAGE FLOW DEPTH(FEET) =   0.25   TRAVEL TIME(MIN.) =  10.77
  Tc(MIN.) =   25.97
  SUBAREA AREA(ACRES) =    11.00       SUBAREA RUNOFF(CFS) =    4.04
  EFFECTIVE AREA(ACRES) =    120.60     AREA-AVERAGED Fm(INCH/HR) =   0.27
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   0.46
  TOTAL AREA(ACRES) =      120.6         PEAK FLOW RATE(CFS) =      65.28
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
  GIVEN CHANNEL BASE(FEET) =  200.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   1.25

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   1.32
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    426.00 =    5267.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    426.00 TO NODE    426.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   25.97
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.652
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.50      0.60     0.100     -
  USER-DEFINED               -        1.70      0.60     0.900     -
  USER-DEFINED               -        0.50      0.60     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.569
  SUBAREA AREA(ACRES) =    3.70      SUBAREA RUNOFF(CFS) =    1.04
  EFFECTIVE AREA(ACRES) =    124.30   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      124.3       PEAK FLOW RATE(CFS) =      65.28
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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

```
 FLOW PROCESS FROM NODE    426.00 TO NODE    427.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   316.00  DOWNSTREAM(FEET) =   310.00
 FLOW LENGTH(FEET) =   321.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.14
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      65.28
 PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   26.37
 LONGEST FLOWPATH FROM NODE    413.00 TO NODE    427.00 =    5588.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    427.00 TO NODE    427.00 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.) =   26.37
 RAINFALL INTENSITY(INCH/HR) =   0.65
 AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.60
 AREA-AVERAGED Ap =  0.46
 EFFECTIVE STREAM AREA(ACRES) =     124.30
 TOTAL STREAM AREA(ACRES) =     124.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      65.28

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      114.88   35.83    0.544  0.60( 0.29) 0.48     305.9     430.00
     1      104.67   38.68    0.521  0.60( 0.29) 0.49     315.2     400.00
     2       65.28   26.37    0.646  0.60( 0.28) 0.46     124.3     413.00

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      172.49   26.37    0.646  0.60( 0.28) 0.48     349.4     413.00
     2      166.67   35.83    0.544  0.60( 0.29) 0.48     430.2     430.00
     3      154.25   38.68    0.521  0.60( 0.29) 0.48     439.5     400.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     172.49    Tc(MIN.) =    26.37
 EFFECTIVE AREA(ACRES) =     349.44   AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =      439.5
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    427.00 =   10563.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    427.00 TO NODE    428.00 IS CODE =  31
----------------------------------------------------------------------------
```



```
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   310.00  DOWNSTREAM(FEET) =   275.00
 FLOW LENGTH(FEET) =   789.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  23.49
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     172.49
 PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   26.93
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    428.00 =   11352.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =      439.5  TC(MIN.) =     26.93
 EFFECTIVE AREA(ACRES) =    349.44  AREA-AVERAGED Fm(INCH/HR)=  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap = 0.475
 PEAK FLOW RATE(CFS)   =     172.49

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      172.49   26.93    0.638  0.60( 0.28) 0.48     349.4     413.00
     2      166.67   36.39    0.539  0.60( 0.29) 0.48     430.2     430.00
     3      154.25   39.27    0.516  0.60( 0.29) 0.48     439.5     400.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:

                      Michael Baker International
                    5 Hutton Centre Drive, Suite 500
                         Santa Ana, CA 92707


 ************************ DESCRIPTION OF STUDY ************************
* RMV PA-3 SUBAREA D ROMP 2018                                        *
* RATIONAL METHOD - REGIONAL RAINFALL                                 *
* 5-YR EV NOVEMBER 2018 FKAZI                                         *
 **********************************************************************

  FILE NAME: 3D05EVRL.DAT
  TIME/DATE OF STUDY: 17:04 12/04/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    5.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  2.707
   2)   10.00;  1.797
   3)   15.00;  1.318
   4)   20.00;  1.128
   5)   25.00;  0.984
   6)   30.00;  0.882
   7)   40.00;  0.755
   8)   50.00;  0.672
   9)   60.00;  0.611
  10)   90.00;  0.509
  11)  120.00;  0.450
  12)  180.00;  0.378
  13)  360.00;  0.280
  14) 1200.00;  0.123
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    605.00  DOWNSTREAM(FEET) =    586.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.417
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.267
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          -        1.20      0.50     0.900    56    8.77
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        -        1.30      0.50     0.600    56    7.42
  PUBLIC PARK                 -        2.40      0.50     0.850    56    8.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.796
  SUBAREA RUNOFF(CFS) =      8.24
  TOTAL AREA(ACRES) =      4.90   PEAK FLOW RATE(CFS) =      8.24

**************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  586.00  DOWNSTREAM ELEVATION(FEET) =  583.00
  STREET LENGTH(FEET) =   333.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      13.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   16.13
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.66
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.20
  STREET FLOW TRAVEL TIME(MIN.) =   2.09   Tc(MIN.) =    9.51
```

```
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.887
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.10      0.50     0.900     -
USER-DEFINED               -        0.40      0.50     0.850     -
USER-DEFINED               -        1.90      0.50     0.400     -
USER-DEFINED               -        4.70      0.50     0.600     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.565
SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =   10.25
EFFECTIVE AREA(ACRES) =     12.00    AREA-AVERAGED Fm(INCH/HR) =  0.33
AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.66
TOTAL AREA(ACRES) =       12.0        PEAK FLOW RATE(CFS) =      16.82

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.70
FLOW VELOCITY(FEET/SEC.) =  2.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.35
LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     663.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    402.00 TO NODE    402.50 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  583.00  DOWNSTREAM ELEVATION(FEET) =  580.00
STREET LENGTH(FEET) =   315.00   CURB HEIGHT(INCHES) =  8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.018
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

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) =      19.81
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.50
  HALFSTREET FLOOD WIDTH(FEET) =   18.71
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.98
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.48
STREET FLOW TRAVEL TIME(MIN.) =   1.76   Tc(MIN.) =   11.27
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.676
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.50      0.50     0.850     -
USER-DEFINED               -        1.80      0.50     0.600     -
USER-DEFINED               -        0.10      0.50     0.500     -
USER-DEFINED               -        2.30      0.50     0.400     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
SUBAREA AREA(ACRES) =    4.70      SUBAREA RUNOFF(CFS) =    5.97
EFFECTIVE AREA(ACRES) =     16.70    AREA-AVERAGED Fm(INCH/HR) =  0.31
```



```
AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.62
TOTAL AREA(ACRES) =       16.7        PEAK FLOW RATE(CFS) =      20.51

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  18.95
FLOW VELOCITY(FEET/SEC.) =  3.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.51
LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.50 =     978.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    402.50 TO NODE    403.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  580.00  DOWNSTREAM ELEVATION(FEET) =  579.00
STREET LENGTH(FEET) =   394.00   CURB HEIGHT(INCHES) =  8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.018
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

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) =      22.08
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.62
  HALFSTREET FLOOD WIDTH(FEET) =   25.35
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.86
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.14
STREET FLOW TRAVEL TIME(MIN.) =   3.53   Tc(MIN.) =   14.79
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.338
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.20      0.50     0.850     -
USER-DEFINED               -        0.10      0.50     0.600     -
USER-DEFINED               -        2.80      0.50     0.400     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.435
SUBAREA AREA(ACRES) =    3.10      SUBAREA RUNOFF(CFS) =    3.12
EFFECTIVE AREA(ACRES) =     19.80    AREA-AVERAGED Fm(INCH/HR) =  0.30
AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.59
TOTAL AREA(ACRES) =       19.8        PEAK FLOW RATE(CFS) =      20.51
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.60   HALFSTREET FLOOD WIDTH(FEET) =  24.65
FLOW VELOCITY(FEET/SEC.) =  1.83   DEPTH*VELOCITY(FT*FT/SEC.) =   1.10
LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1372.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  579.00  DOWNSTREAM ELEVATION(FEET) =  560.00
  STREET LENGTH(FEET) =   974.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      24.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.48
    HALFSTREET FLOOD WIDTH(FEET) =   17.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.98
  STREET FLOW TRAVEL TIME(MIN.) =   3.91   Tc(MIN.) =   18.71
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.177
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.80      0.50     0.100     -
  USER-DEFINED               -        0.70      0.50     0.100     -
  USER-DEFINED               -        1.10      0.50     0.850     -
  USER-DEFINED               -        0.70      0.50     0.850     -
  USER-DEFINED               -        0.10      0.50     0.200     -
  USER-DEFINED               -        0.30      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.267
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =    8.17
  EFFECTIVE AREA(ACRES) =     28.50    AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       28.5        PEAK FLOW RATE(CFS) =      23.86

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.38
  FLOW VELOCITY(FEET/SEC.) =  4.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.95
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =    2346.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.71
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.177
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     1.000     -
  USER-DEFINED               -        0.10      0.50     0.600     -
  USER-DEFINED               -        2.30      0.50     0.900     -
  USER-DEFINED               -        2.70      0.50     0.500     -
```



```
  USER-DEFINED               -        3.40      0.50     0.400     -
  USER-DEFINED               -        5.30      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.432
  SUBAREA AREA(ACRES) =   13.90      SUBAREA RUNOFF(CFS) =   12.02
  EFFECTIVE AREA(ACRES) =     42.40   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       42.4       PEAK FLOW RATE(CFS) =      35.89

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.71
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.177
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.13
  EFFECTIVE AREA(ACRES) =     42.60   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       42.6       PEAK FLOW RATE(CFS) =      36.02

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.71
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.177
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     0.100     -
  USER-DEFINED               -        0.10      0.50     0.200     -
  USER-DEFINED               -        0.10      0.50     0.200     -
  USER-DEFINED               -        0.20      0.50     0.400     -
  USER-DEFINED               -        1.50      0.50     0.850     -
  USER-DEFINED               -        2.50      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.590
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    3.57
  EFFECTIVE AREA(ACRES) =     47.10   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       47.1       PEAK FLOW RATE(CFS) =      39.59

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.71
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.177
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        2.80      0.50      0.850     -
  USER-DEFINED                -        3.00      0.50      0.900     -
  USER-DEFINED                -        6.40      0.50      0.500     -
  USER-DEFINED                -        6.70      0.50      0.600     -
  USER-DEFINED                -        4.30      0.50      0.900     -
  USER-DEFINED                -        8.70      0.50      0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.671
  SUBAREA AREA(ACRES) =   31.90      SUBAREA RUNOFF(CFS) =   24.16
  EFFECTIVE AREA(ACRES) =     79.00   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       79.0       PEAK FLOW RATE(CFS) =      63.76

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 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.) =   18.71
  RAINFALL INTENSITY(INCH/HR) =   1.18
  AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =      79.00
  TOTAL STREAM AREA(ACRES) =      79.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      63.76

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    431.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =    729.00  DOWNSTREAM(FEET) =    630.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.120
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.957
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"      -        0.10      0.50      1.000    56    9.12
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        1.30      0.50      1.000    56    9.12
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        0.10      0.50      1.000    56    9.12
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.97
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      1.97

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



```
  FLOW PROCESS FROM NODE    431.00 TO NODE    432.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    630.00  DOWNSTREAM(FEET) =    597.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   196.00   CHANNEL SLOPE =  0.1684
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.847
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        1.70      0.50      1.000     -
  USER-DEFINED                -        0.10      0.50      1.000     -
  USER-DEFINED                -        0.10      0.50      1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.12
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.38
  AVERAGE FLOW DEPTH(FEET) =   0.44   TRAVEL TIME(MIN.) =   0.61
  Tc(MIN.) =    9.73
  SUBAREA AREA(ACRES) =     1.90      SUBAREA RUNOFF(CFS) =    2.30
  EFFECTIVE AREA(ACRES) =      3.40     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.4         PEAK FLOW RATE(CFS) =       4.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   5.69
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    432.00 =     525.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    432.00 TO NODE    433.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    597.00  DOWNSTREAM(FEET) =    570.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   243.00   CHANNEL SLOPE =  0.1111
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.754
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.10      0.50      0.900     -
  USER-DEFINED                -        3.80      0.50      1.000     -
  USER-DEFINED                -        0.30      0.50      1.000     -
  USER-DEFINED                -        0.10      0.50      1.000     -
  USER-DEFINED                -        0.20      0.50      1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.998
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.66
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.59
  AVERAGE FLOW DEPTH(FEET) =   0.63   TRAVEL TIME(MIN.) =   0.72
  Tc(MIN.) =   10.45
  SUBAREA AREA(ACRES) =     4.50      SUBAREA RUNOFF(CFS) =    5.08
  EFFECTIVE AREA(ACRES) =      7.90     AREA-AVERAGED Fm(INCH/HR) =   0.50
```

```
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        7.9         PEAK FLOW RATE(CFS) =       8.92

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   5.98
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.00 =     768.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    433.00 TO NODE    433.10 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) =   564.00
  FLOW LENGTH(FEET) =  1076.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.92
  PIPE TRAVEL TIME(MIN.) =   3.46    Tc(MIN.) =   13.91
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.10 =    1844.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    433.10 TO NODE    433.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.91
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.422
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.50      0.50     0.850     -
  USER-DEFINED               -        1.70      0.50     0.900     -
  USER-DEFINED               -        5.40      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.613
  SUBAREA AREA(ACRES) =    7.60      SUBAREA RUNOFF(CFS) =    7.63
  EFFECTIVE AREA(ACRES) =     15.50   AREA-AVERAGED Fm(INCH/HR) =  0.40
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.81
  TOTAL AREA(ACRES) =       15.5       PEAK FLOW RATE(CFS) =      14.19

****************************************************************************
  FLOW PROCESS FROM NODE    433.10 TO NODE    404.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   564.00  DOWNSTREAM(FEET) =   560.00
  FLOW LENGTH(FEET) =   830.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.40
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.19
  PIPE TRAVEL TIME(MIN.) =   2.56    Tc(MIN.) =   16.48
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    404.00 =    2674.00 FEET.

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



```
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 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.) =   16.48
  RAINFALL INTENSITY(INCH/HR) =   1.26
  AREA-AVERAGED Fm(INCH/HR) =  0.40
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.81
  EFFECTIVE STREAM AREA(ACRES) =      15.50
  TOTAL STREAM AREA(ACRES) =      15.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.19

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       63.76   18.71    1.177  0.50( 0.28) 0.56      79.0     400.00
      2       14.19   16.48    1.262  0.50( 0.40) 0.81      15.5     430.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       75.65   16.48    1.262  0.50( 0.30) 0.61      85.1     430.00
      2       76.54   18.71    1.177  0.50( 0.30) 0.60      94.5     400.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      76.54    Tc(MIN.) =    18.71
  EFFECTIVE AREA(ACRES) =      94.50   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       94.5
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    404.00 =    2674.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    405.00 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) =   557.00
  FLOW LENGTH(FEET) =   377.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.01
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      76.54
  PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   19.34
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    405.00 =    3051.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =   19.34
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.153
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.30      0.50     0.100     -
  USER-DEFINED               -        0.90      0.50     0.850     -
  USER-DEFINED               -        0.20      0.50     0.200     -
  USER-DEFINED               -        4.50      0.50     0.500     -
  USER-DEFINED               -        3.20      0.50     0.400     -
  USER-DEFINED               -        1.20      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.406
  SUBAREA AREA(ACRES) =   11.30      SUBAREA RUNOFF(CFS) =    9.66
  EFFECTIVE AREA(ACRES) =    105.80   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =      105.8       PEAK FLOW RATE(CFS) =      82.16

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.34
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.153
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.50     0.850     -
  USER-DEFINED               -        0.10      0.50     0.200     -
  USER-DEFINED               -        4.20      0.50     0.500     -
  USER-DEFINED               -        3.80      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.459
  SUBAREA AREA(ACRES) =    8.30      SUBAREA RUNOFF(CFS) =    6.90
  EFFECTIVE AREA(ACRES) =    114.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =      114.1       PEAK FLOW RATE(CFS) =      89.06

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       89.65   17.11    1.238  0.50( 0.29) 0.57     104.7     430.00
      2       89.06   19.34    1.153  0.50( 0.29) 0.57     114.1     400.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      89.65  Tc(MIN.) =   17.11
  AREA-AVERAGED Fm(INCH/HR) =  0.29  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.57  EFFECTIVE AREA(ACRES) =     104.68

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.11
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.238
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```



```
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.80      0.50     0.200     -
  USER-DEFINED               -        0.10      0.50     0.600     -
  USER-DEFINED               -        5.20      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.307
  SUBAREA AREA(ACRES) =   10.10      SUBAREA RUNOFF(CFS) =    9.86
  EFFECTIVE AREA(ACRES) =    114.78   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =      124.2       PEAK FLOW RATE(CFS) =      99.50

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    406.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   557.00  DOWNSTREAM(FEET) =   535.00
  FLOW LENGTH(FEET) =   525.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.70
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      99.50
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   17.55
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    406.00 =    3576.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.55
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.221
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.30      0.50     0.900     -
  USER-DEFINED               -        0.90      0.50     0.850     -
  USER-DEFINED               -        8.70      0.50     0.200     -
  USER-DEFINED               -        0.10      0.50     0.900     -
  USER-DEFINED               -        0.10      0.50     0.600     -
  USER-DEFINED               -        0.40      0.50     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.311
  SUBAREA AREA(ACRES) =   10.50      SUBAREA RUNOFF(CFS) =   10.07
  EFFECTIVE AREA(ACRES) =    125.28   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      134.7       PEAK FLOW RATE(CFS) =     107.83

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.55
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.221
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED             -        9.00      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =     9.00      SUBAREA RUNOFF(CFS) =     9.08
  EFFECTIVE AREA(ACRES) =    134.28   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      143.7       PEAK FLOW RATE(CFS) =     116.91

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.55
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.221
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.30      0.50     0.600     -
  USER-DEFINED               -        0.50      0.50     0.900     -
  USER-DEFINED               -       18.70      0.50     0.600     -
  USER-DEFINED               -        1.00      0.50     0.600     -
  USER-DEFINED               -        0.10      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.609
  SUBAREA AREA(ACRES) =   20.60      SUBAREA RUNOFF(CFS) =   16.99
  EFFECTIVE AREA(ACRES) =    154.88   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      164.3       PEAK FLOW RATE(CFS) =     133.91

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   535.00  DOWNSTREAM(FEET) =   510.00
  FLOW LENGTH(FEET) =   311.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.23
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     133.91
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   17.74
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    407.00 =    3887.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.74
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.214
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     0.500     -
  USER-DEFINED               -        1.10      0.50     0.900     -
```



```
  USER-DEFINED               -        2.20      0.50     0.100     -
  USER-DEFINED               -        0.40      0.50     0.900     -
  USER-DEFINED               -        1.10      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.353
  SUBAREA AREA(ACRES) =     4.90      SUBAREA RUNOFF(CFS) =     4.57
  EFFECTIVE AREA(ACRES) =    159.78   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      169.2       PEAK FLOW RATE(CFS) =     137.47

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    408.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   510.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   624.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.38
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     137.47
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =   18.20
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    408.00 =    4511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    408.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.20
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.196
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.70      0.50     0.900     -
  USER-DEFINED               -        1.60      0.50     0.600     -
  USER-DEFINED               -        1.40      0.50     0.100     -
  USER-DEFINED               -        4.80      0.50     0.900     -
  USER-DEFINED               -        4.20      0.50     0.600     -
  USER-DEFINED               -        2.20      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.649
  SUBAREA AREA(ACRES) =   14.90      SUBAREA RUNOFF(CFS) =   11.69
  EFFECTIVE AREA(ACRES) =    174.68   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      184.1       PEAK FLOW RATE(CFS) =     146.62

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    408.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.20
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.196
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  USER-DEFINED               -        0.30      0.50     0.100     -
  USER-DEFINED               -        2.10      0.50     0.900     -
  USER-DEFINED               -        6.60      0.50     0.600     -
  USER-DEFINED               -        2.00      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.625
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =    8.75
  EFFECTIVE AREA(ACRES) =    185.68   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      195.1       PEAK FLOW RATE(CFS) =     155.37

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    409.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   460.00
  FLOW LENGTH(FEET) =   368.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.71
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     155.37
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   18.45
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    409.00 =    4879.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.45
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.187
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.70      0.50     0.850     -
  USER-DEFINED               -        0.30      0.50     0.900     -
  USER-DEFINED               -        2.20      0.50     0.600     -
  USER-DEFINED               -        0.20      0.50     0.200     -
  USER-DEFINED               -        0.60      0.50     0.100     -
  USER-DEFINED               -        1.80      0.50     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.658
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =    4.48
  EFFECTIVE AREA(ACRES) =    191.48   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      200.9       PEAK FLOW RATE(CFS) =     158.27

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.45
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.187
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```



```
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.20      0.50     0.900     -
  USER-DEFINED               -        2.90      0.50     0.600     -
  USER-DEFINED               -        3.30      0.50     0.500     -
  USER-DEFINED               -        0.10      0.50     0.200     -
  USER-DEFINED               -        0.40      0.50     0.100     -
  USER-DEFINED               -        1.20      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.616
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =    7.19
  EFFECTIVE AREA(ACRES) =    200.58   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      210.0       PEAK FLOW RATE(CFS) =     165.46

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.45
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.187
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.80      0.50     0.600     -
  USER-DEFINED               -        2.00      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.566
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =    4.72
  EFFECTIVE AREA(ACRES) =    206.38   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      215.8       PEAK FLOW RATE(CFS) =     170.18

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    410.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =   291.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.41
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     170.18
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   18.65
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    410.00 =    5170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.65
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.179
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  USER-DEFINED               -        0.90      0.50     0.850     -
  USER-DEFINED               -        1.50      0.50     0.200     -
  USER-DEFINED               -        0.80      0.50     0.100     -
  USER-DEFINED               -        2.30      0.50     0.850     -
  USER-DEFINED               -        1.40      0.50     0.600     -
  USER-DEFINED               -        3.10      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.456
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =    8.56
  EFFECTIVE AREA(ACRES) =    216.38   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      225.8       PEAK FLOW RATE(CFS) =     177.34

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.65
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.179
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.10      0.50     0.850     -
  USER-DEFINED               -        0.10      0.50     0.200     -
  USER-DEFINED               -        4.00      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.645
  SUBAREA AREA(ACRES) =    5.20      SUBAREA RUNOFF(CFS) =    4.01
  EFFECTIVE AREA(ACRES) =    221.58   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      231.0       PEAK FLOW RATE(CFS) =     181.35

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.65
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.179
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.10      0.50     0.200     -
  USER-DEFINED               -        8.90      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =   10.68
  EFFECTIVE AREA(ACRES) =    232.58   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      242.0       PEAK FLOW RATE(CFS) =     192.03

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    411.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```



```
  ELEVATION DATA: UPSTREAM(FEET) =   445.00  DOWNSTREAM(FEET) =   425.00
  FLOW LENGTH(FEET) =   324.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.74
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     192.03
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   18.85
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    411.00 =    5494.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.85
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.172
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     0.200     -
  USER-DEFINED               -        0.20      0.50     0.100     -
  USER-DEFINED               -        1.70      0.50     0.850     -
  USER-DEFINED               -        0.70      0.50     0.200     -
  USER-DEFINED               -        0.20      0.50     0.600     -
  USER-DEFINED               -        0.70      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.504
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    2.98
  EFFECTIVE AREA(ACRES) =    236.18   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      245.6       PEAK FLOW RATE(CFS) =     193.40

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.85
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.172
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.90      0.50     0.850     -
  USER-DEFINED               -        8.80      0.50     0.200     -
  USER-DEFINED               -        0.20      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.267
  SUBAREA AREA(ACRES) =    9.90      SUBAREA RUNOFF(CFS) =    9.25
  EFFECTIVE AREA(ACRES) =    246.08   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      255.5       PEAK FLOW RATE(CFS) =     202.65

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.85
```

```
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.172
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.50      0.50     0.200     -
USER-DEFINED               -        0.10      0.50     0.900     -
USER-DEFINED               -        2.10      0.50     0.600     -
USER-DEFINED               -        0.70      0.50     0.200     -
USER-DEFINED               -        0.10      0.50     0.900     -
USER-DEFINED               -        4.30      0.50     0.600     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.546
SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =    6.31
EFFECTIVE AREA(ACRES) =    253.88   AREA-AVERAGED Fm(INCH/HR) =  0.26
AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.51
TOTAL AREA(ACRES) =      263.3       PEAK FLOW RATE(CFS) =     208.96

****************************************************************************
FLOW PROCESS FROM NODE    411.00 TO NODE    412.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   425.00  DOWNSTREAM(FEET) =   392.00
FLOW LENGTH(FEET) =   641.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  42.0 INCH PIPE IS  33.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  25.64
ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     208.96
PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   19.27
LONGEST FLOWPATH FROM NODE    430.00 TO NODE    412.00 =    6135.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   19.27
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.156
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.60      0.50     0.100     -
USER-DEFINED               -        5.30      0.50     0.200     -
USER-DEFINED               -        0.10      0.50     0.900     -
USER-DEFINED               -        1.10      0.50     0.100     -
USER-DEFINED               -        7.30      0.50     0.200     -
USER-DEFINED               -        0.10      0.50     0.900     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.198
SUBAREA AREA(ACRES) =   14.50      SUBAREA RUNOFF(CFS) =   13.79
EFFECTIVE AREA(ACRES) =    268.38   AREA-AVERAGED Fm(INCH/HR) =  0.25
AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.50
TOTAL AREA(ACRES) =      277.8       PEAK FLOW RATE(CFS) =     219.13

****************************************************************************
FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
```



```
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   19.27
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.156
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.20      0.50     0.200     -
USER-DEFINED               -        0.20      0.50     0.100     -
USER-DEFINED               -        4.10      0.50     0.200     -
USER-DEFINED               -        0.60      0.50     0.900     -
USER-DEFINED               -        3.10      0.50     0.400     -
USER-DEFINED               -        0.50      0.50     0.200     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.317
SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =    7.81
EFFECTIVE AREA(ACRES) =    277.08   AREA-AVERAGED Fm(INCH/HR) =  0.25
AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.49
TOTAL AREA(ACRES) =      286.5       PEAK FLOW RATE(CFS) =     226.94

****************************************************************************
FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   19.27
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.156
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.50      0.50     0.900     -
USER-DEFINED               -        4.00      0.50     0.400     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.456
SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    3.76
EFFECTIVE AREA(ACRES) =    281.58   AREA-AVERAGED Fm(INCH/HR) =  0.25
AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.49
TOTAL AREA(ACRES) =      291.0       PEAK FLOW RATE(CFS) =     230.70

****************************************************************************
FLOW PROCESS FROM NODE    412.00 TO NODE    420.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   392.00  DOWNSTREAM(FEET) =   350.00
FLOW LENGTH(FEET) =  1358.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  48.0 INCH PIPE IS  37.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  21.72
ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     230.70
PIPE TRAVEL TIME(MIN.) =   1.04    Tc(MIN.) =   20.31
LONGEST FLOWPATH FROM NODE    430.00 TO NODE    420.00 =    7493.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    420.00 TO NODE    420.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==========================================================================
  MAINLINE Tc(MIN.) =   20.31
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.119
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.50      0.50     0.100     -
  USER-DEFINED               -        1.30      0.50     0.100     -
  USER-DEFINED               -        0.10      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.105
  SUBAREA AREA(ACRES) =    1.90      SUBAREA RUNOFF(CFS) =    1.82
  EFFECTIVE AREA(ACRES) =    283.48   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      292.9       PEAK FLOW RATE(CFS) =     230.70
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

**************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    421.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    346.00  DOWNSTREAM(FEET) =    320.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1617.00   CHANNEL SLOPE =  0.0161
  CHANNEL BASE(FEET) =  200.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  20.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.907
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        6.90      0.50     0.100     -
  USER-DEFINED               -        3.60      0.50     0.100     -
  USER-DEFINED               -        2.20      0.50     0.100     -
  USER-DEFINED               -        0.70      0.50     0.900     -
  USER-DEFINED               -        0.40      0.50     0.900     -
  USER-DEFINED               -        1.30      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.227
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     236.09
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.18
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   8.47
  Tc(MIN.) =   28.78
  SUBAREA AREA(ACRES) =    15.10       SUBAREA RUNOFF(CFS) =   10.78
  EFFECTIVE AREA(ACRES) =    298.58     AREA-AVERAGED Fm(INCH/HR) =   0.24
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   0.47
  TOTAL AREA(ACRES) =      308.0         PEAK FLOW RATE(CFS) =     230.70
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.36   FLOW VELOCITY(FEET/SEC.) =   3.17
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    421.00 =    9110.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    421.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
```



```
  MAINLINE Tc(MIN.) =   28.78
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.907
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.10      0.50     0.850     -
  USER-DEFINED               -        2.50      0.50     0.850     -
  USER-DEFINED               -        3.60      0.50     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =    3.12
  EFFECTIVE AREA(ACRES) =    305.78   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      315.2       PEAK FLOW RATE(CFS) =     230.70
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

**************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    427.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   320.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =  1453.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  51.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.29
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     230.70
  PIPE TRAVEL TIME(MIN.) =   1.97    Tc(MIN.) =   30.75
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    427.00 =   10563.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    427.00 TO NODE    427.00 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.) =   30.75
  RAINFALL INTENSITY(INCH/HR) =   0.87
  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.48
  EFFECTIVE STREAM AREA(ACRES) =     305.78
  TOTAL STREAM AREA(ACRES) =     315.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     230.70

**************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    414.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    497.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.533
```

```
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.610
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL                 -        0.10      0.50     0.100    56    5.53
PUBLIC PARK                -        1.10      0.50     0.850    56    8.79
RESIDENTIAL
"3-4 DWELLINGS/ACRE"       -        0.10      0.50     0.600    56    7.50
COMMERCIAL                 -        0.10      0.50     0.100    56    5.53
PUBLIC PARK                -        0.30      0.50     0.850    56    8.79
RESIDENTIAL
"3-4 DWELLINGS/ACRE"       -        1.50      0.50     0.600    56    7.50
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.678
SUBAREA RUNOFF(CFS) =      6.54
TOTAL AREA(ACRES) =      3.20   PEAK FLOW RATE(CFS) =      6.54

****************************************************************************
FLOW PROCESS FROM NODE    414.00 TO NODE    414.10 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  497.00  DOWNSTREAM ELEVATION(FEET) =  493.00
STREET LENGTH(FEET) =   371.00   CURB HEIGHT(INCHES) =  8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.018
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

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) =      10.57
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.41
  HALFSTREET FLOOD WIDTH(FEET) =   14.02
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
STREET FLOW TRAVEL TIME(MIN.) =   2.28   Tc(MIN.) =    7.81
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.195
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        1.40      0.50     0.850     -
USER-DEFINED               -        1.40      0.50     0.600     -
USER-DEFINED               -        2.00      0.50     0.600     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.673
SUBAREA AREA(ACRES) =    4.80      SUBAREA RUNOFF(CFS) =    8.03
EFFECTIVE AREA(ACRES) =      8.00    AREA-AVERAGED Fm(INCH/HR) =  0.34
AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.68
TOTAL AREA(ACRES) =        8.0        PEAK FLOW RATE(CFS) =      13.37

END OF SUBAREA STREET FLOW HYDRAULICS:
```



```
DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.51
FLOW VELOCITY(FEET/SEC.) =  2.86   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
LONGEST FLOWPATH FROM NODE    413.00 TO NODE    414.10 =     701.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    414.10 TO NODE    414.20 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  493.00  DOWNSTREAM ELEVATION(FEET) =  490.00
STREET LENGTH(FEET) =   476.00   CURB HEIGHT(INCHES) =  8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.018
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

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) =      17.02
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.50
  HALFSTREET FLOOD WIDTH(FEET) =   19.10
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.46
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.24
STREET FLOW TRAVEL TIME(MIN.) =   3.22   Tc(MIN.) =   11.03
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.698
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.10      0.50     0.200     -
USER-DEFINED               -        0.50      0.50     0.100     -
USER-DEFINED               -        3.40      0.50     0.600     -
USER-DEFINED               -        0.40      0.50     0.100     -
USER-DEFINED               -        1.20      0.50     0.600     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.513
SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =    7.27
EFFECTIVE AREA(ACRES) =     13.60    AREA-AVERAGED Fm(INCH/HR) =  0.30
AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.61
TOTAL AREA(ACRES) =       13.6        PEAK FLOW RATE(CFS) =      17.06

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  19.10
FLOW VELOCITY(FEET/SEC.) =  2.47   DEPTH*VELOCITY(FT*FT/SEC.) =   1.24
LONGEST FLOWPATH FROM NODE    413.00 TO NODE    414.20 =    1177.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    414.20 TO NODE    415.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   490.00  DOWNSTREAM(FEET) =   465.00
```

```
  FLOW LENGTH(FEET) =   488.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.06
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   11.61
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    415.00 =    1665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    415.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.61
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.643
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     0.900     -
  USER-DEFINED               -        2.30      0.50     0.600     -
  USER-DEFINED               -        0.10      0.50     0.200     -
  USER-DEFINED               -        0.80      0.50     0.100     -
  USER-DEFINED               -        3.20      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.537
  SUBAREA AREA(ACRES) =     6.50      SUBAREA RUNOFF(CFS) =     8.04
  EFFECTIVE AREA(ACRES) =     20.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =       20.1       PEAK FLOW RATE(CFS) =      24.42

****************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    416.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   465.00  DOWNSTREAM(FEET) =   440.00
  FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.28
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.42
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   12.15
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    416.00 =    2162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.15
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.591
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.80      0.50     0.100     -
  USER-DEFINED               -        0.40      0.50     0.900     -
  USER-DEFINED               -        3.70      0.50     0.400     -
```



```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.392
  SUBAREA AREA(ACRES) =     4.90      SUBAREA RUNOFF(CFS) =     6.15
  EFFECTIVE AREA(ACRES) =     25.00   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       25.0       PEAK FLOW RATE(CFS) =      29.63

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.15
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.591
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.80      0.50     0.200     -
  USER-DEFINED               -        0.10      0.50     0.900     -
  USER-DEFINED               -        1.60      0.50     0.600     -
  USER-DEFINED               -        3.60      0.50     0.200     -
  USER-DEFINED               -        3.00      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.389
  SUBAREA AREA(ACRES) =    10.10      SUBAREA RUNOFF(CFS) =    12.69
  EFFECTIVE AREA(ACRES) =     35.10   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       35.1       PEAK FLOW RATE(CFS) =      42.32

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    417.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   420.00
  FLOW LENGTH(FEET) =   437.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.59
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.32
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   12.59
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    417.00 =    2599.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.59
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.549
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.50      0.50     0.200     -
  USER-DEFINED               -        0.70      0.50     0.100     -
  USER-DEFINED               -        3.40      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.187
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =    7.33
  EFFECTIVE AREA(ACRES) =     40.70   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       40.7       PEAK FLOW RATE(CFS) =      48.32

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.59
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.549
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.60      0.50     0.100     -
  USER-DEFINED               -        4.00      0.50     0.200     -
  USER-DEFINED               -        0.20      0.50     0.900     -
  USER-DEFINED               -        1.50      0.50     0.100     -
  USER-DEFINED               -        2.10      0.50     0.850     -
  USER-DEFINED               -        1.60      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.264
  SUBAREA AREA(ACRES) =   14.00      SUBAREA RUNOFF(CFS) =   17.85
  EFFECTIVE AREA(ACRES) =     54.70   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       54.7       PEAK FLOW RATE(CFS) =      66.17

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    418.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   619.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.21
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      66.17
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   13.23
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    418.00 =    3218.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.23
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.488
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.70      0.50     0.100     -
  USER-DEFINED               -        2.10      0.50     0.100     -
  USER-DEFINED               -        3.90      0.50     0.100     -
  USER-DEFINED               -        0.20      0.50     0.900     -
```



```
  USER-DEFINED               -        5.50      0.50     0.500     -
  USER-DEFINED               -        3.20      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.333
  SUBAREA AREA(ACRES) =   15.60      SUBAREA RUNOFF(CFS) =   18.54
  EFFECTIVE AREA(ACRES) =     70.30   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       70.3       PEAK FLOW RATE(CFS) =      81.71

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.23
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.488
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.30      0.50     0.500     -
  USER-DEFINED               -        0.40      0.50     0.400     -
  USER-DEFINED               -        3.10      0.50     0.400     -
  USER-DEFINED               -        0.20      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.407
  SUBAREA AREA(ACRES) =    4.00      SUBAREA RUNOFF(CFS) =    4.62
  EFFECTIVE AREA(ACRES) =     74.30   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       74.3       PEAK FLOW RATE(CFS) =      86.33

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.23
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.488
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.60      0.50     0.100     -
  USER-DEFINED               -        2.20      0.50     0.200     -
  USER-DEFINED               -        3.70      0.50     0.100     -
  USER-DEFINED               -        3.50      0.50     0.200     -
  USER-DEFINED               -        0.70      0.50     0.100     -
  USER-DEFINED               -        0.10      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.154
  SUBAREA AREA(ACRES) =   10.80      SUBAREA RUNOFF(CFS) =   13.71
  EFFECTIVE AREA(ACRES) =     85.10   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       85.1       PEAK FLOW RATE(CFS) =     100.05

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    425.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   320.00
  FLOW LENGTH(FEET) =  1179.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.54
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     100.05
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =   14.06
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    425.00 =    4397.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    425.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN.) =   14.06
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.408
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.60      0.50     0.100     -
  USER-DEFINED               -        0.40      0.50     0.100     -
  USER-DEFINED               -        0.90      0.50     0.100     -
  USER-DEFINED               -        5.30      0.50     0.850     -
  USER-DEFINED               -        3.10      0.50     0.850     -
  USER-DEFINED               -        9.10      0.50     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.777
  SUBAREA AREA(ACRES) =   19.40      SUBAREA RUNOFF(CFS) =   17.79
  EFFECTIVE AREA(ACRES) =    104.50   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      104.5       PEAK FLOW RATE(CFS) =     111.72

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    425.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN.) =   14.06
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.408
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.30      0.50     0.900     -
  USER-DEFINED               -        1.90      0.50     0.900     -
  USER-DEFINED               -        1.90      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =    4.39
  EFFECTIVE AREA(ACRES) =    109.60   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      109.6       PEAK FLOW RATE(CFS) =     116.11

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    426.00 IS CODE =  56
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
```



```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    320.00  DOWNSTREAM(FEET) =    316.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   870.00   CHANNEL SLOPE =  0.0046
  GIVEN CHANNEL BASE(FEET) =  200.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   1.36
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.051
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.40      0.50     0.100     -
  USER-DEFINED               -        3.30      0.50     0.100     -
  USER-DEFINED               -        0.80      0.50     0.850     -
  USER-DEFINED               -        0.30      0.50     0.850     -
  USER-DEFINED               -        0.90      0.50     0.900     -
  USER-DEFINED               -        2.30      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.408
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     120.30
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.68
  AVERAGE FLOW DEPTH(FEET) =   0.36   TRAVEL TIME(MIN.) =   8.62
  Tc(MIN.) =   22.69
  SUBAREA AREA(ACRES) =    11.00       SUBAREA RUNOFF(CFS) =    8.38
  EFFECTIVE AREA(ACRES) =    120.60     AREA-AVERAGED Fm(INCH/HR) =   0.23
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   0.46
  TOTAL AREA(ACRES) =      120.6         PEAK FLOW RATE(CFS) =     116.11
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
  GIVEN CHANNEL BASE(FEET) =  200.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   1.35

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.35   FLOW VELOCITY(FEET/SEC.) =   1.66
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    426.00 =    5267.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    426.00 TO NODE    426.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN.) =   22.69
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.051
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.50      0.50     0.100     -
  USER-DEFINED               -        1.70      0.50     0.900     -
  USER-DEFINED               -        0.50      0.50     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.569
  SUBAREA AREA(ACRES) =    3.70      SUBAREA RUNOFF(CFS) =    2.55
  EFFECTIVE AREA(ACRES) =    124.30   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      124.3       PEAK FLOW RATE(CFS) =     116.11
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    426.00 TO NODE    427.00 IS CODE =  31
```

```
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   316.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =   321.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.33
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     116.11
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   23.03
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    427.00 =    5588.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    427.00 TO NODE    427.00 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.) =   23.03
  RAINFALL INTENSITY(INCH/HR) =   1.04
  AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.46
  EFFECTIVE STREAM AREA(ACRES) =     124.30
  TOTAL STREAM AREA(ACRES) =     124.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     116.11

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      230.70   30.75    0.872  0.50( 0.24) 0.48     305.8     430.00
      1      219.48   33.11    0.842  0.50( 0.24) 0.49     315.2     400.00
      2      116.11   23.03    1.041  0.50( 0.23) 0.46     124.3     413.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      334.99   23.03    1.041  0.50( 0.24) 0.48     353.3     413.00
      2      322.72   30.75    0.872  0.50( 0.24) 0.48     430.1     430.00
      3      307.23   33.11    0.842  0.50( 0.24) 0.48     439.5     400.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     334.99    Tc(MIN.) =    23.03
  EFFECTIVE AREA(ACRES) =     353.32   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      439.5
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    427.00 =   10563.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    427.00 TO NODE    428.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```



```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   310.00  DOWNSTREAM(FEET) =   275.00
  FLOW LENGTH(FEET) =   789.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  41.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.11
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     334.99
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   23.52
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    428.00 =   11352.00 FEET.
==============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      439.5  TC(MIN.) =     23.52
  EFFECTIVE AREA(ACRES) =    353.32  AREA-AVERAGED Fm(INCH/HR)=  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap = 0.475
  PEAK FLOW RATE(CFS)   =     334.99

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      334.99   23.52    1.027  0.50( 0.24) 0.48     353.3     413.00
      2      322.72   31.24    0.866  0.50( 0.24) 0.48     430.1     430.00
      3      307.23   33.60    0.836  0.50( 0.24) 0.48     439.5     400.00
==============================================================================
==============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2013 Advanced Engineering Software (aes)
             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:

                      Michael Baker International
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                         Santa Ana, CA 92707


 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA D ROMP 2018                                         *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 10-YR EV NOVEMBER 2018 FKAZI                                         *
 ***********************************************************************

  FILE NAME: 3D10EVRL.DAT
  TIME/DATE OF STUDY: 17:05 12/04/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  3.867
   2)   10.00;  2.568
   3)   15.00;  1.883
   4)   20.00;  1.612
   5)   25.00;  1.405
   6)   30.00;  1.260
   7)   40.00;  1.079
   8)   50.00;  0.961
   9)   60.00;  0.873
  10)   90.00;  0.726
  11)  120.00;  0.643
  12)  180.00;  0.540
  13)  360.00;  0.400
  14) 1200.00;  0.176
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    605.00  DOWNSTREAM(FEET) =    586.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.417
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.239
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56    8.77
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.30      0.30     0.600    56    7.42
  PUBLIC PARK                B        2.40      0.30     0.850    56    8.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.796
  SUBAREA RUNOFF(CFS) =     13.23
  TOTAL AREA(ACRES) =      4.90   PEAK FLOW RATE(CFS) =     13.23

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  586.00  DOWNSTREAM ELEVATION(FEET) =  583.00
  STREET LENGTH(FEET) =   333.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      21.52
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.49
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.00
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.53
  STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =    9.27
```

```
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.758
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 PUBLIC PARK                B        0.40      0.30     0.850    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        1.90      0.30     0.400    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        4.70      0.30     0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.565
 SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =   16.54
 EFFECTIVE AREA(ACRES) =     12.00    AREA-AVERAGED Fm(INCH/HR) =  0.20
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.66
 TOTAL AREA(ACRES) =       12.0        PEAK FLOW RATE(CFS) =      27.65

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.60
 FLOW VELOCITY(FEET/SEC.) =  3.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.74
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     663.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    402.00 TO NODE    402.50 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  583.00  DOWNSTREAM ELEVATION(FEET) =  580.00
 STREET LENGTH(FEET) =   315.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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) =      32.51
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.57
   HALFSTREET FLOOD WIDTH(FEET) =   22.77
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.37
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.92
 STREET FLOW TRAVEL TIME(MIN.) =   1.56   Tc(MIN.) =   10.83
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.455
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.50      0.30     0.850    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        1.80      0.30     0.600    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
```



```
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.30      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
 SUBAREA AREA(ACRES) =    4.70      SUBAREA RUNOFF(CFS) =    9.72
 EFFECTIVE AREA(ACRES) =     16.70    AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.62
 TOTAL AREA(ACRES) =       16.7        PEAK FLOW RATE(CFS) =      34.09

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.58   HALFSTREET FLOOD WIDTH(FEET) =  23.16
 FLOW VELOCITY(FEET/SEC.) =  3.42   DEPTH*VELOCITY(FT*FT/SEC.) =   1.97
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.50 =     978.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    402.50 TO NODE    403.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  580.00  DOWNSTREAM ELEVATION(FEET) =  579.00
 STREET LENGTH(FEET) =   394.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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) =      36.75
   ***STREET FLOWING FULL***
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.71
   HALFSTREET FLOOD WIDTH(FEET) =   32.16
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.13
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.51
 STREET FLOW TRAVEL TIME(MIN.) =   3.08   Tc(MIN.) =   13.91
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.033
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.20      0.30     0.850    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.80      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.435
 SUBAREA AREA(ACRES) =    3.10      SUBAREA RUNOFF(CFS) =    5.31
 EFFECTIVE AREA(ACRES) =     19.80    AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.59
 TOTAL AREA(ACRES) =       19.8        PEAK FLOW RATE(CFS) =      34.09
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  31.51
  FLOW VELOCITY(FEET/SEC.) =  2.07   DEPTH*VELOCITY(FT*FT/SEC.) =   1.44
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  579.00  DOWNSTREAM ELEVATION(FEET) =  560.00
  STREET LENGTH(FEET) =   974.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      40.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.55
    HALFSTREET FLOOD WIDTH(FEET) =   21.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.66
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.56
  STREET FLOW TRAVEL TIME(MIN.) =   3.48   Tc(MIN.) =   17.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.753
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        5.80      0.30      0.100    56
  COMMERCIAL                 B        0.70      0.30      0.100    56
  PUBLIC PARK                B        1.10      0.30      0.850    56
  PUBLIC PARK                B        0.70      0.30      0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30      0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.30      0.30      0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.267
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =   13.10
  EFFECTIVE AREA(ACRES) =     28.50    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       28.5        PEAK FLOW RATE(CFS) =      41.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.68
  FLOW VELOCITY(FEET/SEC.) =  4.69   DEPTH*VELOCITY(FT*FT/SEC.) =   2.58
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =    2346.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
```



```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.753
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30      1.000    66
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30      0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.30      0.30      0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.70      0.30      0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.40      0.30      0.400    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.30      0.30      0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.432
  SUBAREA AREA(ACRES) =   13.90      SUBAREA RUNOFF(CFS) =   20.32
  EFFECTIVE AREA(ACRES) =     42.40   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       42.4        PEAK FLOW RATE(CFS) =      61.50

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.753
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30      0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.27
  EFFECTIVE AREA(ACRES) =     42.60   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       42.6        PEAK FLOW RATE(CFS) =      61.76

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.753
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30      0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30      0.200    56
```

```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  PUBLIC PARK                B        1.50      0.30     0.850    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.50      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.590
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    6.38
  EFFECTIVE AREA(ACRES) =     47.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       47.1       PEAK FLOW RATE(CFS) =      68.15

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.753
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        2.80      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.00      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        6.40      0.30     0.500    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        6.70      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        8.70      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.671
  SUBAREA AREA(ACRES) =   31.90      SUBAREA RUNOFF(CFS) =   44.57
  EFFECTIVE AREA(ACRES) =     79.00   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       79.0       PEAK FLOW RATE(CFS) =     112.71

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 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.) =   17.39
  RAINFALL INTENSITY(INCH/HR) =   1.75
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =      79.00
  TOTAL STREAM AREA(ACRES) =      79.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     112.71
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    431.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =    729.00  DOWNSTREAM(FEET) =    630.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.120
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.797
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.10      0.30     1.000    72    9.12
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.30      0.30     1.000    66    9.12
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66    9.12
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.37
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      3.37

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    432.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    630.00  DOWNSTREAM(FEET) =    597.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   196.00   CHANNEL SLOPE =  0.1684
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.659
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.70      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.10      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.19
  AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   0.53
  Tc(MIN.) =    9.65
  SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    4.03
  EFFECTIVE AREA(ACRES) =      3.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.4         PEAK FLOW RATE(CFS) =       7.22

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   6.56
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    432.00 =     525.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    432.00 TO NODE    433.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    597.00  DOWNSTREAM(FEET) =    570.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   243.00   CHANNEL SLOPE =  0.1111
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.529
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  NATURAL FAIR COVER
  "OPEN BROWSH"              B        3.80      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.30      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.10      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BROWSH"              B        0.20      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.998
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.74
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.38
  AVERAGE FLOW DEPTH(FEET) =   0.78   TRAVEL TIME(MIN.) =   0.63
  Tc(MIN.) =   10.28
  SUBAREA AREA(ACRES) =     4.50       SUBAREA RUNOFF(CFS) =    9.03
  EFFECTIVE AREA(ACRES) =      7.90     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        7.9         PEAK FLOW RATE(CFS) =      15.85

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.87   FLOW VELOCITY(FEET/SEC.) =   6.91
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.00 =     768.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    433.00 TO NODE    433.10 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) =   564.00
  FLOW LENGTH(FEET) =  1076.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.81
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.85
  PIPE TRAVEL TIME(MIN.) =   3.08    Tc(MIN.) =   13.37
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.10 =    1844.00 FEET.

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



```
  FLOW PROCESS FROM NODE    433.10 TO NODE    433.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.37
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.107
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.70      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        5.40      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.613
  SUBAREA AREA(ACRES) =     7.60      SUBAREA RUNOFF(CFS) =   13.15
  EFFECTIVE AREA(ACRES) =     15.50   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.81
  TOTAL AREA(ACRES) =       15.5       PEAK FLOW RATE(CFS) =      26.00

****************************************************************************
  FLOW PROCESS FROM NODE    433.10 TO NODE    404.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   564.00  DOWNSTREAM(FEET) =   560.00
  FLOW LENGTH(FEET) =   830.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.27
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.00
  PIPE TRAVEL TIME(MIN.) =   2.21    Tc(MIN.) =   15.57
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    404.00 =    2674.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 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.) =   15.57
  RAINFALL INTENSITY(INCH/HR) =   1.85
  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.81
  EFFECTIVE STREAM AREA(ACRES) =      15.50
  TOTAL STREAM AREA(ACRES) =      15.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      26.00

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      112.71   17.39    1.753  0.30( 0.17) 0.56      79.0     400.00
      2       26.00   15.57    1.852  0.30( 0.24) 0.81      15.5     430.00
```

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	133.21	15.57	1.852	0.30(0.18)	0.61	86.2	430.00
2	137.12	17.39	1.753	0.30(0.18)	0.60	94.5	400.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 137.12 Tc(MIN.) = 17.39
EFFECTIVE AREA(ACRES) = 94.50 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60
TOTAL AREA(ACRES) = 94.5
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 404.00 = 2674.00 FEET.

****
FLOW PROCESS FROM NODE 404.00 TO NODE 405.00 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) = 557.00
FLOW LENGTH(FEET) = 377.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.47
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 137.12
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 17.94
LONGEST FLOWPATH FROM NODE 430.00 TO NODE 405.00 = 3051.00 FEET.

****
FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 17.94
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.724
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.30	0.30	0.100	56
PUBLIC PARK	B	0.90	0.30	0.850	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.20	0.30	0.200	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	4.50	0.30	0.500	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	3.20	0.30	0.400	56
COMMERCIAL	B	1.20	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.406
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 16.29
EFFECTIVE AREA(ACRES) = 105.80 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 105.8 PEAK FLOW RATE(CFS) = 147.55

****
FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 17.94
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.724
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	0.20	0.30	0.850	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	4.20	0.30	0.500	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	3.80	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.459
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 11.85
EFFECTIVE AREA(ACRES) = 114.10 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57
TOTAL AREA(ACRES) = 114.1 PEAK FLOW RATE(CFS) = 159.40

****
FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 17.94
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.724
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	4.80	0.30	0.200	56
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	0.10	0.30	0.600	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	5.20	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307
SUBAREA AREA(ACRES) = 10.10 SUBAREA RUNOFF(CFS) = 14.83
EFFECTIVE AREA(ACRES) = 124.20 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55
TOTAL AREA(ACRES) = 124.2 PEAK FLOW RATE(CFS) = 174.23

****
FLOW PROCESS FROM NODE 405.00 TO NODE 406.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 557.00 DOWNSTREAM(FEET) = 535.00
FLOW LENGTH(FEET) = 525.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.96
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1

```
  PIPE-FLOW(CFS) =     174.23
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   18.32
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    406.00 =    3576.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.32
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.703
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.30      0.30     0.900    56
  PUBLIC PARK                 B        0.90      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        8.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        0.10      0.30     0.600    56
  PUBLIC PARK                 B        0.40      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.311
  SUBAREA AREA(ACRES) =   10.50      SUBAREA RUNOFF(CFS) =   15.21
  EFFECTIVE AREA(ACRES) =    134.70   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      134.7       PEAK FLOW RATE(CFS) =     187.14

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.32
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.703
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        9.00      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.00      SUBAREA RUNOFF(CFS) =   13.31
  EFFECTIVE AREA(ACRES) =    143.70   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      143.7       PEAK FLOW RATE(CFS) =     200.44

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      201.04   16.50    1.801  0.30( 0.15) 0.51     135.4     430.00
      2      200.44   18.32    1.703  0.30( 0.15) 0.51     143.7     400.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     201.04  Tc(MIN.) =   16.50
  AREA-AVERAGED Fm(INCH/HR) =  0.15  AREA-AVERAGED Fp(INCH/HR) =  0.30
```



```
  AREA-AVERAGED Ap =  0.51  EFFECTIVE AREA(ACRES) =     135.45

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.801
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        0.30      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.50      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B       18.70      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        1.00      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.609
  SUBAREA AREA(ACRES) =   20.60      SUBAREA RUNOFF(CFS) =   30.01
  EFFECTIVE AREA(ACRES) =    156.05   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      164.3       PEAK FLOW RATE(CFS) =     231.05

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   535.00  DOWNSTREAM(FEET) =   510.00
  FLOW LENGTH(FEET) =   311.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  31.60
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     231.05
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   16.67
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    407.00 =    3887.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.67
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.793
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B        0.10      0.30     0.500    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        1.10      0.30     0.900    56
```

```
  COMMERCIAL                  B        2.20      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.40      0.30     0.900    56
  COMMERCIAL                  B        1.10      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.353
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =    7.44
  EFFECTIVE AREA(ACRES) =    160.95   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      169.2       PEAK FLOW RATE(CFS) =     237.24

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    408.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   510.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   624.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.90
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     237.24
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   17.07
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    408.00 =    4511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    408.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.07
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.771
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.70      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        1.60      0.30     0.600    56
  COMMERCIAL                  B        1.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        4.80      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        4.20      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B        2.20      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.649
  SUBAREA AREA(ACRES) =   14.90      SUBAREA RUNOFF(CFS) =   21.14
  EFFECTIVE AREA(ACRES) =    175.85   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      184.1       PEAK FLOW RATE(CFS) =     255.22

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    408.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   17.07
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.771
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        0.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        2.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        6.60      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B        2.00      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.625
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =   15.67
  EFFECTIVE AREA(ACRES) =    186.85   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      195.1       PEAK FLOW RATE(CFS) =     270.89

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    409.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   460.00
  FLOW LENGTH(FEET) =   368.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.39
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     270.89
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   17.29
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    409.00 =    4879.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.759
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 B        0.70      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        2.20      0.30     0.600    56
  APARTMENTS                  B        0.20      0.30     0.200    56
  COMMERCIAL                  B        0.60      0.30     0.100    56
  PUBLIC PARK                 B        1.80      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.658
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =    8.15
  EFFECTIVE AREA(ACRES) =    192.65   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
```

```
  TOTAL AREA(ACRES) =      200.9       PEAK FLOW RATE(CFS) =     277.08

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.759
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.90      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.30      0.30     0.500    56
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.616
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   12.89
  EFFECTIVE AREA(ACRES) =    201.75   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      210.0       PEAK FLOW RATE(CFS) =     289.97

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.759
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.80      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.00      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.566
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =    8.30
  EFFECTIVE AREA(ACRES) =    207.55   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      215.8       PEAK FLOW RATE(CFS) =     298.27

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    410.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =   291.00   MANNING'S N =  0.013
```



```
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  37.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.04
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     298.27
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   17.46
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    410.00 =    5170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.750
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.90      0.30     0.850    56
  APARTMENTS                 B        1.50      0.30     0.200    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  PUBLIC PARK                B        2.30      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.40      0.30     0.600    56
  APARTMENTS                 B        3.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.456
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   14.52
  EFFECTIVE AREA(ACRES) =    217.55   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      225.8       PEAK FLOW RATE(CFS) =     311.03

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.750
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.00      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.645
  SUBAREA AREA(ACRES) =    5.20      SUBAREA RUNOFF(CFS) =    7.28
  EFFECTIVE AREA(ACRES) =    222.75   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      231.0       PEAK FLOW RATE(CFS) =     318.31

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =   17.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.750
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        2.10      0.30     0.200    56
  APARTMENTS                 B        8.90      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =   16.73
  EFFECTIVE AREA(ACRES) =    233.75   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      242.0       PEAK FLOW RATE(CFS) =     335.04

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    411.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   445.00  DOWNSTREAM(FEET) =   425.00
  FLOW LENGTH(FEET) =   324.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  38.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.71
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     335.04
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   17.64
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    411.00 =    5494.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.64
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.740
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  PUBLIC PARK                B        1.70      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.70      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.20      0.30     0.600    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.504
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    5.15
  EFFECTIVE AREA(ACRES) =    237.35   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      245.6       PEAK FLOW RATE(CFS) =     338.19

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   17.64
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.740
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.90      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        8.80      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.267
  SUBAREA AREA(ACRES) =    9.90      SUBAREA RUNOFF(CFS) =   14.79
  EFFECTIVE AREA(ACRES) =    247.25   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      255.5       PEAK FLOW RATE(CFS) =     352.98

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.64
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.740
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.50      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.10      0.30     0.600    56
  APARTMENTS                 B        0.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.546
  SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =   11.07
  EFFECTIVE AREA(ACRES) =    255.05   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      263.3       PEAK FLOW RATE(CFS) =     364.04

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    412.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   425.00  DOWNSTREAM(FEET) =   392.00
  FLOW LENGTH(FEET) =   641.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  38.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.93
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     364.04
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   17.99
```

```
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    412.00 =    6135.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.99
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.721
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.60      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        5.30      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 COMMERCIAL                 B        1.10      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        7.30      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.198
 SUBAREA AREA(ACRES) =   14.50      SUBAREA RUNOFF(CFS) =   21.68
 EFFECTIVE AREA(ACRES) =    269.55   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =      277.8       PEAK FLOW RATE(CFS) =     381.28

****************************************************************************
 FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.99
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.721
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
 COMMERCIAL                 B        0.20      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        4.10      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        3.10      0.30     0.400    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.50      0.30     0.200    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.317
 SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =   12.73
 EFFECTIVE AREA(ACRES) =    278.25   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
 TOTAL AREA(ACRES) =      286.5       PEAK FLOW RATE(CFS) =     394.01

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



```
 FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.99
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.721
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        4.00      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.456
 SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    6.42
 EFFECTIVE AREA(ACRES) =    282.75   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
 TOTAL AREA(ACRES) =      291.0       PEAK FLOW RATE(CFS) =     400.43

****************************************************************************
 FLOW PROCESS FROM NODE    412.00 TO NODE    420.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   392.00  DOWNSTREAM(FEET) =   350.00
 FLOW LENGTH(FEET) =  1358.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  60.0 INCH PIPE IS  45.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  25.11
 ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     400.43
 PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =   18.89
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    420.00 =    7493.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    420.00 TO NODE    420.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   18.89
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.672
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.50      0.30     0.100    56
 COMMERCIAL                 B        1.30      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.105
 SUBAREA AREA(ACRES) =    1.90      SUBAREA RUNOFF(CFS) =    2.81
 EFFECTIVE AREA(ACRES) =    284.65   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
 TOTAL AREA(ACRES) =      292.9       PEAK FLOW RATE(CFS) =     400.43
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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

```
 FLOW PROCESS FROM NODE    420.00 TO NODE    421.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    346.00  DOWNSTREAM(FEET) =    320.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1617.00   CHANNEL SLOPE =  0.0161
 CHANNEL BASE(FEET) =  200.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  20.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.387
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        6.90      0.30     0.100    56
 COMMERCIAL                 B        3.60      0.30     0.100    56
 COMMERCIAL                 B        2.20      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.30      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.227
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     409.39
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.00
 AVERAGE FLOW DEPTH(FEET) =   0.51   TRAVEL TIME(MIN.) =   6.74
 Tc(MIN.) =   25.64
 SUBAREA AREA(ACRES) =    15.10       SUBAREA RUNOFF(CFS) =   17.92
 EFFECTIVE AREA(ACRES) =    299.75     AREA-AVERAGED Fm(INCH/HR) =   0.14
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.48
 TOTAL AREA(ACRES) =      308.0         PEAK FLOW RATE(CFS) =     400.43
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.50   FLOW VELOCITY(FEET/SEC.) =   3.97
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    421.00 =    9110.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    421.00 TO NODE    421.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   25.64
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.387
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        1.10      0.30     0.850    56
 PUBLIC PARK                B        2.50      0.30     0.850    56
 PUBLIC PARK                B        3.60      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =    7.33
 EFFECTIVE AREA(ACRES) =    306.95   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =      315.2       PEAK FLOW RATE(CFS) =     400.43
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```



```
****************************************************************************
 FLOW PROCESS FROM NODE    421.00 TO NODE    427.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   320.00  DOWNSTREAM(FEET) =   310.00
 FLOW LENGTH(FEET) =  1453.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  78.0 INCH PIPE IS  62.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.17
 ESTIMATED PIPE DIAMETER(INCH) =  78.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     400.43
 PIPE TRAVEL TIME(MIN.) =   1.71    Tc(MIN.) =   27.35
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    427.00 =   10563.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    427.00 TO NODE    427.00 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.) =   27.35
 RAINFALL INTENSITY(INCH/HR) =   1.34
 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.48
 EFFECTIVE STREAM AREA(ACRES) =     306.95
 TOTAL STREAM AREA(ACRES) =     315.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     400.43

****************************************************************************
 FLOW PROCESS FROM NODE    413.00 TO NODE    414.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
 ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    497.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.533
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.729
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        0.10      0.30     0.100    56    5.53
 PUBLIC PARK                B        1.10      0.30     0.850    56    8.79
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56    7.50
 COMMERCIAL                 B        0.10      0.30     0.100    56    5.53
 PUBLIC PARK                B        0.30      0.30     0.850    56    8.79
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        1.50      0.30     0.600    56    7.50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.678
 SUBAREA RUNOFF(CFS) =     10.15
```

```
  TOTAL AREA(ACRES) =      3.20   PEAK FLOW RATE(CFS) =     10.15

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.10 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.00  DOWNSTREAM ELEVATION(FEET) =  493.00
  STREET LENGTH(FEET) =   371.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      16.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   16.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.00
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.40
  STREET FLOW TRAVEL TIME(MIN.) =   2.06   Tc(MIN.) =    7.59
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.193
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.40      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.40      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.673
  SUBAREA AREA(ACRES) =    4.80      SUBAREA RUNOFF(CFS) =   12.92
  EFFECTIVE AREA(ACRES) =      8.00    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =        8.0        PEAK FLOW RATE(CFS) =      21.53

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  18.87
  FLOW VELOCITY(FEET/SEC.) =  3.19   DEPTH*VELOCITY(FT*FT/SEC.) =   1.59
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    414.10 =     701.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    414.10 TO NODE    414.20 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  493.00  DOWNSTREAM ELEVATION(FEET) =  490.00
  STREET LENGTH(FEET) =   476.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```



```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      27.47
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.57
    HALFSTREET FLOOD WIDTH(FEET) =   23.09
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.59
  STREET FLOW TRAVEL TIME(MIN.) =   2.86   Tc(MIN.) =   10.45
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.506
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.40      0.30     0.600    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   11.85
  EFFECTIVE AREA(ACRES) =     13.60    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       13.6        PEAK FLOW RATE(CFS) =      28.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.58   HALFSTREET FLOOD WIDTH(FEET) =  23.40
  FLOW VELOCITY(FEET/SEC.) =  2.80   DEPTH*VELOCITY(FT*FT/SEC.) =   1.62
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    414.20 =    1177.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    414.20 TO NODE    415.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   490.00  DOWNSTREAM(FEET) =   465.00
  FLOW LENGTH(FEET) =   488.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.84
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.44
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   10.97
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    415.00 =    1665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    415.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   10.97
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.435
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        2.30      0.30     0.600    56
  APARTMENTS                  B        0.10      0.30     0.200    56
  COMMERCIAL                  B        0.80      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        3.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.537
  SUBAREA AREA(ACRES) =    6.50      SUBAREA RUNOFF(CFS) =   13.30
  EFFECTIVE AREA(ACRES) =     20.10   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =       20.1       PEAK FLOW RATE(CFS) =      40.88

********************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    416.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   465.00  DOWNSTREAM(FEET) =   440.00
  FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.20
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.88
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   11.45
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    416.00 =    2162.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   11.45
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.369
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        0.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.40      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        3.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.392
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =    9.93
  EFFECTIVE AREA(ACRES) =     25.00   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       25.0       PEAK FLOW RATE(CFS) =      49.62
```



```
********************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   11.45
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.369
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        1.80      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        1.60      0.30     0.600    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        3.60      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        3.00      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.389
  SUBAREA AREA(ACRES) =   10.10      SUBAREA RUNOFF(CFS) =   20.48
  EFFECTIVE AREA(ACRES) =     35.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       35.1       PEAK FLOW RATE(CFS) =      70.09

********************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    417.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   420.00
  FLOW LENGTH(FEET) =   437.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.01
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      70.09
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   11.83
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    417.00 =    2599.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   11.83
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.317
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        1.50      0.30     0.200    56
  COMMERCIAL                  B        0.70      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        3.40      0.30     0.200    56
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.188
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   11.39
  EFFECTIVE AREA(ACRES) =     40.70   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       40.7       PEAK FLOW RATE(CFS) =      79.83

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.83
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.317
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        4.60      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  COMMERCIAL                 B        1.50      0.30     0.100    56
  PUBLIC PARK                B        2.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.60      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.264
  SUBAREA AREA(ACRES) =   14.00      SUBAREA RUNOFF(CFS) =   28.19
  EFFECTIVE AREA(ACRES) =     54.70   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       54.7       PEAK FLOW RATE(CFS) =     108.02

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    418.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   619.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.31
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     108.02
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   12.40
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    418.00 =    3218.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.40
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.240
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
  COMMERCIAL                 B        0.70      0.30     0.100    56
  COMMERCIAL                 B        2.10      0.30     0.100    56
  COMMERCIAL                 B        3.90      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        5.50      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.20      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.333
  SUBAREA AREA(ACRES) =   15.60      SUBAREA RUNOFF(CFS) =   30.04
  EFFECTIVE AREA(ACRES) =     70.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       70.3       PEAK FLOW RATE(CFS) =     134.26

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.40
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.240
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.40      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.10      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.407
  SUBAREA AREA(ACRES) =    4.00      SUBAREA RUNOFF(CFS) =    7.62
  EFFECTIVE AREA(ACRES) =     74.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       74.3       PEAK FLOW RATE(CFS) =     141.89

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.40
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.240
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.20      0.30     0.200    56
  COMMERCIAL                 B        3.70      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.50      0.30     0.200    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
```

```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.154
  SUBAREA AREA(ACRES) =   10.80      SUBAREA RUNOFF(CFS) =   21.32
  EFFECTIVE AREA(ACRES) =     85.10   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       85.1       PEAK FLOW RATE(CFS) =     163.21

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    425.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   320.00
  FLOW LENGTH(FEET) =  1179.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.58
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     163.21
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   13.14
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    425.00 =    4397.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    425.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.14
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.138
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        5.30      0.30     0.850    56
  PUBLIC PARK                B        3.10      0.30     0.850    56
  PUBLIC PARK                B        9.10      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.777
  SUBAREA AREA(ACRES) =   19.40      SUBAREA RUNOFF(CFS) =   33.27
  EFFECTIVE AREA(ACRES) =    104.50   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      104.5       PEAK FLOW RATE(CFS) =     188.72

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    425.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.14
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.138
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```



```
  ".4 DWELLING/ACRE"         B        1.30      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.90      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =    8.58
  EFFECTIVE AREA(ACRES) =    109.60   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      109.6       PEAK FLOW RATE(CFS) =     197.29

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    426.00 IS CODE =  56
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    320.00  DOWNSTREAM(FEET) =    316.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   870.00   CHANNEL SLOPE =  0.0046
  GIVEN CHANNEL BASE(FEET) =  200.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   1.49
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.606
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.40      0.30     0.100    56
  COMMERCIAL                 B        3.30      0.30     0.100    56
  PUBLIC PARK                B        0.80      0.30     0.850    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.408
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     204.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.07
  AVERAGE FLOW DEPTH(FEET) =   0.49   TRAVEL TIME(MIN.) =   7.01
  Tc(MIN.) =   20.15
  SUBAREA AREA(ACRES) =    11.00       SUBAREA RUNOFF(CFS) =   14.69
  EFFECTIVE AREA(ACRES) =    120.60     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.46
  TOTAL AREA(ACRES) =      120.6         PEAK FLOW RATE(CFS) =     197.29
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
  GIVEN CHANNEL BASE(FEET) =  200.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   1.48

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =   2.05
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    426.00 =    5267.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    426.00 TO NODE    426.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
  MAINLINE Tc(MIN.) =   20.15
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.606
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        1.50      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        1.70      0.30     0.900    56
  PUBLIC PARK               B        0.50      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.569
  SUBAREA AREA(ACRES) =    3.70      SUBAREA RUNOFF(CFS) =    4.78
  EFFECTIVE AREA(ACRES) =    124.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      124.3       PEAK FLOW RATE(CFS) =     197.29
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    426.00 TO NODE    427.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   316.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =   321.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.47
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     197.29
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   20.45
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    427.00 =    5588.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    427.00 TO NODE    427.00 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.) =   20.45
  RAINFALL INTENSITY(INCH/HR) =   1.59
  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.46
  EFFECTIVE STREAM AREA(ACRES) =     124.30
  TOTAL STREAM AREA(ACRES) =     124.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     197.29

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      400.43   27.35    1.337  0.30( 0.15) 0.48     306.9     430.00
      1      385.96   29.31    1.280  0.30( 0.15) 0.49     315.2     400.00
      2      197.29   20.45    1.593  0.30( 0.14) 0.46     124.3     413.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```



```
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      561.19   20.45    1.593  0.30( 0.14) 0.48     353.9     413.00
      2      562.98   27.35    1.337  0.30( 0.14) 0.48     431.2     430.00
      3      540.81   29.31    1.280  0.30( 0.14) 0.48     439.5     400.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     562.98    Tc(MIN.) =    27.35
  EFFECTIVE AREA(ACRES) =     431.25   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      439.5
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    427.00 =   10563.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    427.00 TO NODE    428.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   310.00  DOWNSTREAM(FEET) =   275.00
  FLOW LENGTH(FEET) =   789.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  49.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  31.16
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     562.98
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   27.77
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    428.00 =   11352.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      439.5  TC(MIN.) =     27.77
  EFFECTIVE AREA(ACRES) =    431.25  AREA-AVERAGED Fm(INCH/HR)=  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.477
  PEAK FLOW RATE(CFS)   =     562.98

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      561.19   20.88    1.576  0.30( 0.14) 0.48     353.9     413.00
      2      562.98   27.77    1.325  0.30( 0.14) 0.48     431.2     430.00
      3      540.81   29.73    1.268  0.30( 0.14) 0.48     439.5     400.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:

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                         Santa Ana, CA 92707


 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA D ROMP 2018                                         *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 25-YR EV NOVEMBER 2018 FKAZI                                         *
 ***********************************************************************

  FILE NAME: 3D25EVRL.DAT
  TIME/DATE OF STUDY: 17:07 12/04/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  4.933
   2)   10.00;  3.214
   3)   15.00;  2.451
   4)   20.00;  2.024
   5)   25.00;  1.763
   6)   30.00;  1.547
   7)   40.00;  1.347
   8)   50.00;  1.194
   9)   60.00;  1.070
  10)   90.00;  0.902
  11)  120.00;  0.792
  12)  180.00;  0.662
  13)  360.00;  0.490
  14) 1200.00;  0.216
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    605.00  DOWNSTREAM(FEET) =    586.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.417
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.102
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56    8.77
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.30      0.30     0.600    56    7.42
  PUBLIC PARK                B        2.40      0.30     0.850    56    8.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.796
  SUBAREA RUNOFF(CFS) =     17.04
  TOTAL AREA(ACRES) =      4.90   PEAK FLOW RATE(CFS) =     17.04

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  586.00  DOWNSTREAM ELEVATION(FEET) =  583.00
  STREET LENGTH(FEET) =   333.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      27.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.55
    HALFSTREET FLOOD WIDTH(FEET) =   21.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.18
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.74
  STREET FLOW TRAVEL TIME(MIN.) =   1.75   Tc(MIN.) =    9.16
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 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.501
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 PUBLIC PARK                B        0.40      0.30     0.850    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        1.90      0.30     0.400    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        4.70      0.30     0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.565
 SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =   21.29
 EFFECTIVE AREA(ACRES) =     12.00    AREA-AVERAGED Fm(INCH/HR) =  0.20
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.66
 TOTAL AREA(ACRES) =       12.0        PEAK FLOW RATE(CFS) =      35.68

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.59   HALFSTREET FLOOD WIDTH(FEET) =  23.87
 FLOW VELOCITY(FEET/SEC.) =  3.38   DEPTH*VELOCITY(FT*FT/SEC.) =   1.99
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     663.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    402.00 TO NODE    402.50 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  583.00  DOWNSTREAM ELEVATION(FEET) =  580.00
 STREET LENGTH(FEET) =   315.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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) =      41.94
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.61
   HALFSTREET FLOOD WIDTH(FEET) =   25.12
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.60
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.20
 STREET FLOW TRAVEL TIME(MIN.) =   1.46   Tc(MIN.) =   10.62
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.119
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.50      0.30     0.850    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        1.80      0.30     0.600    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
```



```
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.30      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
 SUBAREA AREA(ACRES) =    4.70      SUBAREA RUNOFF(CFS) =   12.52
 EFFECTIVE AREA(ACRES) =     16.70    AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.62
 TOTAL AREA(ACRES) =       16.7        PEAK FLOW RATE(CFS) =      44.07

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.62   HALFSTREET FLOOD WIDTH(FEET) =  25.66
 FLOW VELOCITY(FEET/SEC.) =  3.63   DEPTH*VELOCITY(FT*FT/SEC.) =   2.25
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.50 =     978.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    402.50 TO NODE    403.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  580.00  DOWNSTREAM ELEVATION(FEET) =  579.00
 STREET LENGTH(FEET) =   394.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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) =      47.64
   ***STREET FLOWING FULL***
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.76
   HALFSTREET FLOOD WIDTH(FEET) =   34.60
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.76
 STREET FLOW TRAVEL TIME(MIN.) =   2.83   Tc(MIN.) =   13.45
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.688
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.20      0.30     0.850    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.80      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.435
 SUBAREA AREA(ACRES) =    3.10      SUBAREA RUNOFF(CFS) =    7.13
 EFFECTIVE AREA(ACRES) =     19.80    AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.59
 TOTAL AREA(ACRES) =       19.8        PEAK FLOW RATE(CFS) =      44.72

 END OF SUBAREA STREET FLOW HYDRAULICS:
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```
  DEPTH(FEET) = 0.75   HALFSTREET FLOOD WIDTH(FEET) =  33.93
  FLOW VELOCITY(FEET/SEC.) =  2.28   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  579.00  DOWNSTREAM ELEVATION(FEET) =  560.00
  STREET LENGTH(FEET) =   974.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      53.44
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.59
    HALFSTREET FLOOD WIDTH(FEET) =   24.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.00
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.96
  STREET FLOW TRAVEL TIME(MIN.) =   3.25   Tc(MIN.) =   16.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.306
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        5.80      0.30     0.100    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  PUBLIC PARK                B        1.10      0.30     0.850    56
  PUBLIC PARK                B        0.70      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.267
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =   17.43
  EFFECTIVE AREA(ACRES) =     28.50    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       28.5        PEAK FLOW RATE(CFS) =      55.35

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.60   HALFSTREET FLOOD WIDTH(FEET) =  24.34
  FLOW VELOCITY(FEET/SEC.) =  5.05   DEPTH*VELOCITY(FT*FT/SEC.) =   3.01
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =    2346.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
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============================================================================
  MAINLINE Tc(MIN.) =   16.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.306
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.30      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.70      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.40      0.30     0.400    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.432
  SUBAREA AREA(ACRES) =   13.90      SUBAREA RUNOFF(CFS) =   27.23
  EFFECTIVE AREA(ACRES) =     42.40   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       42.4       PEAK FLOW RATE(CFS) =      82.58

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.306
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.37
  EFFECTIVE AREA(ACRES) =     42.60   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       42.6       PEAK FLOW RATE(CFS) =      82.95

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.306
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
```

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  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  PUBLIC PARK                B        1.50      0.30     0.850    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.50      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.590
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    8.62
  EFFECTIVE AREA(ACRES) =     47.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       47.1       PEAK FLOW RATE(CFS) =      91.57

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.306
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        2.80      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.00      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        6.40      0.30     0.500    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        6.70      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        8.70      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.671
  SUBAREA AREA(ACRES) =   31.90      SUBAREA RUNOFF(CFS) =   60.43
  EFFECTIVE AREA(ACRES) =     79.00   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       79.0       PEAK FLOW RATE(CFS) =     152.00

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 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.) =   16.70
  RAINFALL INTENSITY(INCH/HR) =   2.31
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =      79.00
  TOTAL STREAM AREA(ACRES) =      79.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     152.00

****************************************************************************
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  FLOW PROCESS FROM NODE    430.00 TO NODE    431.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =    729.00  DOWNSTREAM(FEET) =    630.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.120
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.517
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.10      0.30     1.000    72    9.12
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.30      0.30     1.000    66    9.12
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66    9.12
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.34
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      4.34

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    432.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    630.00  DOWNSTREAM(FEET) =    597.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   196.00   CHANNEL SLOPE =  0.1684
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.346
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.70      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.10      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.95
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.60
  AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   0.49
  Tc(MIN.) =    9.61
  SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    5.21
  EFFECTIVE AREA(ACRES) =      3.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.4         PEAK FLOW RATE(CFS) =       9.32

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.66   FLOW VELOCITY(FEET/SEC.) =   7.11
```

```
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    432.00 =     525.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    432.00 TO NODE    433.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    597.00  DOWNSTREAM(FEET) =    570.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   243.00   CHANNEL SLOPE =  0.1111
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.182
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        3.80      0.30     1.000    66
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.30      0.30     1.000    65
 NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF"     B        0.10      0.30     1.000    72
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.20      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.998
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.16
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.84
 AVERAGE FLOW DEPTH(FEET) =   0.86   TRAVEL TIME(MIN.) =   0.59
 Tc(MIN.) =   10.21
 SUBAREA AREA(ACRES) =     4.50       SUBAREA RUNOFF(CFS) =   11.68
 EFFECTIVE AREA(ACRES) =      7.90     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        7.9         PEAK FLOW RATE(CFS) =      20.50

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.96   FLOW VELOCITY(FEET/SEC.) =   7.35
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.00 =     768.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    433.00 TO NODE    433.10 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) =   564.00
 FLOW LENGTH(FEET) =  1076.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.27
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      20.50
 PIPE TRAVEL TIME(MIN.) =   2.86    Tc(MIN.) =   13.07
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.10 =    1844.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    433.10 TO NODE    433.10 IS CODE =  81
```



```
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.07
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.746
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.50      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.70      0.30     0.900    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        5.40      0.30     0.500    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.613
 SUBAREA AREA(ACRES) =    7.60      SUBAREA RUNOFF(CFS) =   17.53
 EFFECTIVE AREA(ACRES) =     15.50   AREA-AVERAGED Fm(INCH/HR) =  0.24
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.81
 TOTAL AREA(ACRES) =       15.5       PEAK FLOW RATE(CFS) =      34.92

****************************************************************************
 FLOW PROCESS FROM NODE    433.10 TO NODE    404.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   564.00  DOWNSTREAM(FEET) =   560.00
 FLOW LENGTH(FEET) =   830.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.90
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      34.92
 PIPE TRAVEL TIME(MIN.) =   2.01    Tc(MIN.) =   15.07
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    404.00 =    2674.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 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.) =   15.07
 RAINFALL INTENSITY(INCH/HR) =   2.44
 AREA-AVERAGED Fm(INCH/HR) =  0.24
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.81
 EFFECTIVE STREAM AREA(ACRES) =      15.50
 TOTAL STREAM AREA(ACRES) =      15.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.92

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
     1      152.00   16.70    2.306  0.30( 0.17) 0.56      79.0     400.00
     2       34.92   15.07    2.445  0.30( 0.24) 0.81      15.5     430.00
```

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      181.03   15.07    2.445  0.30( 0.18) 0.60      86.8     430.00
     2      184.71   16.70    2.306  0.30( 0.18) 0.60      94.5     400.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     184.71    Tc(MIN.) =    16.70
 EFFECTIVE AREA(ACRES) =      94.50   AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =       94.5
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    404.00 =    2674.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    404.00 TO NODE    405.00 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) =   557.00
 FLOW LENGTH(FEET) =   377.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  57.0 INCH PIPE IS  44.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.35
 ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     184.71
 PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   17.21
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    405.00 =    3051.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.21
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.263
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.30      0.30     0.100    56
 PUBLIC PARK                B        0.90      0.30     0.850    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        4.50      0.30     0.500    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        3.20      0.30     0.400    56
 COMMERCIAL                 B        1.20      0.30     0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.406
 SUBAREA AREA(ACRES) =   11.30      SUBAREA RUNOFF(CFS) =   21.77
 EFFECTIVE AREA(ACRES) =    105.80   AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.58
 TOTAL AREA(ACRES) =      105.8       PEAK FLOW RATE(CFS) =     198.85

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```



```
 FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.21
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.263
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.20      0.30     0.850    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        4.20      0.30     0.500    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        3.80      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.459
 SUBAREA AREA(ACRES) =    8.30      SUBAREA RUNOFF(CFS) =   15.87
 EFFECTIVE AREA(ACRES) =    114.10   AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.57
 TOTAL AREA(ACRES) =      114.1       PEAK FLOW RATE(CFS) =     214.73

****************************************************************************
 FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.21
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.263
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        4.80      0.30     0.200    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        5.20      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.307
 SUBAREA AREA(ACRES) =   10.10      SUBAREA RUNOFF(CFS) =   19.73
 EFFECTIVE AREA(ACRES) =    124.20   AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =      124.2       PEAK FLOW RATE(CFS) =     234.46

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      234.51   15.58    2.401  0.30( 0.16) 0.55     116.5     430.00
     2      234.46   17.21    2.263  0.30( 0.17) 0.55     124.2     400.00
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =     234.51  Tc(MIN.) =   15.58
 AREA-AVERAGED Fm(INCH/HR) =  0.16  AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.55  EFFECTIVE AREA(ACRES) =     116.51

****************************************************************************
 FLOW PROCESS FROM NODE    405.00 TO NODE    406.00 IS CODE =  31
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   557.00  DOWNSTREAM(FEET) =   535.00
  FLOW LENGTH(FEET) =   525.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.24
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     234.51
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   15.94
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    406.00 =    3576.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.94
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.370
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        8.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.311
  SUBAREA AREA(ACRES) =   10.50      SUBAREA RUNOFF(CFS) =   21.52
  EFFECTIVE AREA(ACRES) =    127.01   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      134.7       PEAK FLOW RATE(CFS) =     252.80

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.94
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.370
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        9.00      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.00      SUBAREA RUNOFF(CFS) =   18.71
  EFFECTIVE AREA(ACRES) =    136.01   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      143.7       PEAK FLOW RATE(CFS) =     271.51
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.94
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.370
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.30      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       18.70      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.00      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.609
  SUBAREA AREA(ACRES) =   20.60      SUBAREA RUNOFF(CFS) =   40.56
  EFFECTIVE AREA(ACRES) =    156.61   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      164.3       PEAK FLOW RATE(CFS) =     312.07

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   535.00  DOWNSTREAM(FEET) =   510.00
  FLOW LENGTH(FEET) =   311.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  35.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.54
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     312.07
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   16.10
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    407.00 =    3887.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.10
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.357
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  COMMERCIAL                 B        2.20      0.30     0.100    56
```

```
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.40      0.30     0.900    56
  COMMERCIAL                  B        1.10      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.353
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =    9.93
  EFFECTIVE AREA(ACRES) =    161.51   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      169.2       PEAK FLOW RATE(CFS) =     320.14

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    408.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   510.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   624.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  38.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.06
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     320.14
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   16.47
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    408.00 =    4511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    408.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.47
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.326
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.70      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        1.60      0.30     0.600    56
  COMMERCIAL                  B        1.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        4.80      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        4.20      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B        2.20      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.649
  SUBAREA AREA(ACRES) =   14.90      SUBAREA RUNOFF(CFS) =   28.58
  EFFECTIVE AREA(ACRES) =    176.41   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      184.1       PEAK FLOW RATE(CFS) =     344.12

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    408.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   16.47
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.326
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        0.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        2.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        6.60      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B        2.00      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.625
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =   21.17
  EFFECTIVE AREA(ACRES) =    187.41   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      195.1       PEAK FLOW RATE(CFS) =     365.28

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    409.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   460.00
  FLOW LENGTH(FEET) =   368.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  40.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.00
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     365.28
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   16.67
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    409.00 =    4879.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.308
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 B        0.70      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        2.20      0.30     0.600    56
  APARTMENTS                  B        0.20      0.30     0.200    56
  COMMERCIAL                  B        0.60      0.30     0.100    56
  PUBLIC PARK                 B        1.80      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.658
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =   11.02
  EFFECTIVE AREA(ACRES) =    193.21   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      200.9       PEAK FLOW RATE(CFS) =     373.36
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.308
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.90      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.30      0.30     0.500    56
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.616
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   17.39
  EFFECTIVE AREA(ACRES) =    202.31   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      210.0       PEAK FLOW RATE(CFS) =     390.75

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.308
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.80      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.00      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.566
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =   11.16
  EFFECTIVE AREA(ACRES) =    208.11   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      215.8       PEAK FLOW RATE(CFS) =     401.91

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    410.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =   291.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  42.0 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.30
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     401.91
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   16.83
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    410.00 =    5170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.83
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.294
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.90      0.30     0.850    56
  APARTMENTS                 B        1.50      0.30     0.200    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  PUBLIC PARK                B        2.30      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.40      0.30     0.600    56
  APARTMENTS                 B        3.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.456
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   19.42
  EFFECTIVE AREA(ACRES) =    218.11   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      225.8       PEAK FLOW RATE(CFS) =     418.77

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.83
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.294
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.00      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.645
  SUBAREA AREA(ACRES) =    5.20      SUBAREA RUNOFF(CFS) =    9.83
  EFFECTIVE AREA(ACRES) =    223.31   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      231.0       PEAK FLOW RATE(CFS) =     428.60

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.83
```

```
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.294
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        2.10      0.30     0.200    56
  APARTMENTS                B        8.90      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =   22.12
  EFFECTIVE AREA(ACRES) =    234.31   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      242.0       PEAK FLOW RATE(CFS) =     450.72

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    411.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   445.00  DOWNSTREAM(FEET) =   425.00
  FLOW LENGTH(FEET) =   324.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  43.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.21
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     450.72
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   17.00
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    411.00 =    5494.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.281
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        0.10      0.30     0.200    56
  COMMERCIAL                B        0.20      0.30     0.100    56
  PUBLIC PARK               B        1.70      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"      B        0.70      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        0.20      0.30     0.600    56
  COMMERCIAL                B        0.70      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.504
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    6.90
  EFFECTIVE AREA(ACRES) =    237.91   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      245.6       PEAK FLOW RATE(CFS) =     454.69

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   17.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.281
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.90      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"      B        8.80      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        0.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.267
  SUBAREA AREA(ACRES) =    9.90      SUBAREA RUNOFF(CFS) =   19.61
  EFFECTIVE AREA(ACRES) =    247.81   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      255.5       PEAK FLOW RATE(CFS) =     474.30

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.281
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        0.50      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        2.10      0.30     0.600    56
  APARTMENTS                B        0.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        4.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.546
  SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =   14.86
  EFFECTIVE AREA(ACRES) =    255.61   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      263.3       PEAK FLOW RATE(CFS) =     489.16

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    412.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   425.00  DOWNSTREAM(FEET) =   392.00
  FLOW LENGTH(FEET) =   641.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  43.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.18
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     489.16
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   17.33
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    412.00 =    6135.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.33
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.252
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  COMMERCIAL                 B        1.10      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        7.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.198
  SUBAREA AREA(ACRES) =   14.50      SUBAREA RUNOFF(CFS) =   28.62
  EFFECTIVE AREA(ACRES) =    270.11   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      277.8       PEAK FLOW RATE(CFS) =     511.25

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.33
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.252
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.10      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.10      0.30     0.400    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.50      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.317
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =   16.89
  EFFECTIVE AREA(ACRES) =    278.81   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      286.5       PEAK FLOW RATE(CFS) =     528.14

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.33
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.252
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.00      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.456
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    8.57
  EFFECTIVE AREA(ACRES) =    283.31   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      291.0       PEAK FLOW RATE(CFS) =     536.71

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    420.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   392.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =  1358.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  51.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.85
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     536.71
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   18.17
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    420.00 =    7493.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    420.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.17
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.180
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      0.30     0.100    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.105
  SUBAREA AREA(ACRES) =    1.90      SUBAREA RUNOFF(CFS) =    3.67
  EFFECTIVE AREA(ACRES) =    285.21   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      292.9       PEAK FLOW RATE(CFS) =     536.71
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    421.00 IS CODE =  51
```

```
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    346.00  DOWNSTREAM(FEET) =    320.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1617.00   CHANNEL SLOPE =  0.0161
  CHANNEL BASE(FEET) =  200.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  20.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.805
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        6.90      0.30     0.100    56
  COMMERCIAL                 B        3.60      0.30     0.100    56
  COMMERCIAL                 B        2.20      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.227
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     548.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.47
  AVERAGE FLOW DEPTH(FEET) =   0.61   TRAVEL TIME(MIN.) =   6.02
  Tc(MIN.) =   24.19
  SUBAREA AREA(ACRES) =    15.10       SUBAREA RUNOFF(CFS) =   23.60
  EFFECTIVE AREA(ACRES) =    300.31     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.48
  TOTAL AREA(ACRES) =      308.0         PEAK FLOW RATE(CFS) =     536.71
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.60   FLOW VELOCITY(FEET/SEC.) =   4.43
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    421.00 =    9110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    421.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   24.19
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.805
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.10      0.30     0.850    56
  PUBLIC PARK                B        2.50      0.30     0.850    56
  PUBLIC PARK                B        3.60      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =   10.04
  EFFECTIVE AREA(ACRES) =    307.51   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      315.2       PEAK FLOW RATE(CFS) =     536.71
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    427.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   320.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =  1453.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  87.0 INCH PIPE IS  69.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.24
  ESTIMATED PIPE DIAMETER(INCH) =  87.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     536.71
  PIPE TRAVEL TIME(MIN.) =   1.59    Tc(MIN.) =   25.78
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    427.00 =   10563.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    427.00 TO NODE    427.00 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.) =   25.78
  RAINFALL INTENSITY(INCH/HR) =   1.73
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.48
  EFFECTIVE STREAM AREA(ACRES) =     307.51
  TOTAL STREAM AREA(ACRES) =     315.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     536.71

****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    414.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    497.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.533
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.750
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.10      0.30     0.100    56    5.53
  PUBLIC PARK                B        1.10      0.30     0.850    56    8.79
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56    7.50
  COMMERCIAL                 B        0.10      0.30     0.100    56    5.53
  PUBLIC PARK                B        0.30      0.30     0.850    56    8.79
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.50      0.30     0.600    56    7.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.678
  SUBAREA RUNOFF(CFS) =     13.09
  TOTAL AREA(ACRES) =      3.20   PEAK FLOW RATE(CFS) =     13.09
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.10 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.00  DOWNSTREAM ELEVATION(FEET) =  493.00
  STREET LENGTH(FEET) =   371.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      21.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   18.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.59
  STREET FLOW TRAVEL TIME(MIN.) =   1.94   Tc(MIN.) =    7.47
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.083
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.40      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.40      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.673
  SUBAREA AREA(ACRES) =    4.80      SUBAREA RUNOFF(CFS) =   16.77
  EFFECTIVE AREA(ACRES) =      8.00    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =        8.0        PEAK FLOW RATE(CFS) =      27.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.54   HALFSTREET FLOOD WIDTH(FEET) =  20.90
  FLOW VELOCITY(FEET/SEC.) =  3.41   DEPTH*VELOCITY(FT*FT/SEC.) =   1.83
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    414.10 =     701.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    414.10 TO NODE    414.20 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  493.00  DOWNSTREAM ELEVATION(FEET) =  490.00
  STREET LENGTH(FEET) =   476.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```



```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      35.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.62
    HALFSTREET FLOOD WIDTH(FEET) =   25.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.95
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.83
  STREET FLOW TRAVEL TIME(MIN.) =   2.69   Tc(MIN.) =   10.16
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.189
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.40      0.30     0.600    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   15.30
  EFFECTIVE AREA(ACRES) =     13.60    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       13.6        PEAK FLOW RATE(CFS) =      36.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.63   HALFSTREET FLOOD WIDTH(FEET) =  25.90
  FLOW VELOCITY(FEET/SEC.) =  2.98   DEPTH*VELOCITY(FT*FT/SEC.) =   1.86
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    414.20 =    1177.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    414.20 TO NODE    415.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   490.00  DOWNSTREAM(FEET) =   465.00
  FLOW LENGTH(FEET) =   488.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.00
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.80
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   10.64
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    415.00 =    1665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    415.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
  MAINLINE Tc(MIN.) =   10.64
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.116
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.30      0.30     0.600    56
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.537
  SUBAREA AREA(ACRES) =    6.50      SUBAREA RUNOFF(CFS) =   17.29
  EFFECTIVE AREA(ACRES) =     20.10   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =       20.1       PEAK FLOW RATE(CFS) =      53.19

****************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    416.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   465.00  DOWNSTREAM(FEET) =   440.00
  FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.44
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.19
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   11.09
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    416.00 =    2162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.09
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.047
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.392
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =   12.92
  EFFECTIVE AREA(ACRES) =     25.00   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       25.0       PEAK FLOW RATE(CFS) =      64.87
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.09
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.047
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.80      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.60      0.30     0.600    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.60      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.00      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.389
  SUBAREA AREA(ACRES) =   10.10      SUBAREA RUNOFF(CFS) =   26.64
  EFFECTIVE AREA(ACRES) =     35.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       35.1       PEAK FLOW RATE(CFS) =      91.51

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    417.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   420.00
  FLOW LENGTH(FEET) =   437.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.30
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      91.51
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   11.45
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    417.00 =    2599.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.45
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.993
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.50      0.30     0.200    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.40      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.188
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   14.80
  EFFECTIVE AREA(ACRES) =     40.70   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       40.7       PEAK FLOW RATE(CFS) =     104.58

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.45
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.993
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        4.60      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  COMMERCIAL                 B        1.50      0.30     0.100    56
  PUBLIC PARK                B        2.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.60      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.264
  SUBAREA AREA(ACRES) =   14.00      SUBAREA RUNOFF(CFS) =   36.71
  EFFECTIVE AREA(ACRES) =     54.70   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       54.7       PEAK FLOW RATE(CFS) =     141.30

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    418.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   619.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.91
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     141.30
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   11.97
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    418.00 =    3218.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.97
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.914
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.70      0.30     0.100    56
```



```
  COMMERCIAL                 B        2.10      0.30     0.100    56
  COMMERCIAL                 B        3.90      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        5.50      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.20      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.333
  SUBAREA AREA(ACRES) =   15.60      SUBAREA RUNOFF(CFS) =   39.50
  EFFECTIVE AREA(ACRES) =     70.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       70.3       PEAK FLOW RATE(CFS) =     176.91

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.97
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.914
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.40      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.10      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.407
  SUBAREA AREA(ACRES) =    4.00      SUBAREA RUNOFF(CFS) =   10.05
  EFFECTIVE AREA(ACRES) =     74.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       74.3       PEAK FLOW RATE(CFS) =     186.96

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.97
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.914
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.20      0.30     0.200    56
  COMMERCIAL                 B        3.70      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.50      0.30     0.200    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  RESIDENTIAL
```

```
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.154
  SUBAREA AREA(ACRES) =   10.80      SUBAREA RUNOFF(CFS) =   27.87
  EFFECTIVE AREA(ACRES) =     85.10   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       85.1       PEAK FLOW RATE(CFS) =     214.83

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    425.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   320.00
  FLOW LENGTH(FEET) =  1179.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.08
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     214.83
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   12.64
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    425.00 =    4397.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    425.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.64
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.811
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        5.30      0.30     0.850    56
  PUBLIC PARK                B        3.10      0.30     0.850    56
  PUBLIC PARK                B        9.10      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.777
  SUBAREA AREA(ACRES) =   19.40      SUBAREA RUNOFF(CFS) =   45.00
  EFFECTIVE AREA(ACRES) =    104.50   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      104.5       PEAK FLOW RATE(CFS) =     251.94

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    425.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.64
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.811
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.30      0.30     0.900    56
```



```
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.90      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =   11.66
  EFFECTIVE AREA(ACRES) =    109.60   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      109.6       PEAK FLOW RATE(CFS) =     263.60

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    426.00 IS CODE =  56
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    320.00  DOWNSTREAM(FEET) =    316.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   870.00   CHANNEL SLOPE =  0.0046
  GIVEN CHANNEL BASE(FEET) =  200.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   1.58
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.120
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.40      0.30     0.100    56
  COMMERCIAL                 B        3.30      0.30     0.100    56
  PUBLIC PARK                B        0.80      0.30     0.850    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.408
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     273.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.33
  AVERAGE FLOW DEPTH(FEET) =   0.58   TRAVEL TIME(MIN.) =   6.23
  Tc(MIN.) =   18.88
  SUBAREA AREA(ACRES) =    11.00       SUBAREA RUNOFF(CFS) =   19.78
  EFFECTIVE AREA(ACRES) =    120.60     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.46
  TOTAL AREA(ACRES) =      120.6         PEAK FLOW RATE(CFS) =     263.60
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
  GIVEN CHANNEL BASE(FEET) =  200.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   1.57

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.57   FLOW VELOCITY(FEET/SEC.) =   2.30
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    426.00 =    5267.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    426.00 TO NODE    426.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 MAINLINE Tc(MIN.) =   18.88
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.120
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.50      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.70      0.30      0.900    56
 PUBLIC PARK                B        0.50      0.30      0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.569
 SUBAREA AREA(ACRES) =    3.70      SUBAREA RUNOFF(CFS) =    6.49
 EFFECTIVE AREA(ACRES) =    124.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
 TOTAL AREA(ACRES) =      124.3       PEAK FLOW RATE(CFS) =     263.60
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    426.00 TO NODE    427.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   316.00  DOWNSTREAM(FEET) =   310.00
 FLOW LENGTH(FEET) =   321.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.80
 ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     263.60
 PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   19.16
 LONGEST FLOWPATH FROM NODE    413.00 TO NODE    427.00 =    5588.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    427.00 TO NODE    427.00 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.) =   19.16
 RAINFALL INTENSITY(INCH/HR) =   2.10
 AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.46
 EFFECTIVE STREAM AREA(ACRES) =     124.30
 TOTAL STREAM AREA(ACRES) =     124.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     263.60

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      536.71   25.78    1.729  0.30( 0.15) 0.48     307.5     430.00
     1      514.56   27.53    1.654  0.30( 0.15) 0.49     315.2     400.00
     2      263.60   19.16    2.096  0.30( 0.14) 0.46     124.3     413.00

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



```
 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      754.74   19.16    2.096  0.30( 0.14) 0.48     352.8     413.00
     2      750.96   25.78    1.729  0.30( 0.14) 0.48     431.8     430.00
     3      718.67   27.53    1.654  0.30( 0.14) 0.48     439.5     400.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     754.74    Tc(MIN.) =    19.16
 EFFECTIVE AREA(ACRES) =     352.82   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =      439.5
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    427.00 =   10563.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    427.00 TO NODE    428.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   310.00  DOWNSTREAM(FEET) =   275.00
 FLOW LENGTH(FEET) =   789.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  69.0 INCH PIPE IS  56.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  33.16
 ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     754.74
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   19.56
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    428.00 =   11352.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =      439.5  TC(MIN.) =     19.56
 EFFECTIVE AREA(ACRES) =    352.82  AREA-AVERAGED Fm(INCH/HR)=  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.475
 PEAK FLOW RATE(CFS)   =     754.74

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      754.74   19.56    2.062  0.30( 0.14) 0.48     352.8     413.00
     2      750.96   26.18    1.712  0.30( 0.14) 0.48     431.8     430.00
     3      718.67   27.92    1.637  0.30( 0.14) 0.48     439.5     400.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:

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 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA D ROMP 2018                                         *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 50-YR EV NOVEMBER 2018 FKAZI                                         *
 ************************************************************************

  FILE NAME: 3D50EVRL.DAT
  TIME/DATE OF STUDY: 17:09 12/04/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  5.453
   2)   10.00;  3.490
   3)   15.00;  2.670
   4)   20.00;  2.230
   5)   25.00;  1.926
   6)   30.00;  1.733
   7)   40.00;  1.467
   8)   50.00;  1.305
   9)   60.00;  1.202
  10)   90.00;  0.999
  11)  120.00;  0.869
  12)  180.00;  0.747
  13)  360.00;  0.555
  14) 1200.00;  0.244
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    605.00  DOWNSTREAM(FEET) =    586.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.417
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.504
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56    8.77
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.30      0.30     0.600    56    7.42
  PUBLIC PARK                B        2.40      0.30     0.850    56    8.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.796
  SUBAREA RUNOFF(CFS) =     18.81
  TOTAL AREA(ACRES) =      4.90   PEAK FLOW RATE(CFS) =     18.81

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  586.00  DOWNSTREAM ELEVATION(FEET) =  583.00
  STREET LENGTH(FEET) =   333.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      30.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.56
    HALFSTREET FLOOD WIDTH(FEET) =   22.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.83
  STREET FLOW TRAVEL TIME(MIN.) =   1.71   Tc(MIN.) =    9.13
```

```
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.834
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 PUBLIC PARK                B        0.40      0.30     0.850    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        1.90      0.30     0.400    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        4.70      0.30     0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.565
 SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =   23.41
 EFFECTIVE AREA(ACRES) =     12.00    AREA-AVERAGED Fm(INCH/HR) =  0.20
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.66
 TOTAL AREA(ACRES) =       12.0        PEAK FLOW RATE(CFS) =      39.27

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.61   HALFSTREET FLOOD WIDTH(FEET) =  24.80
 FLOW VELOCITY(FEET/SEC.) =  3.45   DEPTH*VELOCITY(FT*FT/SEC.) =   2.09
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     663.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    402.00 TO NODE    402.50 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  583.00  DOWNSTREAM ELEVATION(FEET) =  580.00
 STREET LENGTH(FEET) =   315.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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) =      46.12
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.63
   HALFSTREET FLOOD WIDTH(FEET) =   26.13
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.67
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.31
 STREET FLOW TRAVEL TIME(MIN.) =   1.43   Tc(MIN.) =   10.56
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.399
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.50      0.30     0.850    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        1.80      0.30     0.600    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
```



```
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.30      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
 SUBAREA AREA(ACRES) =    4.70      SUBAREA RUNOFF(CFS) =   13.71
 EFFECTIVE AREA(ACRES) =     16.70    AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.62
 TOTAL AREA(ACRES) =       16.7        PEAK FLOW RATE(CFS) =      48.28

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.64   HALFSTREET FLOOD WIDTH(FEET) =  26.52
 FLOW VELOCITY(FEET/SEC.) =  3.73   DEPTH*VELOCITY(FT*FT/SEC.) =   2.37
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.50 =     978.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    402.50 TO NODE    403.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  580.00  DOWNSTREAM ELEVATION(FEET) =  579.00
 STREET LENGTH(FEET) =   394.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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) =      52.21
   ***STREET FLOWING FULL***
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.78
   HALFSTREET FLOOD WIDTH(FEET) =   35.52
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.40
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.86
 STREET FLOW TRAVEL TIME(MIN.) =   2.74   Tc(MIN.) =   13.30
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.949
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.20      0.30     0.850    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.80      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.435
 SUBAREA AREA(ACRES) =    3.10      SUBAREA RUNOFF(CFS) =    7.86
 EFFECTIVE AREA(ACRES) =     19.80    AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.59
 TOTAL AREA(ACRES) =       19.8        PEAK FLOW RATE(CFS) =      49.38

 END OF SUBAREA STREET FLOW HYDRAULICS:
```

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  DEPTH(FEET) = 0.76   HALFSTREET FLOOD WIDTH(FEET) =  34.91
  FLOW VELOCITY(FEET/SEC.) =  2.36   DEPTH*VELOCITY(FT*FT/SEC.) =   1.80
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  579.00  DOWNSTREAM ELEVATION(FEET) =  560.00
  STREET LENGTH(FEET) =   974.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      59.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.61
    HALFSTREET FLOOD WIDTH(FEET) =   24.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.13
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.12
  STREET FLOW TRAVEL TIME(MIN.) =   3.17   Tc(MIN.) =   16.47
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.541
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        5.80      0.30     0.100    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  PUBLIC PARK                B        1.10      0.30     0.850    56
  PUBLIC PARK                B        0.70      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.267
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =   19.27
  EFFECTIVE AREA(ACRES) =     28.50    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       28.5        PEAK FLOW RATE(CFS) =      61.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.62   HALFSTREET FLOOD WIDTH(FEET) =  25.35
  FLOW VELOCITY(FEET/SEC.) =  5.17   DEPTH*VELOCITY(FT*FT/SEC.) =   3.18
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =    2346.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



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============================================================================
  MAINLINE Tc(MIN.) =   16.47
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.541
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.30      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.70      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.40      0.30     0.400    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.432
  SUBAREA AREA(ACRES) =   13.90      SUBAREA RUNOFF(CFS) =   30.17
  EFFECTIVE AREA(ACRES) =     42.40   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       42.4       PEAK FLOW RATE(CFS) =      91.55

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.47
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.541
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.41
  EFFECTIVE AREA(ACRES) =     42.60   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       42.6       PEAK FLOW RATE(CFS) =      91.96

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.47
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.541
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
```

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  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  PUBLIC PARK                B        1.50      0.30     0.850    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.50      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.590
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    9.57
  EFFECTIVE AREA(ACRES) =     47.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       47.1       PEAK FLOW RATE(CFS) =     101.53

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.47
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.541
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        2.80      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.00      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        6.40      0.30     0.500    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        6.70      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        8.70      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.671
  SUBAREA AREA(ACRES) =   31.90      SUBAREA RUNOFF(CFS) =   67.18
  EFFECTIVE AREA(ACRES) =     79.00   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       79.0       PEAK FLOW RATE(CFS) =     168.71

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 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.) =   16.47
  RAINFALL INTENSITY(INCH/HR) =   2.54
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =      79.00
  TOTAL STREAM AREA(ACRES) =      79.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     168.71

****************************************************************************
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  FLOW PROCESS FROM NODE    430.00 TO NODE    431.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =    729.00  DOWNSTREAM(FEET) =    630.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.120
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.835
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.10      0.30     1.000    72    9.12
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.30      0.30     1.000    66    9.12
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66    9.12
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.77
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      4.77

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    432.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    630.00  DOWNSTREAM(FEET) =    597.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   196.00   CHANNEL SLOPE =  0.1684
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.645
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.70      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.10      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.72
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   0.49
  Tc(MIN.) =    9.61
  SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    5.72
  EFFECTIVE AREA(ACRES) =      3.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.4         PEAK FLOW RATE(CFS) =      10.23

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.69   FLOW VELOCITY(FEET/SEC.) =   7.18
```

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  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    432.00 =     525.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    432.00 TO NODE    433.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    597.00  DOWNSTREAM(FEET) =    570.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   243.00   CHANNEL SLOPE =  0.1111
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.460
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.80      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.30      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.10      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.20      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.998
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.64
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.00
  AVERAGE FLOW DEPTH(FEET) =   0.89   TRAVEL TIME(MIN.) =   0.58
  Tc(MIN.) =   10.18
  SUBAREA AREA(ACRES) =     4.50       SUBAREA RUNOFF(CFS) =   12.80
  EFFECTIVE AREA(ACRES) =      7.90     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        7.9         PEAK FLOW RATE(CFS) =      22.47

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.00   FLOW VELOCITY(FEET/SEC.) =   7.54
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.00 =     768.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    433.00 TO NODE    433.10 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) =   564.00
  FLOW LENGTH(FEET) =  1076.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.54
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.47
  PIPE TRAVEL TIME(MIN.) =   2.74    Tc(MIN.) =   12.93
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.10 =    1844.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    433.10 TO NODE    433.10 IS CODE =  81
```



```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.93
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.010
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.70      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        5.40      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.613
  SUBAREA AREA(ACRES) =     7.60      SUBAREA RUNOFF(CFS) =   19.33
  EFFECTIVE AREA(ACRES) =     15.50   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.81
  TOTAL AREA(ACRES) =       15.5       PEAK FLOW RATE(CFS) =      38.60

****************************************************************************
  FLOW PROCESS FROM NODE    433.10 TO NODE    404.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   564.00  DOWNSTREAM(FEET) =   560.00
  FLOW LENGTH(FEET) =   830.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.01
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.60
  PIPE TRAVEL TIME(MIN.) =   1.97    Tc(MIN.) =   14.90
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    404.00 =    2674.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 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.) =   14.90
  RAINFALL INTENSITY(INCH/HR) =   2.69
  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.81
  EFFECTIVE STREAM AREA(ACRES) =      15.50
  TOTAL STREAM AREA(ACRES) =      15.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      38.60

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      168.71   16.47    2.541  0.30( 0.17) 0.56      79.0     400.00
      2       38.60   14.90    2.686  0.30( 0.24) 0.81      15.5     430.00
```

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      200.62   14.90    2.686  0.30( 0.18) 0.60      87.0     430.00
      2      205.02   16.47    2.541  0.30( 0.18) 0.60      94.5     400.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     205.02    Tc(MIN.) =    16.47
  EFFECTIVE AREA(ACRES) =      94.50   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       94.5
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    404.00 =    2674.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    405.00 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) =   557.00
  FLOW LENGTH(FEET) =   377.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  45.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.75
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     205.02
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   16.96
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    405.00 =    3051.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.96
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.498
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.30      0.30     0.100    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.50      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.20      0.30     0.400    56
  COMMERCIAL                 B        1.20      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.406
  SUBAREA AREA(ACRES) =   11.30      SUBAREA RUNOFF(CFS) =   24.16
  EFFECTIVE AREA(ACRES) =    105.80   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =      105.8       PEAK FLOW RATE(CFS) =     221.24

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



```
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.96
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.498
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.20      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.80      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.459
  SUBAREA AREA(ACRES) =    8.30      SUBAREA RUNOFF(CFS) =   17.63
  EFFECTIVE AREA(ACRES) =    114.10   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =      114.1       PEAK FLOW RATE(CFS) =     238.87

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.96
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.498
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.80      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        5.20      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.307
  SUBAREA AREA(ACRES) =   10.10      SUBAREA RUNOFF(CFS) =   21.87
  EFFECTIVE AREA(ACRES) =    124.20   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =      124.2       PEAK FLOW RATE(CFS) =     260.74

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    406.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   557.00  DOWNSTREAM(FEET) =   535.00
  FLOW LENGTH(FEET) =   525.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  36.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.23
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     260.74
```

```
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   17.31
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    406.00 =    3576.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.31
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.467
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        8.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.311
  SUBAREA AREA(ACRES) =   10.50      SUBAREA RUNOFF(CFS) =   22.43
  EFFECTIVE AREA(ACRES) =    134.70   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      134.7       PEAK FLOW RATE(CFS) =     279.76

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      279.98   15.74    2.605  0.30( 0.16) 0.53     127.2     430.00
      2      279.76   17.31    2.467  0.30( 0.16) 0.53     134.7     400.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     279.98  Tc(MIN.) =   15.74
  AREA-AVERAGED Fm(INCH/HR) =  0.16  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.53  EFFECTIVE AREA(ACRES) =     127.19

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.74
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.605
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        9.00      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.00      SUBAREA RUNOFF(CFS) =   20.61
  EFFECTIVE AREA(ACRES) =    136.19   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      143.7       PEAK FLOW RATE(CFS) =     300.59
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.74
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.605
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.30      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       18.70      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.00      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.609
  SUBAREA AREA(ACRES) =   20.60      SUBAREA RUNOFF(CFS) =   44.91
  EFFECTIVE AREA(ACRES) =    156.79   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      164.3       PEAK FLOW RATE(CFS) =     345.50

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   535.00  DOWNSTREAM(FEET) =   510.00
  FLOW LENGTH(FEET) =   311.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  34.77
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     345.50
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   15.89
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    407.00 =    3887.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.89
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.592
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  COMMERCIAL                 B        2.20      0.30     0.100    56
```

```
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  COMMERCIAL                 B        1.10      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.353
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =   10.96
  EFFECTIVE AREA(ACRES) =    161.69   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      169.2       PEAK FLOW RATE(CFS) =     354.61

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    408.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   510.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   624.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  38.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.96
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     354.61
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   16.25
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    408.00 =    4511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    408.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.25
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.560
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.60      0.30     0.600    56
  COMMERCIAL                 B        1.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.80      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.20      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.20      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.649
  SUBAREA AREA(ACRES) =   14.90      SUBAREA RUNOFF(CFS) =   31.72
  EFFECTIVE AREA(ACRES) =    176.59   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      184.1       PEAK FLOW RATE(CFS) =     381.72

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    408.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   16.25
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.560
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        6.60      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.00      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.625
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =   23.49
  EFFECTIVE AREA(ACRES) =    187.59   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      195.1       PEAK FLOW RATE(CFS) =     405.21

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    409.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   460.00
  FLOW LENGTH(FEET) =   368.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  41.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  31.07
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     405.21
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   16.45
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    409.00 =    4879.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.45
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.543
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.70      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.20      0.30     0.600    56
  APARTMENTS                 B        0.20      0.30     0.200    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  PUBLIC PARK                B        1.80      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.658
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =   12.24
  EFFECTIVE AREA(ACRES) =    193.39   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      200.9       PEAK FLOW RATE(CFS) =     414.52
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.45
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.543
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.90      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.30      0.30     0.500    56
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.616
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   19.31
  EFFECTIVE AREA(ACRES) =    202.49   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      210.0       PEAK FLOW RATE(CFS) =     433.83

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.45
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.543
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.80      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.00      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.566
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =   12.39
  EFFECTIVE AREA(ACRES) =    208.29   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      215.8       PEAK FLOW RATE(CFS) =     446.22

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    410.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =   291.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.8 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  31.30
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     446.22
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   16.60
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    410.00 =    5170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.60
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.529
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.90      0.30     0.850    56
  APARTMENTS                 B        1.50      0.30     0.200    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  PUBLIC PARK                B        2.30      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.40      0.30     0.600    56
  APARTMENTS                 B        3.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.456
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   21.53
  EFFECTIVE AREA(ACRES) =    218.29   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      225.8       PEAK FLOW RATE(CFS) =     465.19

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.60
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.529
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.00      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.645
  SUBAREA AREA(ACRES) =    5.20      SUBAREA RUNOFF(CFS) =   10.93
  EFFECTIVE AREA(ACRES) =    223.49   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      231.0       PEAK FLOW RATE(CFS) =     476.12

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.60
```

```
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.529
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        2.10      0.30     0.200    56
  APARTMENTS                B        8.90      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =   24.44
  EFFECTIVE AREA(ACRES) =    234.49   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      242.0       PEAK FLOW RATE(CFS) =     500.56

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    411.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   445.00  DOWNSTREAM(FEET) =   425.00
  FLOW LENGTH(FEET) =   324.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  43.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  34.34
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     500.56
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   16.76
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    411.00 =    5494.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.76
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.515
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        0.10      0.30     0.200    56
  COMMERCIAL                B        0.20      0.30     0.100    56
  PUBLIC PARK               B        1.70      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"      B        0.70      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        0.20      0.30     0.600    56
  COMMERCIAL                B        0.70      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.504
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    7.66
  EFFECTIVE AREA(ACRES) =    238.09   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      245.6       PEAK FLOW RATE(CFS) =     505.30

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   16.76
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.515
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.90      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"      B        8.80      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        0.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.267
  SUBAREA AREA(ACRES) =    9.90      SUBAREA RUNOFF(CFS) =   21.70
  EFFECTIVE AREA(ACRES) =    247.99   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      255.5       PEAK FLOW RATE(CFS) =     527.00

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.76
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.515
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        0.50      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        2.10      0.30     0.600    56
  APARTMENTS                B        0.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        4.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.546
  SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =   16.51
  EFFECTIVE AREA(ACRES) =    255.79   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      263.3       PEAK FLOW RATE(CFS) =     543.50

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    412.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   425.00  DOWNSTREAM(FEET) =   392.00
  FLOW LENGTH(FEET) =   641.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  47.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.53
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     543.50
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   17.09
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    412.00 =    6135.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.09
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.486
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  COMMERCIAL                 B        1.10      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        7.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.198
  SUBAREA AREA(ACRES) =   14.50      SUBAREA RUNOFF(CFS) =   31.67
  EFFECTIVE AREA(ACRES) =    270.29   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      277.8       PEAK FLOW RATE(CFS) =     568.52

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.09
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.486
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.10      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.10      0.30     0.400    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.50      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.317
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =   18.72
  EFFECTIVE AREA(ACRES) =    278.99   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      286.5       PEAK FLOW RATE(CFS) =     587.24

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.09
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.486
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.00      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.456
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =    9.52
  EFFECTIVE AREA(ACRES) =    283.49   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      291.0       PEAK FLOW RATE(CFS) =     596.76

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    420.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   392.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =  1358.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  69.0 INCH PIPE IS  53.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.63
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     596.76
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   17.91
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    420.00 =    7493.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    420.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.91
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.414
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      0.30     0.100    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.105
  SUBAREA AREA(ACRES) =    1.90      SUBAREA RUNOFF(CFS) =    4.07
  EFFECTIVE AREA(ACRES) =    285.39   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      292.9       PEAK FLOW RATE(CFS) =     596.76
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    421.00 IS CODE =  51
```

```
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    346.00  DOWNSTREAM(FEET) =    320.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1617.00   CHANNEL SLOPE =  0.0161
  CHANNEL BASE(FEET) =  200.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  20.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.007
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        6.90      0.30     0.100    56
  COMMERCIAL                 B        3.60      0.30     0.100    56
  COMMERCIAL                 B        2.20      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.227
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     609.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.68
  AVERAGE FLOW DEPTH(FEET) =   0.65   TRAVEL TIME(MIN.) =   5.76
  Tc(MIN.) =   23.67
  SUBAREA AREA(ACRES) =    15.10       SUBAREA RUNOFF(CFS) =   26.35
  EFFECTIVE AREA(ACRES) =    300.49     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.48
  TOTAL AREA(ACRES) =      308.0         PEAK FLOW RATE(CFS) =     596.76
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.64   FLOW VELOCITY(FEET/SEC.) =   4.63
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    421.00 =    9110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    421.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.67
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.007
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.10      0.30     0.850    56
  PUBLIC PARK                B        2.50      0.30     0.850    56
  PUBLIC PARK                B        3.60      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    7.20      SUBAREA RUNOFF(CFS) =   11.35
  EFFECTIVE AREA(ACRES) =    307.69   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      315.2       PEAK FLOW RATE(CFS) =     596.76
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    427.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   320.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =  1453.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  90.0 INCH PIPE IS  72.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.59
  ESTIMATED PIPE DIAMETER(INCH) =  90.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     596.76
  PIPE TRAVEL TIME(MIN.) =   1.55    Tc(MIN.) =   25.22
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    427.00 =   10563.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    427.00 TO NODE    427.00 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.) =   25.22
  RAINFALL INTENSITY(INCH/HR) =   1.92
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.48
  EFFECTIVE STREAM AREA(ACRES) =     307.69
  TOTAL STREAM AREA(ACRES) =     315.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     596.76

****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    414.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    497.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.533
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  5.244
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.10      0.30     0.100    56    5.53
  PUBLIC PARK                B        1.10      0.30     0.850    56    8.79
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56    7.50
  COMMERCIAL                 B        0.10      0.30     0.100    56    5.53
  PUBLIC PARK                B        0.30      0.30     0.850    56    8.79
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.50      0.30     0.600    56    7.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.678
  SUBAREA RUNOFF(CFS) =     14.52
  TOTAL AREA(ACRES) =      3.20   PEAK FLOW RATE(CFS) =     14.52
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.10 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.00  DOWNSTREAM ELEVATION(FEET) =  493.00
  STREET LENGTH(FEET) =   371.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      23.84
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.51
    HALFSTREET FLOOD WIDTH(FEET) =   19.65
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.27
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.68
  STREET FLOW TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =    7.42
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.502
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.40      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.40      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.673
  SUBAREA AREA(ACRES) =    4.80      SUBAREA RUNOFF(CFS) =   18.58
  EFFECTIVE AREA(ACRES) =      8.00    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =        8.0        PEAK FLOW RATE(CFS) =      30.96

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.76
  FLOW VELOCITY(FEET/SEC.) =  3.50   DEPTH*VELOCITY(FT*FT/SEC.) =   1.93
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    414.10 =     701.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    414.10 TO NODE    414.20 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  493.00  DOWNSTREAM ELEVATION(FEET) =  490.00
  STREET LENGTH(FEET) =   476.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```



```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      39.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.64
    HALFSTREET FLOOD WIDTH(FEET) =   26.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.93
  STREET FLOW TRAVEL TIME(MIN.) =   2.63   Tc(MIN.) =   10.05
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.482
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.40      0.30     0.600    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   16.78
  EFFECTIVE AREA(ACRES) =     13.60    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       13.6        PEAK FLOW RATE(CFS) =      40.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.64   HALFSTREET FLOOD WIDTH(FEET) =  26.84
  FLOW VELOCITY(FEET/SEC.) =  3.05   DEPTH*VELOCITY(FT*FT/SEC.) =   1.96
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    414.20 =    1177.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    414.20 TO NODE    415.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   490.00  DOWNSTREAM(FEET) =   465.00
  FLOW LENGTH(FEET) =   488.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.29
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.39
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   10.52
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    415.00 =    1665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    415.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
  MAINLINE Tc(MIN.) =   10.52
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.405
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.30      0.30     0.600    56
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.537
  SUBAREA AREA(ACRES) =    6.50      SUBAREA RUNOFF(CFS) =   18.98
  EFFECTIVE AREA(ACRES) =     20.10   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =       20.1       PEAK FLOW RATE(CFS) =      58.42

****************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    416.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   465.00  DOWNSTREAM(FEET) =   440.00
  FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.72
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.42
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   10.96
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    416.00 =    2162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   10.96
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.333
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.392
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =   14.18
  EFFECTIVE AREA(ACRES) =     25.00   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       25.0       PEAK FLOW RATE(CFS) =      71.29
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   10.96
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.333
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.80      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.60      0.30     0.600    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.60      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.00      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.389
  SUBAREA AREA(ACRES) =   10.10      SUBAREA RUNOFF(CFS) =   29.23
  EFFECTIVE AREA(ACRES) =     35.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       35.1       PEAK FLOW RATE(CFS) =     100.52

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    417.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   420.00
  FLOW LENGTH(FEET) =   437.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.54
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     100.52
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   11.31
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    417.00 =    2599.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   11.31
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.274
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.50      0.30     0.200    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.40      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.188
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   16.22
  EFFECTIVE AREA(ACRES) =     40.70   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       40.7       PEAK FLOW RATE(CFS) =     114.90

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.31
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.274
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        4.60      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  COMMERCIAL                 B        1.50      0.30     0.100    56
  PUBLIC PARK                B        2.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.60      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.264
  SUBAREA AREA(ACRES) =   14.00      SUBAREA RUNOFF(CFS) =   40.26
  EFFECTIVE AREA(ACRES) =     54.70   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       54.7       PEAK FLOW RATE(CFS) =     155.16

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    418.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   619.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.19
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     155.16
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   11.83
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    418.00 =    3218.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.83
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.191
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.70      0.30     0.100    56
```



```
  COMMERCIAL                 B        2.10      0.30     0.100    56
  COMMERCIAL                 B        3.90      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        5.50      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.20      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.333
  SUBAREA AREA(ACRES) =   15.60      SUBAREA RUNOFF(CFS) =   43.39
  EFFECTIVE AREA(ACRES) =     70.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       70.3       PEAK FLOW RATE(CFS) =     194.43

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.83
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.191
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.40      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.10      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.407
  SUBAREA AREA(ACRES) =    4.00      SUBAREA RUNOFF(CFS) =   11.05
  EFFECTIVE AREA(ACRES) =     74.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       74.3       PEAK FLOW RATE(CFS) =     205.48

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.83
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.191
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.20      0.30     0.200    56
  COMMERCIAL                 B        3.70      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.50      0.30     0.200    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  RESIDENTIAL
```

```
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.154
  SUBAREA AREA(ACRES) =   10.80      SUBAREA RUNOFF(CFS) =   30.56
  EFFECTIVE AREA(ACRES) =     85.10   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       85.1       PEAK FLOW RATE(CFS) =     236.04

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    425.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   320.00
  FLOW LENGTH(FEET) =  1179.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.40
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     236.04
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =   12.49
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    425.00 =    4397.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    425.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.49
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.081
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        5.30      0.30     0.850    56
  PUBLIC PARK                B        3.10      0.30     0.850    56
  PUBLIC PARK                B        9.10      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.777
  SUBAREA AREA(ACRES) =   19.40      SUBAREA RUNOFF(CFS) =   49.73
  EFFECTIVE AREA(ACRES) =    104.50   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      104.5       PEAK FLOW RATE(CFS) =     277.37

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    425.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.49
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.081
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.30      0.30     0.900    56
```



```
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.90      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =   12.90
  EFFECTIVE AREA(ACRES) =    109.60   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      109.6       PEAK FLOW RATE(CFS) =     290.28

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    426.00 IS CODE =  56
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    320.00  DOWNSTREAM(FEET) =    316.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   870.00   CHANNEL SLOPE =  0.0046
  GIVEN CHANNEL BASE(FEET) =  200.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   1.62
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.365
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.40      0.30     0.100    56
  COMMERCIAL                 B        3.30      0.30     0.100    56
  PUBLIC PARK                B        0.80      0.30     0.850    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.408
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     301.38
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.43
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   5.97
  Tc(MIN.) =   18.47
  SUBAREA AREA(ACRES) =    11.00       SUBAREA RUNOFF(CFS) =   22.20
  EFFECTIVE AREA(ACRES) =    120.60     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.46
  TOTAL AREA(ACRES) =      120.6         PEAK FLOW RATE(CFS) =     290.28
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
  GIVEN CHANNEL BASE(FEET) =  200.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   1.61

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   2.38
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    426.00 =    5267.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    426.00 TO NODE    426.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =   18.47
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.365
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.50      0.30      0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.70      0.30      0.900    56
  PUBLIC PARK                B        0.50      0.30      0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.569
  SUBAREA AREA(ACRES) =    3.70      SUBAREA RUNOFF(CFS) =    7.31
  EFFECTIVE AREA(ACRES) =    124.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      124.3       PEAK FLOW RATE(CFS) =     290.28
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    426.00 TO NODE    427.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   316.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =   321.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  46.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.95
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     290.28
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   18.75
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    427.00 =    5588.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    427.00 TO NODE    427.00 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.) =   18.75
  RAINFALL INTENSITY(INCH/HR) =   2.34
  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.46
  EFFECTIVE STREAM AREA(ACRES) =     124.30
  TOTAL STREAM AREA(ACRES) =     124.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     290.28

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      596.76   25.22    1.917  0.30( 0.15) 0.48     307.7     430.00
      1      576.12   26.92    1.852  0.30( 0.15) 0.49     315.2     400.00
      2      290.28   18.75    2.340  0.30( 0.14) 0.46     124.3     413.00

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



```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      839.69   18.75    2.340  0.30( 0.14) 0.48     353.0     413.00
      2      831.33   25.22    1.917  0.30( 0.14) 0.48     432.0     430.00
      3      802.05   26.92    1.852  0.30( 0.14) 0.48     439.5     400.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     839.69    Tc(MIN.) =    18.75
  EFFECTIVE AREA(ACRES) =     353.04   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      439.5
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    427.00 =   10563.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    427.00 TO NODE    428.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   310.00  DOWNSTREAM(FEET) =   275.00
  FLOW LENGTH(FEET) =   789.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  72.0 INCH PIPE IS  58.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  34.12
  ESTIMATED PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     839.69
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   19.14
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    428.00 =   11352.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      439.5  TC(MIN.) =     19.14
  EFFECTIVE AREA(ACRES) =    353.04  AREA-AVERAGED Fm(INCH/HR)=  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.475
  PEAK FLOW RATE(CFS)   =     839.69

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      839.69   19.14    2.306  0.30( 0.14) 0.48     353.0     413.00
      2      831.33   25.61    1.903  0.30( 0.14) 0.48     432.0     430.00
      3      802.05   27.31    1.837  0.30( 0.14) 0.48     439.5     400.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
        (c) Copyright 1983-2013 Advanced Engineering Software (aes)
            Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:

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 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA D ROMP 2018                                         *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 100-YR EV NOVEMBER 2018 FKAZI                                        *
 ****************************************************************************

  FILE NAME: 3D00EVRL.DAT
  TIME/DATE OF STUDY: 09:50 01/17/2019
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  6.027
   2)   10.00;  3.864
   3)   15.00;  2.981
   4)   20.00;  2.449
   5)   25.00;  2.118
   6)   30.00;  1.891
   7)   40.00;  1.635
   8)   50.00;  1.412
   9)   60.00;  1.310
  10)   90.00;  1.109
  11)  120.00;  0.972
  12)  180.00;  0.816
  13)  360.00;  0.607
  14) 1200.00;  0.266
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    605.00  DOWNSTREAM(FEET) =    586.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.417
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.981
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30      0.900    56    8.77
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.30      0.30      0.600    56    7.42
  PUBLIC PARK                B        2.40      0.30      0.850    56    8.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.796
  SUBAREA RUNOFF(CFS) =     20.91
  TOTAL AREA(ACRES) =      4.90   PEAK FLOW RATE(CFS) =     20.91

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  586.00  DOWNSTREAM ELEVATION(FEET) =  583.00
  STREET LENGTH(FEET) =   333.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      34.03
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.58
    HALFSTREET FLOOD WIDTH(FEET) =   23.40
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.94
  STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =    9.08
```

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 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.264
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 PUBLIC PARK                B        0.40      0.30     0.850    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        1.90      0.30     0.400    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        4.70      0.30     0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.565
 SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =   26.16
 EFFECTIVE AREA(ACRES) =     12.00    AREA-AVERAGED Fm(INCH/HR) =  0.20
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.66
 TOTAL AREA(ACRES) =       12.0        PEAK FLOW RATE(CFS) =      43.91

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.63   HALFSTREET FLOOD WIDTH(FEET) =  25.90
 FLOW VELOCITY(FEET/SEC.) =  3.55   DEPTH*VELOCITY(FT*FT/SEC.) =   2.22
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     663.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    402.00 TO NODE    402.50 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  583.00  DOWNSTREAM ELEVATION(FEET) =  580.00
 STREET LENGTH(FEET) =   315.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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) =      51.58
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.65
   HALFSTREET FLOOD WIDTH(FEET) =   27.23
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.79
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.46
 STREET FLOW TRAVEL TIME(MIN.) =   1.39   Tc(MIN.) =   10.46
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.782
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.50      0.30     0.850    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        1.80      0.30     0.600    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
```



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 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.30      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
 SUBAREA AREA(ACRES) =    4.70      SUBAREA RUNOFF(CFS) =   15.33
 EFFECTIVE AREA(ACRES) =     16.70    AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.62
 TOTAL AREA(ACRES) =       16.7        PEAK FLOW RATE(CFS) =      54.04

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.66   HALFSTREET FLOOD WIDTH(FEET) =  27.77
 FLOW VELOCITY(FEET/SEC.) =  3.82   DEPTH*VELOCITY(FT*FT/SEC.) =   2.51
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.50 =     978.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    402.50 TO NODE    403.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  580.00  DOWNSTREAM ELEVATION(FEET) =  579.00
 STREET LENGTH(FEET) =   394.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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) =      58.49
   ***STREET FLOWING FULL***
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.80
   HALFSTREET FLOOD WIDTH(FEET) =   36.68
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.49
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.99
 STREET FLOW TRAVEL TIME(MIN.) =   2.63   Tc(MIN.) =   13.10
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.317
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.20      0.30     0.850    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.80      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.435
 SUBAREA AREA(ACRES) =    3.10      SUBAREA RUNOFF(CFS) =    8.89
 EFFECTIVE AREA(ACRES) =     19.80    AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.59
 TOTAL AREA(ACRES) =       19.8        PEAK FLOW RATE(CFS) =      55.94

 END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.79   HALFSTREET FLOOD WIDTH(FEET) =  36.19
  FLOW VELOCITY(FEET/SEC.) =  2.46   DEPTH*VELOCITY(FT*FT/SEC.) =   1.94
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  579.00  DOWNSTREAM ELEVATION(FEET) =  560.00
  STREET LENGTH(FEET) =   974.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      66.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.63
    HALFSTREET FLOOD WIDTH(FEET) =   26.21
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.33
  STREET FLOW TRAVEL TIME(MIN.) =   3.08   Tc(MIN.) =   16.17
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.856
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        5.80      0.30     0.100    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  PUBLIC PARK                B        1.10      0.30     0.850    56
  PUBLIC PARK                B        0.70      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.30      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.267
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =   21.74
  EFFECTIVE AREA(ACRES) =     28.50    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       28.5        PEAK FLOW RATE(CFS) =      69.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.64   HALFSTREET FLOOD WIDTH(FEET) =  26.60
  FLOW VELOCITY(FEET/SEC.) =  5.33   DEPTH*VELOCITY(FT*FT/SEC.) =   3.40
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =    2346.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



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============================================================================
  MAINLINE Tc(MIN.) =   16.17
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.856
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.30      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.70      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.40      0.30     0.400    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.432
  SUBAREA AREA(ACRES) =   13.90      SUBAREA RUNOFF(CFS) =   34.11
  EFFECTIVE AREA(ACRES) =     42.40   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       42.4       PEAK FLOW RATE(CFS) =     103.58

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.17
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.856
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.47
  EFFECTIVE AREA(ACRES) =     42.60   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       42.6       PEAK FLOW RATE(CFS) =     104.04

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.17
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.856
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
```

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  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  PUBLIC PARK                B        1.50      0.30     0.850    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.50      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.590
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =   10.85
  EFFECTIVE AREA(ACRES) =     47.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       47.1       PEAK FLOW RATE(CFS) =     114.89

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.17
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.856
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        2.80      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.00      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        6.40      0.30     0.500    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        6.70      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        8.70      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.671
  SUBAREA AREA(ACRES) =   31.90      SUBAREA RUNOFF(CFS) =   76.23
  EFFECTIVE AREA(ACRES) =     79.00   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       79.0       PEAK FLOW RATE(CFS) =     191.12

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 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.) =   16.17
  RAINFALL INTENSITY(INCH/HR) =   2.86
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =      79.00
  TOTAL STREAM AREA(ACRES) =      79.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     191.12

****************************************************************************
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  FLOW PROCESS FROM NODE    430.00 TO NODE    431.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =    729.00  DOWNSTREAM(FEET) =    630.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.120
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.245
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.10      0.30     1.000    72    9.12
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.30      0.30     1.000    66    9.12
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66    9.12
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      5.33
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      5.33

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    432.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    630.00  DOWNSTREAM(FEET) =    597.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   196.00   CHANNEL SLOPE =  0.1684
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.039
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.70      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        0.10      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.86
  AVERAGE FLOW DEPTH(FEET) =   0.64   TRAVEL TIME(MIN.) =   0.48
  Tc(MIN.) =    9.60
  SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    6.39
  EFFECTIVE AREA(ACRES) =      3.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.4         PEAK FLOW RATE(CFS) =      11.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.71   FLOW VELOCITY(FEET/SEC.) =   7.47
```

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 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    432.00 =     525.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    432.00 TO NODE    433.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    597.00  DOWNSTREAM(FEET) =    570.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   243.00   CHANNEL SLOPE =  0.1111
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.836
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        3.80      0.30     1.000    66
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.30      0.30     1.000    65
 NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF"     B        0.10      0.30     1.000    72
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.20      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.998
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.60
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.20
 AVERAGE FLOW DEPTH(FEET) =   0.93   TRAVEL TIME(MIN.) =   0.56
 Tc(MIN.) =   10.16
 SUBAREA AREA(ACRES) =     4.50       SUBAREA RUNOFF(CFS) =   14.32
 EFFECTIVE AREA(ACRES) =      7.90     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        7.9         PEAK FLOW RATE(CFS) =      25.14

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.04   FLOW VELOCITY(FEET/SEC.) =   7.74
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.00 =     768.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    433.00 TO NODE    433.10 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) =   564.00
 FLOW LENGTH(FEET) =  1076.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.66
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      25.14
 PIPE TRAVEL TIME(MIN.) =   2.69    Tc(MIN.) =   12.85
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.10 =    1844.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    433.10 TO NODE    433.10 IS CODE =  81
```



```
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.85
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.361
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.50      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.70      0.30     0.900    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        5.40      0.30     0.500    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.613
 SUBAREA AREA(ACRES) =    7.60      SUBAREA RUNOFF(CFS) =   21.73
 EFFECTIVE AREA(ACRES) =     15.50   AREA-AVERAGED Fm(INCH/HR) =  0.24
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.81
 TOTAL AREA(ACRES) =       15.5       PEAK FLOW RATE(CFS) =      43.49

****************************************************************************
 FLOW PROCESS FROM NODE    433.10 TO NODE    404.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   564.00  DOWNSTREAM(FEET) =   560.00
 FLOW LENGTH(FEET) =   830.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.08
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      43.49
 PIPE TRAVEL TIME(MIN.) =   1.95    Tc(MIN.) =   14.80
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    404.00 =    2674.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 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.) =   14.80
 RAINFALL INTENSITY(INCH/HR) =   3.02
 AREA-AVERAGED Fm(INCH/HR) =  0.24
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.81
 EFFECTIVE STREAM AREA(ACRES) =      15.50
 TOTAL STREAM AREA(ACRES) =      15.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      43.49

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
     1      191.12   16.17    2.856  0.30( 0.17) 0.56      79.0     400.00
     2       43.49   14.80    3.016  0.30( 0.24) 0.81      15.5     430.00
```

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      228.81   14.80    3.016  0.30( 0.18) 0.60      87.8     430.00
      2      232.11   16.17    2.856  0.30( 0.18) 0.60      94.5     400.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     232.11    Tc(MIN.) =    16.17
  EFFECTIVE AREA(ACRES) =      94.50   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       94.5
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    404.00 =    2674.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    405.00 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) =   557.00
  FLOW LENGTH(FEET) =   377.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  47.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.16
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     232.11
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   16.65
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    405.00 =    3051.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.65
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.805
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.30      0.30     0.100    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.50      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.20      0.30     0.400    56
  COMMERCIAL                 B        1.20      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.406
  SUBAREA AREA(ACRES) =   11.30      SUBAREA RUNOFF(CFS) =   27.29
  EFFECTIVE AREA(ACRES) =    105.80   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =      105.8       PEAK FLOW RATE(CFS) =     250.55

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



```
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.65
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.805
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.20      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.80      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.459
  SUBAREA AREA(ACRES) =    8.30      SUBAREA RUNOFF(CFS) =   19.93
  EFFECTIVE AREA(ACRES) =    114.10   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =      114.1       PEAK FLOW RATE(CFS) =     270.48

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.65
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.805
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.80      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        5.20      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.307
  SUBAREA AREA(ACRES) =   10.10      SUBAREA RUNOFF(CFS) =   24.66
  EFFECTIVE AREA(ACRES) =    124.20   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =      124.2       PEAK FLOW RATE(CFS) =     295.15

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    406.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   557.00  DOWNSTREAM(FEET) =   535.00
  FLOW LENGTH(FEET) =   525.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.16
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     295.15
```

```
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   16.98
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    406.00 =    3576.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.98
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.770
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        8.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.311
  SUBAREA AREA(ACRES) =   10.50      SUBAREA RUNOFF(CFS) =   25.29
  EFFECTIVE AREA(ACRES) =    134.70   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      134.7       PEAK FLOW RATE(CFS) =     316.46

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      317.57   15.62    2.916  0.30( 0.16) 0.53     128.0     430.00
      2      316.46   16.98    2.770  0.30( 0.16) 0.53     134.7     400.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     317.57  Tc(MIN.) =   15.62
  AREA-AVERAGED Fm(INCH/HR) =  0.16  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.53  EFFECTIVE AREA(ACRES) =     128.01

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.62
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.916
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        9.00      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.00      SUBAREA RUNOFF(CFS) =   23.13
  EFFECTIVE AREA(ACRES) =    137.01   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      143.7       PEAK FLOW RATE(CFS) =     340.70
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.62
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.916
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.30      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       18.70      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.00      0.30     0.600    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.609
  SUBAREA AREA(ACRES) =   20.60      SUBAREA RUNOFF(CFS) =   50.67
  EFFECTIVE AREA(ACRES) =    157.61   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      164.3       PEAK FLOW RATE(CFS) =     391.37

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   535.00  DOWNSTREAM(FEET) =   510.00
  FLOW LENGTH(FEET) =   311.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  36.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  36.01
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     391.37
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   15.76
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    407.00 =    3887.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.76
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.900
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  COMMERCIAL                 B        2.20      0.30     0.100    56
```

```
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  COMMERCIAL                 B        1.10      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.353
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =   12.32
  EFFECTIVE AREA(ACRES) =    162.51   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      169.2       PEAK FLOW RATE(CFS) =     401.52

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    408.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   510.00  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   624.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  43.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.32
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     401.52
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   16.11
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    408.00 =    4511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    408.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.11
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.862
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.60      0.30     0.600    56
  COMMERCIAL                 B        1.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.80      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.20      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.20      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.649
  SUBAREA AREA(ACRES) =   14.90      SUBAREA RUNOFF(CFS) =   35.78
  EFFECTIVE AREA(ACRES) =    177.41   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      184.1       PEAK FLOW RATE(CFS) =     431.78

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    408.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   16.11
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.862
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        6.60      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.00      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.625
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =   26.48
  EFFECTIVE AREA(ACRES) =    188.41   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =      195.1       PEAK FLOW RATE(CFS) =     458.26

****************************************************************************
  FLOW PROCESS FROM NODE    408.00 TO NODE    409.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   460.00
  FLOW LENGTH(FEET) =   368.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.13
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     458.26
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   16.30
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    409.00 =    4879.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.842
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.70      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.20      0.30     0.600    56
  APARTMENTS                 B        0.20      0.30     0.200    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  PUBLIC PARK                B        1.80      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.658
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =   13.81
  EFFECTIVE AREA(ACRES) =    194.21   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      200.9       PEAK FLOW RATE(CFS) =     468.62
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.842
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.90      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.30      0.30     0.500    56
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.616
  SUBAREA AREA(ACRES) =    9.10      SUBAREA RUNOFF(CFS) =   21.76
  EFFECTIVE AREA(ACRES) =    203.31   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      210.0       PEAK FLOW RATE(CFS) =     490.38

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    409.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.842
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.80      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.00      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.566
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =   13.95
  EFFECTIVE AREA(ACRES) =    209.11   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      215.8       PEAK FLOW RATE(CFS) =     504.33

****************************************************************************
  FLOW PROCESS FROM NODE    409.00 TO NODE    410.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =   291.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  44.5 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.33
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     504.33
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   16.45
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    410.00 =    5170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.45
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.826
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.90      0.30     0.850    56
  APARTMENTS                 B        1.50      0.30     0.200    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  PUBLIC PARK                B        2.30      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.40      0.30     0.600    56
  APARTMENTS                 B        3.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.456
  SUBAREA AREA(ACRES) =   10.00      SUBAREA RUNOFF(CFS) =   24.20
  EFFECTIVE AREA(ACRES) =    219.11   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      225.8       PEAK FLOW RATE(CFS) =     525.53

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.45
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.826
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        4.00      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.645
  SUBAREA AREA(ACRES) =    5.20      SUBAREA RUNOFF(CFS) =   12.32
  EFFECTIVE AREA(ACRES) =    224.31   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =      231.0       PEAK FLOW RATE(CFS) =     537.86

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    410.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.45
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.826
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        2.10      0.30     0.200    56
  APARTMENTS                B        8.90      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =   11.00      SUBAREA RUNOFF(CFS) =   27.39
  EFFECTIVE AREA(ACRES) =    235.31   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      242.0       PEAK FLOW RATE(CFS) =     565.24

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    411.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   445.00  DOWNSTREAM(FEET) =   425.00
  FLOW LENGTH(FEET) =   324.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  45.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  35.48
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     565.24
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   16.61
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    411.00 =    5494.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.810
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        0.10      0.30     0.200    56
  COMMERCIAL                B        0.20      0.30     0.100    56
  PUBLIC PARK               B        1.70      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"      B        0.70      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        0.20      0.30     0.600    56
  COMMERCIAL                B        0.70      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.504
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    8.61
  EFFECTIVE AREA(ACRES) =    238.91   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      245.6       PEAK FLOW RATE(CFS) =     570.43

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   16.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.810
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.90      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"      B        8.80      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        0.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.267
  SUBAREA AREA(ACRES) =    9.90      SUBAREA RUNOFF(CFS) =   24.32
  EFFECTIVE AREA(ACRES) =    248.81   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      255.5       PEAK FLOW RATE(CFS) =     594.75

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    411.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.810
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        0.50      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        2.10      0.30     0.600    56
  APARTMENTS                B        0.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"      B        4.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.546
  SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =   18.58
  EFFECTIVE AREA(ACRES) =    256.61   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =      263.3       PEAK FLOW RATE(CFS) =     613.32

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    412.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   425.00  DOWNSTREAM(FEET) =   392.00
  FLOW LENGTH(FEET) =   641.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  49.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.59
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     613.32
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   16.93
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    412.00 =    6135.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.776
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  COMMERCIAL                 B        1.10      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        7.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.198
  SUBAREA AREA(ACRES) =   14.50      SUBAREA RUNOFF(CFS) =   35.45
  EFFECTIVE AREA(ACRES) =    271.11   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      277.8       PEAK FLOW RATE(CFS) =     640.96

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.776
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.10      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.10      0.30     0.400    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.50      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.317
  SUBAREA AREA(ACRES) =    8.70      SUBAREA RUNOFF(CFS) =   20.99
  EFFECTIVE AREA(ACRES) =    279.81   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      286.5       PEAK FLOW RATE(CFS) =     661.96

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.776
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.00      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.456
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =   10.69
  EFFECTIVE AREA(ACRES) =    284.31   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      291.0       PEAK FLOW RATE(CFS) =     672.65

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    420.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   392.00  DOWNSTREAM(FEET) =   350.00
  FLOW LENGTH(FEET) =  1358.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  72.0 INCH PIPE IS  56.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.44
  ESTIMATED PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     672.65
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   17.72
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    420.00 =    7493.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    420.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.72
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.692
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      0.30     0.100    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.105
  SUBAREA AREA(ACRES) =    1.90      SUBAREA RUNOFF(CFS) =    4.55
  EFFECTIVE AREA(ACRES) =    286.21   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      292.9       PEAK FLOW RATE(CFS) =     672.65
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    421.00 IS CODE =  51
```

```
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    346.00  DOWNSTREAM(FEET) =    320.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1617.00   CHANNEL SLOPE =  0.0161
  CHANNEL BASE(FEET) =  200.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  20.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.234
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        6.90      0.30     0.100    56
  COMMERCIAL                 B        3.60      0.30     0.100    56
  COMMERCIAL                 B        2.20      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.227
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     687.38
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.88
  AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   5.52
  Tc(MIN.) =   23.24
  SUBAREA AREA(ACRES) =    15.10       SUBAREA RUNOFF(CFS) =   29.44
  EFFECTIVE AREA(ACRES) =    301.31     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.48
  TOTAL AREA(ACRES) =      308.0         PEAK FLOW RATE(CFS) =     672.65
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   4.87
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    421.00 =    9110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    421.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.24
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.234
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.10      0.30     0.850    56
  PUBLIC PARK                B        2.50      0.30     0.850    56
  PUBLIC PARK                B        3.60      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =     7.20      SUBAREA RUNOFF(CFS) =   12.83
  EFFECTIVE AREA(ACRES) =    308.51   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      315.2       PEAK FLOW RATE(CFS) =     672.65
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    427.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   320.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =  1453.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  96.0 INCH PIPE IS  73.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.23
  ESTIMATED PIPE DIAMETER(INCH) =  96.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     672.65
  PIPE TRAVEL TIME(MIN.) =   1.49    Tc(MIN.) =   24.74
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    427.00 =   10563.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    427.00 TO NODE    427.00 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.) =   24.74
  RAINFALL INTENSITY(INCH/HR) =   2.14
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.48
  EFFECTIVE STREAM AREA(ACRES) =     308.51
  TOTAL STREAM AREA(ACRES) =     315.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     672.65

****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    414.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    497.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.533
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.797
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.10      0.30     0.100    56    5.53
  PUBLIC PARK                B        1.10      0.30     0.850    56    8.79
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56    7.50
  COMMERCIAL                 B        0.10      0.30     0.100    56    5.53
  PUBLIC PARK                B        0.30      0.30     0.850    56    8.79
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.50      0.30     0.600    56    7.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.678
  SUBAREA RUNOFF(CFS) =     16.11
  TOTAL AREA(ACRES) =      3.20   PEAK FLOW RATE(CFS) =     16.11
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.10 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.00  DOWNSTREAM ELEVATION(FEET) =  493.00
  STREET LENGTH(FEET) =   371.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      26.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   20.51
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.84   Tc(MIN.) =    7.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.999
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        1.40      0.30     0.850    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.40      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.00      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.673
  SUBAREA AREA(ACRES) =    4.80      SUBAREA RUNOFF(CFS) =   20.73
  EFFECTIVE AREA(ACRES) =      8.00    AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =        8.0        PEAK FLOW RATE(CFS) =      34.54

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.57   HALFSTREET FLOOD WIDTH(FEET) =  22.77
  FLOW VELOCITY(FEET/SEC.) =  3.58   DEPTH*VELOCITY(FT*FT/SEC.) =   2.04
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    414.10 =     701.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    414.10 TO NODE    414.20 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  493.00  DOWNSTREAM ELEVATION(FEET) =  490.00
  STREET LENGTH(FEET) =   476.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00
```



```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      44.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.66
    HALFSTREET FLOOD WIDTH(FEET) =   27.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.05
  STREET FLOW TRAVEL TIME(MIN.) =   2.55   Tc(MIN.) =    9.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.895
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.40      0.30     0.600    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   18.85
  EFFECTIVE AREA(ACRES) =     13.60    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       13.6        PEAK FLOW RATE(CFS) =      45.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.66   HALFSTREET FLOOD WIDTH(FEET) =  28.09
  FLOW VELOCITY(FEET/SEC.) =  3.14   DEPTH*VELOCITY(FT*FT/SEC.) =   2.08
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    414.20 =    1177.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    414.20 TO NODE    415.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   490.00  DOWNSTREAM(FEET) =   465.00
  FLOW LENGTH(FEET) =   488.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.57
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      45.44
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =   10.39
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    415.00 =    1665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    415.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
  MAINLINE Tc(MIN.) =   10.39
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.795
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.30      0.30     0.600    56
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        0.80      0.30     0.100    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.20      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.537
  SUBAREA AREA(ACRES) =    6.50      SUBAREA RUNOFF(CFS) =   21.26
  EFFECTIVE AREA(ACRES) =     20.10   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =       20.1       PEAK FLOW RATE(CFS) =      65.47

****************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    416.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   465.00  DOWNSTREAM(FEET) =   440.00
  FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.89
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      65.47
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   10.83
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    416.00 =    2162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.83
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.717
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.70      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.392
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =   15.88
  EFFECTIVE AREA(ACRES) =     25.00   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       25.0       PEAK FLOW RATE(CFS) =      79.95
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.83
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.717
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.80      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.60      0.30     0.600    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.60      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        3.00      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.389
  SUBAREA AREA(ACRES) =   10.10      SUBAREA RUNOFF(CFS) =   32.73
  EFFECTIVE AREA(ACRES) =     35.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       35.1       PEAK FLOW RATE(CFS) =     112.68

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    417.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   420.00
  FLOW LENGTH(FEET) =   437.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.42
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     112.68
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   11.17
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    417.00 =    2599.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.17
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.657
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.50      0.30     0.200    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.40      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.188
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   18.15
  EFFECTIVE AREA(ACRES) =     40.70   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       40.7       PEAK FLOW RATE(CFS) =     128.93

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.17
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.657
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        4.60      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  COMMERCIAL                 B        1.50      0.30     0.100    56
  PUBLIC PARK                B        2.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.60      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.264
  SUBAREA AREA(ACRES) =   14.00      SUBAREA RUNOFF(CFS) =   45.08
  EFFECTIVE AREA(ACRES) =     54.70   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       54.7       PEAK FLOW RATE(CFS) =     174.01

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    418.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   619.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.93
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     174.01
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   11.66
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    418.00 =    3218.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.66
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.570
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.70      0.30     0.100    56
```



```
  COMMERCIAL                 B        2.10      0.30     0.100    56
  COMMERCIAL                 B        3.90      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        5.50      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.20      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.333
  SUBAREA AREA(ACRES) =   15.60      SUBAREA RUNOFF(CFS) =   48.72
  EFFECTIVE AREA(ACRES) =     70.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       70.3       PEAK FLOW RATE(CFS) =     218.45

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.66
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.570
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.40      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.10      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.20      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.407
  SUBAREA AREA(ACRES) =    4.00      SUBAREA RUNOFF(CFS) =   12.41
  EFFECTIVE AREA(ACRES) =     74.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       74.3       PEAK FLOW RATE(CFS) =     230.87

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    418.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.66
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.570
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.20      0.30     0.200    56
  COMMERCIAL                 B        3.70      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.50      0.30     0.200    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  RESIDENTIAL
```

```
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.154
  SUBAREA AREA(ACRES) =   10.80      SUBAREA RUNOFF(CFS) =   34.26
  EFFECTIVE AREA(ACRES) =     85.10   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       85.1       PEAK FLOW RATE(CFS) =     265.12

****************************************************************************
  FLOW PROCESS FROM NODE    418.00 TO NODE    425.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   320.00
  FLOW LENGTH(FEET) =  1179.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.56
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     265.12
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   12.31
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    425.00 =    4397.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    425.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.31
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.457
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  COMMERCIAL                 B        0.90      0.30     0.100    56
  PUBLIC PARK                B        5.30      0.30     0.850    56
  PUBLIC PARK                B        3.10      0.30     0.850    56
  PUBLIC PARK                B        9.10      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.777
  SUBAREA AREA(ACRES) =   19.40      SUBAREA RUNOFF(CFS) =   56.29
  EFFECTIVE AREA(ACRES) =    104.50   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      104.5       PEAK FLOW RATE(CFS) =     312.71

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    425.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.31
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.457
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.30      0.30     0.900    56
```



```
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.90      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =   14.63
  EFFECTIVE AREA(ACRES) =    109.60   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      109.6       PEAK FLOW RATE(CFS) =     327.34

****************************************************************************
  FLOW PROCESS FROM NODE    425.00 TO NODE    426.00 IS CODE =  56
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    320.00  DOWNSTREAM(FEET) =    316.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   870.00   CHANNEL SLOPE =  0.0046
  GIVEN CHANNEL BASE(FEET) =  200.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   1.67
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.662
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.40      0.30     0.100    56
  COMMERCIAL                 B        3.30      0.30     0.100    56
  PUBLIC PARK                B        0.80      0.30     0.850    56
  PUBLIC PARK                B        0.30      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.408
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     339.91
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.55
  AVERAGE FLOW DEPTH(FEET) =   0.66   TRAVEL TIME(MIN.) =   5.69
  Tc(MIN.) =   18.00
  SUBAREA AREA(ACRES) =    11.00       SUBAREA RUNOFF(CFS) =   25.14
  EFFECTIVE AREA(ACRES) =    120.60     AREA-AVERAGED Fm(INCH/HR) =   0.14
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.46
  TOTAL AREA(ACRES) =      120.6         PEAK FLOW RATE(CFS) =     327.34
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
  GIVEN CHANNEL BASE(FEET) =  200.00   CHANNEL FREEBOARD(FEET) =  1.0
  "Z" FACTOR =   3.000   MANNING'S FACTOR = 0.030
  *ESTIMATED CHANNEL HEIGHT(FEET) =   1.65

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.65   FLOW VELOCITY(FEET/SEC.) =   2.49
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    426.00 =    5267.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    426.00 TO NODE    426.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =   18.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.662
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.50      0.30      0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.70      0.30      0.900    56
  PUBLIC PARK                B        0.50      0.30      0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.569
  SUBAREA AREA(ACRES) =    3.70      SUBAREA RUNOFF(CFS) =    8.30
  EFFECTIVE AREA(ACRES) =    124.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      124.3       PEAK FLOW RATE(CFS) =     327.34
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    426.00 TO NODE    427.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   316.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =   321.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  47.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.60
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     327.34
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   18.27
  LONGEST FLOWPATH FROM NODE    413.00 TO NODE    427.00 =    5588.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    427.00 TO NODE    427.00 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.) =   18.27
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.46
  EFFECTIVE STREAM AREA(ACRES) =     124.30
  TOTAL STREAM AREA(ACRES) =     124.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     327.34

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      672.65   24.74    2.135  0.30( 0.15) 0.48     308.5     430.00
      1      650.12   26.20    2.063  0.30( 0.15) 0.49     315.2     400.00
      2      327.34   18.27    2.633  0.30( 0.14) 0.46     124.3     413.00

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



```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      948.40   18.27    2.633  0.30( 0.14) 0.48     352.2     413.00
      2      934.74   24.74    2.135  0.30( 0.14) 0.48     432.8     430.00
      3      902.75   26.20    2.063  0.30( 0.14) 0.48     439.5     400.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     948.40    Tc(MIN.) =    18.27
  EFFECTIVE AREA(ACRES) =     352.20   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      439.5
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    427.00 =   10563.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    427.00 TO NODE    428.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   310.00  DOWNSTREAM(FEET) =   275.00
  FLOW LENGTH(FEET) =   789.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  78.0 INCH PIPE IS  58.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  35.75
  ESTIMATED PIPE DIAMETER(INCH) =  78.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     948.40
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   18.64
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    428.00 =   11352.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      439.5  TC(MIN.) =     18.64
  EFFECTIVE AREA(ACRES) =    352.20  AREA-AVERAGED Fm(INCH/HR)=  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.476
  PEAK FLOW RATE(CFS)   =     948.40

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      948.40   18.64    2.594  0.30( 0.14) 0.48     352.2     413.00
      2      934.74   25.11    2.113  0.30( 0.14) 0.48     432.8     430.00
      3      902.75   26.58    2.046  0.30( 0.14) 0.48     439.5     400.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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            Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:

                      Michael Baker International
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                            Santa Ana, CA
                                92707

 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-4 SUBAREA E                                                    *
* RATIONAL METHOD - REGIONAL RAINFALL                                   *
* 2-YR EV JUNE 2018 ROKAMOTO                                           *
 ************************************************************************

  FILE NAME: 4E02EVRL.DAT
  TIME/DATE OF STUDY: 09:39 06/26/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  1.873
   2)   10.00;  1.249
   3)   15.00;  0.951
   4)   20.00;  0.777
   5)   25.00;  0.669
   6)   30.00;  0.593
   7)   40.00;  0.511
   8)   50.00;  0.454
   9)   60.00;  0.400
  10)   90.00;  0.346
  11)  120.00;  0.290
  12)  180.00;  0.236
  13)  360.00;  0.180
  14) 1200.00;  0.084
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    485.00  DOWNSTREAM(FEET) =    455.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.873
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          -        0.20      0.60      0.900    56    8.00
  COMMERCIAL                  -        0.80      0.60      0.100    56    5.00
  RESIDENTIAL
  ".4 DWELLING/ACRE"          -        0.50      0.60      0.900    56    8.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.473
  SUBAREA RUNOFF(CFS) =      2.15
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      2.15

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    801.10 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  455.00  DOWNSTREAM ELEVATION(FEET) =  451.00
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       4.07
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.78
  STREET FLOW TRAVEL TIME(MIN.) =   1.80   Tc(MIN.) =    6.80
```

```
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.648
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.10      0.60     0.100     -
USER-DEFINED               -        2.10      0.60     0.100     -
USER-DEFINED               -        0.70      0.60     0.900     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.293
SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    3.84
EFFECTIVE AREA(ACRES) =      4.40    AREA-AVERAGED Fm(INCH/HR) =  0.21
AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.35
TOTAL AREA(ACRES) =        4.4        PEAK FLOW RATE(CFS) =       5.68

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =   9.91
FLOW VELOCITY(FEET/SEC.) =  2.66   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
LONGEST FLOWPATH FROM NODE    800.00 TO NODE    801.10 =     600.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    801.10 TO NODE    802.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  451.00  DOWNSTREAM ELEVATION(FEET) =  445.00
STREET LENGTH(FEET) =   391.00   CURB HEIGHT(INCHES) =  8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.018
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

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) =       9.14
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.38
  HALFSTREET FLOOD WIDTH(FEET) =   12.23
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.99
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.14
STREET FLOW TRAVEL TIME(MIN.) =   2.18   Tc(MIN.) =    8.99
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.376
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.60      0.60     0.100     -
USER-DEFINED               -        0.20      0.60     0.900     -
USER-DEFINED               -        3.00      0.60     0.100     -
USER-DEFINED               -        0.10      0.60     0.900     -
USER-DEFINED               -        1.70      0.60     0.100     -
USER-DEFINED               -        0.50      0.60     0.900     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.205
SUBAREA AREA(ACRES) =    6.10      SUBAREA RUNOFF(CFS) =    6.88
```



```
EFFECTIVE AREA(ACRES) =     10.50    AREA-AVERAGED Fm(INCH/HR) =  0.16
AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.27
TOTAL AREA(ACRES) =       10.5        PEAK FLOW RATE(CFS) =      11.48

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.48
FLOW VELOCITY(FEET/SEC.) =  3.16   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =     991.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    802.00 TO NODE    808.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   445.00  DOWNSTREAM(FEET) =   398.00
FLOW LENGTH(FEET) =   843.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  13.23
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      11.48
PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =   10.05
LONGEST FLOWPATH FROM NODE    800.00 TO NODE    808.00 =    1834.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   10.05
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.246
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        2.00      0.60     0.900     -
USER-DEFINED               -        2.20      0.60     0.900     -
USER-DEFINED               -        4.20      0.60     0.900     -
USER-DEFINED               -        5.30      0.60     0.100     -
USER-DEFINED               -        7.10      0.60     0.100     -
USER-DEFINED               -        8.60      0.60     0.100     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.329
SUBAREA AREA(ACRES) =   29.40      SUBAREA RUNOFF(CFS) =   27.76
EFFECTIVE AREA(ACRES) =     39.90   AREA-AVERAGED Fm(INCH/HR) =  0.19
AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.31
TOTAL AREA(ACRES) =       39.9       PEAK FLOW RATE(CFS) =      38.02

****************************************************************************
FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   10.05
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.246
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  USER-DEFINED               -        0.60      0.60     0.900     -
  USER-DEFINED               -        1.30      0.60     0.900     -
  USER-DEFINED               -        5.60      0.60     0.100     -
  USER-DEFINED               -        8.30      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.196
  SUBAREA AREA(ACRES) =   15.80      SUBAREA RUNOFF(CFS) =   16.05
  EFFECTIVE AREA(ACRES) =     55.70   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.28
  TOTAL AREA(ACRES) =       55.7       PEAK FLOW RATE(CFS) =      54.06

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 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.) =   10.05
  RAINFALL INTENSITY(INCH/HR) =   1.25
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.28
  EFFECTIVE STREAM AREA(ACRES) =      55.70
  TOTAL STREAM AREA(ACRES) =      55.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      54.06

****************************************************************************
  FLOW PROCESS FROM NODE    810.00 TO NODE    811.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   307.00
  ELEVATION DATA: UPSTREAM(FEET) =    785.00  DOWNSTREAM(FEET) =    705.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.358
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      -        0.10      0.60     1.000    56    9.13
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        0.10      0.60     1.000    56    9.13
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      -        0.20      0.60     1.000    56    9.13
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        0.50      0.60     1.000    56    9.13
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.61
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      0.61

****************************************************************************
  FLOW PROCESS FROM NODE    811.00 TO NODE    812.00 IS CODE =  51
----------------------------------------------------------------------------
```



```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    705.00  DOWNSTREAM(FEET) =    525.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   695.00   CHANNEL SLOPE =  0.2590
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.189
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.10      0.60     1.000     -
  USER-DEFINED               -        3.10      0.60     1.000     -
  USER-DEFINED               -        3.20      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.86
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.15
  AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   1.88
  Tc(MIN.) =   11.01
  SUBAREA AREA(ACRES) =     8.40      SUBAREA RUNOFF(CFS) =    4.45
  EFFECTIVE AREA(ACRES) =      9.30     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        9.3         PEAK FLOW RATE(CFS) =       4.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =   7.03
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    812.00 =    1002.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    812.00 TO NODE    813.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    460.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1010.00   CHANNEL SLOPE =  0.0644
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.972
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     1.000     -
  USER-DEFINED               -        0.30      0.60     1.000     -
  USER-DEFINED               -        0.70      0.60     1.000     -
  USER-DEFINED               -        1.20      0.60     1.000     -
  USER-DEFINED               -        5.80      0.60     1.000     -
  USER-DEFINED               -        6.30      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.64
  AVERAGE FLOW DEPTH(FEET) =   0.73   TRAVEL TIME(MIN.) =   3.63
  Tc(MIN.) =   14.65
  SUBAREA AREA(ACRES) =    14.40      SUBAREA RUNOFF(CFS) =    4.82
  EFFECTIVE AREA(ACRES) =     23.70     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
```

```
 TOTAL AREA(ACRES) =       23.7         PEAK FLOW RATE(CFS) =       7.94

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.75   FLOW VELOCITY(FEET/SEC.) =   4.70
 LONGEST FLOWPATH FROM NODE    810.00 TO NODE    813.00 =    2012.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    813.00 TO NODE    813.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.65
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.972
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -       10.40      0.60     1.000     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =   10.40      SUBAREA RUNOFF(CFS) =    3.48
 EFFECTIVE AREA(ACRES) =     34.10   AREA-AVERAGED Fm(INCH/HR) =  0.60
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =       34.1       PEAK FLOW RATE(CFS) =      11.43

****************************************************************************
 FLOW PROCESS FROM NODE    813.00 TO NODE    808.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   398.00
 FLOW LENGTH(FEET) =  1046.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.52
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.43
 PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =   15.93
 LONGEST FLOWPATH FROM NODE    810.00 TO NODE    808.00 =    3058.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 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.) =   15.93
 RAINFALL INTENSITY(INCH/HR) =   0.92
 AREA-AVERAGED Fm(INCH/HR) =  0.60
 AREA-AVERAGED Fp(INCH/HR) =  0.60
 AREA-AVERAGED Ap =  1.00
 EFFECTIVE STREAM AREA(ACRES) =      34.10
 TOTAL STREAM AREA(ACRES) =      34.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.43

 ** CONFLUENCE DATA **
```



```
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       54.06   10.05    1.246  0.60( 0.17) 0.28      55.7     800.00
     2       11.43   15.93    0.918  0.60( 0.60) 1.00      34.1     810.00

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       65.49   10.05    1.246  0.60( 0.29) 0.48      77.2     800.00
     2       49.06   15.93    0.918  0.60( 0.33) 0.55      89.8     810.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      65.49    Tc(MIN.) =    10.05
 EFFECTIVE AREA(ACRES) =      77.20   AREA-AVERAGED Fm(INCH/HR) =  0.29
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =       89.8
 LONGEST FLOWPATH FROM NODE    810.00 TO NODE    808.00 =    3058.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    808.00 TO NODE    809.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   398.00  DOWNSTREAM(FEET) =   341.00
 FLOW LENGTH(FEET) =   756.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.60
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      65.49
 PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   10.61
 LONGEST FLOWPATH FROM NODE    810.00 TO NODE    809.00 =    3814.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.61
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.213
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        5.60      0.60     0.200     -
 USER-DEFINED               -       12.30      0.60     0.200     -
 USER-DEFINED               -        0.50      0.60     0.100     -
 USER-DEFINED               -        5.40      0.60     0.100     -
 USER-DEFINED               -        4.70      0.60     0.900     -
 USER-DEFINED               -        4.20      0.60     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.372
 SUBAREA AREA(ACRES) =   32.70      SUBAREA RUNOFF(CFS) =   29.12
 EFFECTIVE AREA(ACRES) =    109.90   AREA-AVERAGED Fm(INCH/HR) =  0.27
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      122.5       PEAK FLOW RATE(CFS) =      93.38
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.61
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.213
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        9.90      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    9.90      SUBAREA RUNOFF(CFS) =   10.27
  EFFECTIVE AREA(ACRES) =    119.80   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      132.4       PEAK FLOW RATE(CFS) =     103.66

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 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.) =   10.61
  RAINFALL INTENSITY(INCH/HR) =   1.21
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =     119.80
  TOTAL STREAM AREA(ACRES) =     132.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     103.66

****************************************************************************
  FLOW PROCESS FROM NODE    818.00 TO NODE    819.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   323.00
  ELEVATION DATA: UPSTREAM(FEET) =    625.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.864
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.391
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      -        0.10      0.60     1.000    56    8.86
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        0.30      0.60     1.000    56    8.86
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      -        0.60      0.60     1.000    56    8.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
```



```
  SUBAREA RUNOFF(CFS) =      0.71
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      0.71

****************************************************************************
  FLOW PROCESS FROM NODE    819.00 TO NODE    820.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    517.00  DOWNSTREAM(FEET) =    395.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1167.00   CHANNEL SLOPE =  0.1045
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.054
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     0.100     -
  USER-DEFINED               -        0.90      0.60     0.900     -
  USER-DEFINED               -        1.30      0.60     0.100     -
  USER-DEFINED               -        0.80      0.60     1.000     -
  USER-DEFINED               -        2.40      0.60     1.000     -
  USER-DEFINED               -        3.20      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.845
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.93
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.42
  AVERAGE FLOW DEPTH(FEET) =   0.47   TRAVEL TIME(MIN.) =   4.40
  Tc(MIN.) =   13.27
  SUBAREA AREA(ACRES) =     8.70       SUBAREA RUNOFF(CFS) =    4.29
  EFFECTIVE AREA(ACRES) =      9.70     AREA-AVERAGED Fm(INCH/HR) =   0.52
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   0.86
  TOTAL AREA(ACRES) =        9.7         PEAK FLOW RATE(CFS) =       4.70

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.56   FLOW VELOCITY(FEET/SEC.) =   4.96
  LONGEST FLOWPATH FROM NODE    818.00 TO NODE    820.00 =    1490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.27
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.054
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.00      0.60     1.000     -
  USER-DEFINED               -        7.10      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   11.10      SUBAREA RUNOFF(CFS) =    4.54
  EFFECTIVE AREA(ACRES) =     20.80   AREA-AVERAGED Fm(INCH/HR) =  0.56
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =       20.8       PEAK FLOW RATE(CFS) =       9.24

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

```
 FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.27
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.054
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        3.40      0.60     1.000     -
 USER-DEFINED               -        1.80      0.60     1.000     -
 USER-DEFINED               -        3.60      0.60     1.000     -
 USER-DEFINED               -        1.00      0.60     0.100     -
 USER-DEFINED               -        0.10      0.60     1.000     -
 USER-DEFINED               -        0.50      0.60     1.000     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.913
 SUBAREA AREA(ACRES) =   10.40      SUBAREA RUNOFF(CFS) =    4.74
 EFFECTIVE AREA(ACRES) =     31.20   AREA-AVERAGED Fm(INCH/HR) =  0.56
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.93
 TOTAL AREA(ACRES) =       31.2       PEAK FLOW RATE(CFS) =      13.98

****************************************************************************
 FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.27
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.054
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        4.60      0.60     1.000     -
 USER-DEFINED               -        2.60      0.60     1.000     -
 USER-DEFINED               -        0.20      0.60     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.997
 SUBAREA AREA(ACRES) =    7.40      SUBAREA RUNOFF(CFS) =    3.04
 EFFECTIVE AREA(ACRES) =     38.60   AREA-AVERAGED Fm(INCH/HR) =  0.56
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.94
 TOTAL AREA(ACRES) =       38.6       PEAK FLOW RATE(CFS) =      17.02

****************************************************************************
 FLOW PROCESS FROM NODE    820.00 TO NODE    817.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   340.00
 FLOW LENGTH(FEET) =  1232.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.26
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      17.02
 PIPE TRAVEL TIME(MIN.) =   1.55    Tc(MIN.) =   14.81
 LONGEST FLOWPATH FROM NODE    818.00 TO NODE    817.00 =    2722.00 FEET.

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



```
 FLOW PROCESS FROM NODE    817.00 TO NODE    817.00 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.) =   14.81
 RAINFALL INTENSITY(INCH/HR) =   0.96
 AREA-AVERAGED Fm(INCH/HR) =  0.56
 AREA-AVERAGED Fp(INCH/HR) =  0.60
 AREA-AVERAGED Ap =  0.94
 EFFECTIVE STREAM AREA(ACRES) =      38.60
 TOTAL STREAM AREA(ACRES) =      38.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      17.02

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      103.66   10.61    1.213  0.60( 0.25) 0.42     119.8     800.00
     1       73.03   16.53    0.898  0.60( 0.28) 0.47     132.4     810.00
     2       17.02   14.81    0.962  0.60( 0.56) 0.94      38.6     818.00

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      120.67   10.61    1.213  0.60( 0.31) 0.52     147.4     800.00
     2       98.94   14.81    0.962  0.60( 0.34) 0.57     167.3     818.00
     3       87.28   16.53    0.898  0.60( 0.35) 0.58     171.0     810.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     120.67    Tc(MIN.) =    10.61
 EFFECTIVE AREA(ACRES) =     147.44   AREA-AVERAGED Fm(INCH/HR) =  0.31
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.52
 TOTAL AREA(ACRES) =      171.0
 LONGEST FLOWPATH FROM NODE    810.00 TO NODE    817.00 =    3814.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =      171.0  TC(MIN.) =     10.61
 EFFECTIVE AREA(ACRES) =    147.44  AREA-AVERAGED Fm(INCH/HR)=  0.31
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap = 0.517
 PEAK FLOW RATE(CFS)   =     120.67

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      120.67   10.61    1.213  0.60( 0.31) 0.52     147.4     800.00
     2       98.94   14.81    0.962  0.60( 0.34) 0.57     167.3     818.00
     3       87.28   16.53    0.898  0.60( 0.35) 0.58     171.0     810.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                        Analysis prepared by:

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                                92707

 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-4 SUBAREA E                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 5-YR EV JUNE 2018 ROKAMOTO                                          *
 **********************************************************************

  FILE NAME: 4E05EVRL.DAT
  TIME/DATE OF STUDY: 09:35 06/26/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    5.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  2.739
   2)   10.00;  1.815
   3)   15.00;  1.325
   4)   20.00;  1.135
   5)   25.00;  0.989
   6)   30.00;  0.885
   7)   40.00;  0.759
   8)   50.00;  0.676
   9)   60.00;  0.615
  10)   90.00;  0.513
  11)  120.00;  0.455
  12)  180.00;  0.383
  13)  360.00;  0.284
  14) 1200.00;  0.125
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    485.00  DOWNSTREAM(FEET) =    455.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.739
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          -        0.20      0.50     0.900    56    8.00
  COMMERCIAL                  -        0.80      0.50     0.100    56    5.00
  RESIDENTIAL
  ".4 DWELLING/ACRE"          -        0.50      0.50     0.900    56    8.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.473
  SUBAREA RUNOFF(CFS) =      3.38
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      3.38

**************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    801.10 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  455.00  DOWNSTREAM ELEVATION(FEET) =  451.00
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       6.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.73
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   1.65   Tc(MIN.) =    6.65
```

```
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.435
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.10      0.50     0.100     -
USER-DEFINED               -        2.10      0.50     0.100     -
USER-DEFINED               -        0.70      0.50     0.900     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.293
SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    5.97
EFFECTIVE AREA(ACRES) =      4.40    AREA-AVERAGED Fm(INCH/HR) =  0.18
AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.35
TOTAL AREA(ACRES) =        4.4        PEAK FLOW RATE(CFS) =       8.94

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.15
FLOW VELOCITY(FEET/SEC.) =  2.96   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
LONGEST FLOWPATH FROM NODE    800.00 TO NODE    801.10 =     600.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    801.10 TO NODE    802.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  451.00  DOWNSTREAM ELEVATION(FEET) =  445.00
STREET LENGTH(FEET) =   391.00   CURB HEIGHT(INCHES) =  8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.018
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

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) =      14.35
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.43
  HALFSTREET FLOOD WIDTH(FEET) =   14.80
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.34
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.42
STREET FLOW TRAVEL TIME(MIN.) =   1.95   Tc(MIN.) =    8.60
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.074
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.60      0.50     0.100     -
USER-DEFINED               -        0.20      0.50     0.900     -
USER-DEFINED               -        3.00      0.50     0.100     -
USER-DEFINED               -        0.10      0.50     0.900     -
USER-DEFINED               -        1.70      0.50     0.100     -
USER-DEFINED               -        0.50      0.50     0.900     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.205
SUBAREA AREA(ACRES) =    6.10      SUBAREA RUNOFF(CFS) =   10.82
```



```
EFFECTIVE AREA(ACRES) =     10.50    AREA-AVERAGED Fm(INCH/HR) =  0.13
AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.27
TOTAL AREA(ACRES) =       10.5        PEAK FLOW RATE(CFS) =      18.33

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.45
FLOW VELOCITY(FEET/SEC.) =  3.51   DEPTH*VELOCITY(FT*FT/SEC.) =   1.60
LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =     991.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    802.00 TO NODE    808.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   445.00  DOWNSTREAM(FEET) =   398.00
FLOW LENGTH(FEET) =   843.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  14.72
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      18.33
PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =    9.55
LONGEST FLOWPATH FROM NODE    800.00 TO NODE    808.00 =    1834.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    9.55
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.897
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        2.00      0.50     0.900     -
USER-DEFINED               -        2.20      0.50     0.900     -
USER-DEFINED               -        4.20      0.50     0.900     -
USER-DEFINED               -        5.30      0.50     0.100     -
USER-DEFINED               -        7.10      0.50     0.100     -
USER-DEFINED               -        8.60      0.50     0.100     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.329
SUBAREA AREA(ACRES) =   29.40      SUBAREA RUNOFF(CFS) =   45.85
EFFECTIVE AREA(ACRES) =     39.90   AREA-AVERAGED Fm(INCH/HR) =  0.16
AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.31
TOTAL AREA(ACRES) =       39.9       PEAK FLOW RATE(CFS) =      62.52

****************************************************************************
FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    9.55
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.897
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED               -        0.60      0.50     0.900     -
```

```
  USER-DEFINED               -        1.30      0.50     0.900     -
  USER-DEFINED               -        5.60      0.50     0.100     -
  USER-DEFINED               -        8.30      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.196
  SUBAREA AREA(ACRES) =   15.80      SUBAREA RUNOFF(CFS) =   25.58
  EFFECTIVE AREA(ACRES) =     55.70   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.28
  TOTAL AREA(ACRES) =       55.7       PEAK FLOW RATE(CFS) =      88.10

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 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.) =    9.55
  RAINFALL INTENSITY(INCH/HR) =   1.90
  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.28
  EFFECTIVE STREAM AREA(ACRES) =      55.70
  TOTAL STREAM AREA(ACRES) =      55.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      88.10

****************************************************************************
  FLOW PROCESS FROM NODE    810.00 TO NODE    811.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   307.00
  ELEVATION DATA: UPSTREAM(FEET) =    785.00  DOWNSTREAM(FEET) =    705.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.976
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      -        0.10      0.50     1.000    56    9.13
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        0.10      0.50     1.000    56    9.13
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      -        0.20      0.50     1.000    56    9.13
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        0.50      0.50     1.000    56    9.13
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.20
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      1.20

****************************************************************************
  FLOW PROCESS FROM NODE    811.00 TO NODE    812.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```



```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    705.00  DOWNSTREAM(FEET) =    525.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   695.00   CHANNEL SLOPE =  0.2590
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.747
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.10      0.50     1.000     -
  USER-DEFINED               -        3.10      0.50     1.000     -
  USER-DEFINED               -        3.20      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.42
  AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   1.56
  Tc(MIN.) =   10.69
  SUBAREA AREA(ACRES) =     8.40      SUBAREA RUNOFF(CFS) =    9.43
  EFFECTIVE AREA(ACRES) =      9.30     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        9.3         PEAK FLOW RATE(CFS) =      10.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.64   FLOW VELOCITY(FEET/SEC.) =   8.55
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    812.00 =    1002.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    812.00 TO NODE    813.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    460.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1010.00   CHANNEL SLOPE =  0.0644
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.457
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     1.000     -
  USER-DEFINED               -        0.30      0.50     1.000     -
  USER-DEFINED               -        0.70      0.50     1.000     -
  USER-DEFINED               -        1.20      0.50     1.000     -
  USER-DEFINED               -        5.80      0.50     1.000     -
  USER-DEFINED               -        6.30      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.69
  AVERAGE FLOW DEPTH(FEET) =   0.99   TRAVEL TIME(MIN.) =   2.96
  Tc(MIN.) =   13.65
  SUBAREA AREA(ACRES) =    14.40      SUBAREA RUNOFF(CFS) =   12.40
  EFFECTIVE AREA(ACRES) =     23.70     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       23.7         PEAK FLOW RATE(CFS) =      20.41
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.07   FLOW VELOCITY(FEET/SEC.) =   6.00
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    813.00 =    2012.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    813.00 TO NODE    813.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.65
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.457
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       10.40      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   10.40      SUBAREA RUNOFF(CFS) =    8.96
  EFFECTIVE AREA(ACRES) =     34.10   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       34.1       PEAK FLOW RATE(CFS) =      29.37

****************************************************************************
  FLOW PROCESS FROM NODE    813.00 TO NODE    808.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   398.00
  FLOW LENGTH(FEET) =  1046.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.91
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.37
  PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =   14.68
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    808.00 =    3058.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 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) =   1.36
  AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      34.10
  TOTAL STREAM AREA(ACRES) =      34.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      29.37

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```



```
       1       88.10    9.55    1.897  0.50( 0.14) 0.28      55.7     800.00
       2       29.37   14.68    1.356  0.50( 0.50) 1.00      34.1     810.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
       1      117.47    9.55    1.897  0.50( 0.24) 0.48      77.9     800.00
       2       90.35   14.68    1.356  0.50( 0.28) 0.55      89.8     810.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     117.47    Tc(MIN.) =     9.55
  EFFECTIVE AREA(ACRES) =      77.89   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       89.8
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    808.00 =    3058.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    809.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   398.00  DOWNSTREAM(FEET) =   341.00
  FLOW LENGTH(FEET) =   756.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.05
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     117.47
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   10.04
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    809.00 =    3814.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.04
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.811
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.60      0.50     0.200     -
  USER-DEFINED               -       12.30      0.50     0.200     -
  USER-DEFINED               -        0.50      0.50     0.100     -
  USER-DEFINED               -        5.40      0.50     0.100     -
  USER-DEFINED               -        4.70      0.50     0.900     -
  USER-DEFINED               -        4.20      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.372
  SUBAREA AREA(ACRES) =   32.70      SUBAREA RUNOFF(CFS) =   47.82
  EFFECTIVE AREA(ACRES) =    110.59   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      122.5       PEAK FLOW RATE(CFS) =     157.79

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

```
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   10.04
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.811
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        9.90      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    9.90      SUBAREA RUNOFF(CFS) =   15.69
  EFFECTIVE AREA(ACRES) =    120.49   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      132.4       PEAK FLOW RATE(CFS) =     173.49

********************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 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.) =   10.04
  RAINFALL INTENSITY(INCH/HR) =   1.81
  AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =     120.49
  TOTAL STREAM AREA(ACRES) =     132.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     173.49

********************************************************************************
  FLOW PROCESS FROM NODE    818.00 TO NODE    819.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   323.00
  ELEVATION DATA: UPSTREAM(FEET) =    625.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.864
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.025
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      -        0.10      0.50     1.000    56    8.86
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        0.30      0.50     1.000    56    8.86
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      -        0.60      0.50     1.000    56    8.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.37
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      1.37
```



```
********************************************************************************
  FLOW PROCESS FROM NODE    819.00 TO NODE    820.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    517.00  DOWNSTREAM(FEET) =    395.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1167.00   CHANNEL SLOPE =  0.1045
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.564
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     0.100     -
  USER-DEFINED               -        0.90      0.50     0.900     -
  USER-DEFINED               -        1.30      0.50     0.100     -
  USER-DEFINED               -        0.80      0.50     1.000     -
  USER-DEFINED               -        2.40      0.50     1.000     -
  USER-DEFINED               -        3.20      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.845
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.93
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.25
  AVERAGE FLOW DEPTH(FEET) =   0.61   TRAVEL TIME(MIN.) =   3.70
  Tc(MIN.) =   12.57
  SUBAREA AREA(ACRES) =     8.70       SUBAREA RUNOFF(CFS) =    8.93
  EFFECTIVE AREA(ACRES) =      9.70     AREA-AVERAGED Fm(INCH/HR) =   0.43
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   0.86
  TOTAL AREA(ACRES) =        9.7         PEAK FLOW RATE(CFS) =       9.89

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   5.97
  LONGEST FLOWPATH FROM NODE    818.00 TO NODE    820.00 =    1490.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   12.57
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.564
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.00      0.50     1.000     -
  USER-DEFINED               -        7.10      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   11.10      SUBAREA RUNOFF(CFS) =   10.62
  EFFECTIVE AREA(ACRES) =     20.80   AREA-AVERAGED Fm(INCH/HR) =  0.47
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =       20.8       PEAK FLOW RATE(CFS) =      20.51

********************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
--------------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   12.57
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.564
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.40      0.50     1.000     -
  USER-DEFINED               -        1.80      0.50     1.000     -
  USER-DEFINED               -        3.60      0.50     1.000     -
  USER-DEFINED               -        1.00      0.50     0.100     -
  USER-DEFINED               -        0.10      0.50     1.000     -
  USER-DEFINED               -        0.50      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.913
  SUBAREA AREA(ACRES) =   10.40      SUBAREA RUNOFF(CFS) =   10.36
  EFFECTIVE AREA(ACRES) =     31.20   AREA-AVERAGED Fm(INCH/HR) =  0.46
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.93
  TOTAL AREA(ACRES) =       31.2       PEAK FLOW RATE(CFS) =      30.87

********************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   12.57
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.564
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.60      0.50     1.000     -
  USER-DEFINED               -        2.60      0.50     1.000     -
  USER-DEFINED               -        0.20      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.997
  SUBAREA AREA(ACRES) =    7.40      SUBAREA RUNOFF(CFS) =    7.09
  EFFECTIVE AREA(ACRES) =     38.60   AREA-AVERAGED Fm(INCH/HR) =  0.47
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =       38.6       PEAK FLOW RATE(CFS) =      37.96

********************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    817.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   340.00
  FLOW LENGTH(FEET) =  1232.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.16
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.96
  PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =   13.84
  LONGEST FLOWPATH FROM NODE    818.00 TO NODE    817.00 =    2722.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    817.00 TO NODE    817.00 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.) =   13.84
  RAINFALL INTENSITY(INCH/HR) =   1.44
  AREA-AVERAGED Fm(INCH/HR) =  0.47
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.94
  EFFECTIVE STREAM AREA(ACRES) =      38.60
  TOTAL STREAM AREA(ACRES) =      38.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      37.96

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      173.49   10.04    1.811  0.50( 0.21) 0.42     120.5     800.00
      1      128.70   15.20    1.317  0.50( 0.24) 0.47     132.4     810.00
      2       37.96   13.84    1.439  0.50( 0.47) 0.94      38.6     818.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      211.45   10.04    1.811  0.50( 0.26) 0.52     148.5     800.00
      2      178.48   13.84    1.439  0.50( 0.29) 0.57     167.9     818.00
      3      161.90   15.20    1.317  0.50( 0.29) 0.58     171.0     810.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     211.45    Tc(MIN.) =    10.04
  EFFECTIVE AREA(ACRES) =     148.50   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      171.0
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    817.00 =    3814.00 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      171.0  TC(MIN.) =     10.04
  EFFECTIVE AREA(ACRES) =    148.50  AREA-AVERAGED Fm(INCH/HR)=  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap = 0.520
  PEAK FLOW RATE(CFS)   =     211.45

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      211.45   10.04    1.811  0.50( 0.26) 0.52     148.5     800.00
      2      178.48   13.84    1.439  0.50( 0.29) 0.57     167.9     818.00
      3      161.90   15.20    1.317  0.50( 0.29) 0.58     171.0     810.00
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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                              Santa Ana, CA
                                  92707

 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-4 SUBAREA E                                                       *
* RATIONAL METHOD - REGIONAL RAINFALL                                      *
* 10-YR EV JUNE 2018 ROKAMOTO                                             *
 ****************************************************************************

  FILE NAME: 4E10EVRL.DAT
  TIME/DATE OF STUDY: 09:33 06/26/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  3.913
   2)   10.00;  2.593
   3)   15.00;  1.893
   4)   20.00;  1.621
   5)   25.00;  1.412
   6)   30.00;  1.265
   7)   40.00;  1.084
   8)   50.00;  0.966
   9)   60.00;  0.879
  10)   90.00;  0.733
  11)  120.00;  0.650
  12)  180.00;  0.547
  13)  360.00;  0.406
  14) 1200.00;  0.179
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    485.00  DOWNSTREAM(FEET) =    455.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.913
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30      0.900    56    8.00
  COMMERCIAL                 B        0.80      0.30      0.100    56    5.00
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30      0.900    56    8.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.473
  SUBAREA RUNOFF(CFS) =      5.09
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      5.09

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    801.10 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  455.00  DOWNSTREAM ELEVATION(FEET) =  451.00
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =       9.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.54
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.00
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
  STREET FLOW TRAVEL TIME(MIN.) =   1.50   Tc(MIN.) =    6.50
```

```
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.516
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.10      0.30     0.100    56
 COMMERCIAL                 B        2.10      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.293
 SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    8.95
 EFFECTIVE AREA(ACRES) =      4.40    AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
 TOTAL AREA(ACRES) =        4.4        PEAK FLOW RATE(CFS) =      13.50

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.57
 FLOW VELOCITY(FEET/SEC.) =  3.23   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    801.10 =     600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    801.10 TO NODE    802.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  451.00  DOWNSTREAM ELEVATION(FEET) =  445.00
 STREET LENGTH(FEET) =   391.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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) =      21.71
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.48
   HALFSTREET FLOOD WIDTH(FEET) =   17.62
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.66
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.75
 STREET FLOW TRAVEL TIME(MIN.) =   1.78   Tc(MIN.) =    8.28
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.046
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.60      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
 COMMERCIAL                 B        3.00      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 COMMERCIAL                 B        1.70      0.30     0.100    56
 RESIDENTIAL
```



```
 ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.205
 SUBAREA AREA(ACRES) =    6.10      SUBAREA RUNOFF(CFS) =   16.39
 EFFECTIVE AREA(ACRES) =     10.50    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.27
 TOTAL AREA(ACRES) =       10.5        PEAK FLOW RATE(CFS) =      28.03

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.49
 FLOW VELOCITY(FEET/SEC.) =  3.91   DEPTH*VELOCITY(FT*FT/SEC.) =   2.00
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =     991.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    802.00 TO NODE    808.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   445.00  DOWNSTREAM(FEET) =   398.00
 FLOW LENGTH(FEET) =   843.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.35
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      28.03
 PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =    9.14
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    808.00 =    1834.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.14
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.820
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.00      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        4.20      0.30     0.900    56
 COMMERCIAL                 B        5.30      0.30     0.100    56
 COMMERCIAL                 B        7.10      0.30     0.100    56
 COMMERCIAL                 B        8.60      0.30     0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.329
 SUBAREA AREA(ACRES) =   29.40      SUBAREA RUNOFF(CFS) =   72.00
 EFFECTIVE AREA(ACRES) =     39.90   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
 TOTAL AREA(ACRES) =       39.9       PEAK FLOW RATE(CFS) =      97.88

****************************************************************************
 FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
  MAINLINE Tc(MIN.) =    9.14
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.820
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.30      0.30     0.900    56
  COMMERCIAL                 B        5.60      0.30     0.100    56
  COMMERCIAL                 B        8.30      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.196
  SUBAREA AREA(ACRES) =   15.80      SUBAREA RUNOFF(CFS) =   39.26
  EFFECTIVE AREA(ACRES) =     55.70   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.28
  TOTAL AREA(ACRES) =       55.7       PEAK FLOW RATE(CFS) =     137.14

********************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 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.) =    9.14
  RAINFALL INTENSITY(INCH/HR) =   2.82
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.28
  EFFECTIVE STREAM AREA(ACRES) =      55.70
  TOTAL STREAM AREA(ACRES) =      55.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     137.14

********************************************************************************
  FLOW PROCESS FROM NODE    810.00 TO NODE    811.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   307.00
  ELEVATION DATA: UPSTREAM(FEET) =    785.00  DOWNSTREAM(FEET) =    705.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.823
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63    9.13
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66    9.13
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.20      0.30     1.000    63    9.13
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.50      0.30     1.000    66    9.13
```



```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.04
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.04

********************************************************************************
  FLOW PROCESS FROM NODE    811.00 TO NODE    812.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    705.00  DOWNSTREAM(FEET) =    525.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   695.00   CHANNEL SLOPE =  0.2590
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.526
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.10      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.10      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.20      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.47
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.57
  AVERAGE FLOW DEPTH(FEET) =   0.64   TRAVEL TIME(MIN.) =   1.35
  Tc(MIN.) =   10.48
  SUBAREA AREA(ACRES) =     8.40      SUBAREA RUNOFF(CFS) =   16.83
  EFFECTIVE AREA(ACRES) =      9.30     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        9.3         PEAK FLOW RATE(CFS) =      18.63

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOW VELOCITY(FEET/SEC.) =   9.79
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    812.00 =    1002.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    812.00 TO NODE    813.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    460.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1010.00   CHANNEL SLOPE =  0.0644
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.169
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
```

```
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.70      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.20      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.80      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.30      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      30.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.61
  AVERAGE FLOW DEPTH(FEET) =   1.25   TRAVEL TIME(MIN.) =   2.55
  Tc(MIN.) =   13.03
  SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   24.22
  EFFECTIVE AREA(ACRES) =     23.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       23.7         PEAK FLOW RATE(CFS) =      39.86

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.37   FLOW VELOCITY(FEET/SEC.) =   7.07
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    813.00 =    2012.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    813.00 TO NODE    813.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.03
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.169
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B       10.40      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   10.40      SUBAREA RUNOFF(CFS) =   17.49
  EFFECTIVE AREA(ACRES) =     34.10   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       34.1       PEAK FLOW RATE(CFS) =      57.35

****************************************************************************
  FLOW PROCESS FROM NODE    813.00 TO NODE    808.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   398.00
  FLOW LENGTH(FEET) =  1046.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.99
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.35
  PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =   13.90
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    808.00 =    3058.00 FEET.

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



```
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 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.) =   13.90
  RAINFALL INTENSITY(INCH/HR) =   2.05
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      34.10
  TOTAL STREAM AREA(ACRES) =      34.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      57.35

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      137.14    9.14    2.820  0.30( 0.08) 0.28      55.7     800.00
      2       57.35   13.90    2.047  0.30( 0.30) 1.00      34.1     810.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      191.55    9.14    2.820  0.30( 0.15) 0.49      78.1     800.00
      2      155.75   13.90    2.047  0.30( 0.17) 0.55      89.8     810.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     191.55    Tc(MIN.) =     9.14
  EFFECTIVE AREA(ACRES) =      78.12   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       89.8
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    808.00 =    3058.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    809.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   398.00  DOWNSTREAM(FEET) =   341.00
  FLOW LENGTH(FEET) =   756.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.30
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     191.55
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    9.57
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    809.00 =    3814.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =    9.57
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.706
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        5.60      0.30     0.200    56
  APARTMENTS                 B       12.30      0.30     0.200    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  COMMERCIAL                 B        5.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.70      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.372
  SUBAREA AREA(ACRES) =   32.70      SUBAREA RUNOFF(CFS) =   76.35
  EFFECTIVE AREA(ACRES) =    110.82   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      122.5       PEAK FLOW RATE(CFS) =     256.36

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.57
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.706
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        9.90      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    9.90      SUBAREA RUNOFF(CFS) =   23.84
  EFFECTIVE AREA(ACRES) =    120.72   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      132.4       PEAK FLOW RATE(CFS) =     280.20

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 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) =   2.71
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =     120.72
  TOTAL STREAM AREA(ACRES) =     132.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     280.20

****************************************************************************
  FLOW PROCESS FROM NODE    818.00 TO NODE    819.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```



```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   323.00
  ELEVATION DATA: UPSTREAM(FEET) =    625.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.864
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.893
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63    8.86
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66    8.86
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.60      0.30     1.000    63    8.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.33
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      2.33

****************************************************************************
  FLOW PROCESS FROM NODE    819.00 TO NODE    820.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    517.00  DOWNSTREAM(FEET) =    395.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1167.00   CHANNEL SLOPE =  0.1045
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.302
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.80      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.40      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.20      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.845
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.43
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.05
  AVERAGE FLOW DEPTH(FEET) =   0.76   TRAVEL TIME(MIN.) =   3.22
  Tc(MIN.) =   12.08
  SUBAREA AREA(ACRES) =     8.70       SUBAREA RUNOFF(CFS) =   16.04
  EFFECTIVE AREA(ACRES) =      9.70     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.86
  TOTAL AREA(ACRES) =        9.7         PEAK FLOW RATE(CFS) =      17.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  0.93   FLOW VELOCITY(FEET/SEC.) =   6.93
  LONGEST FLOWPATH FROM NODE    818.00 TO NODE    820.00 =    1490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.08
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.302
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.00      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        7.10      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   11.10      SUBAREA RUNOFF(CFS) =   20.00
  EFFECTIVE AREA(ACRES) =     20.80   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =       20.8       PEAK FLOW RATE(CFS) =      37.84

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.08
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.302
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.40      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.80      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.60      0.30     1.000    63
  COMMERCIAL                 B        1.00      0.30     0.100    56
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.50      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.913
  SUBAREA AREA(ACRES) =   10.40      SUBAREA RUNOFF(CFS) =   18.98
  EFFECTIVE AREA(ACRES) =     31.20   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.93
  TOTAL AREA(ACRES) =       31.2       PEAK FLOW RATE(CFS) =      56.82

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.08
```



```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.302
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        4.60      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.60      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.997
  SUBAREA AREA(ACRES) =    7.40      SUBAREA RUNOFF(CFS) =   13.34
  EFFECTIVE AREA(ACRES) =     38.60   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =       38.6       PEAK FLOW RATE(CFS) =      70.15

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    817.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   340.00
  FLOW LENGTH(FEET) =  1232.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.81
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      70.15
  PIPE TRAVEL TIME(MIN.) =   1.09    Tc(MIN.) =   13.17
  LONGEST FLOWPATH FROM NODE    818.00 TO NODE    817.00 =    2722.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    817.00 TO NODE    817.00 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.) =   13.17
  RAINFALL INTENSITY(INCH/HR) =   2.15
  AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.94
  EFFECTIVE STREAM AREA(ACRES) =      38.60
  TOTAL STREAM AREA(ACRES) =      38.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      70.15

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      280.20    9.57    2.706  0.30( 0.13) 0.42     120.7     800.00
      1      219.36   14.35    1.983  0.30( 0.14) 0.47     132.4     810.00
      2       70.15   13.17    2.149  0.30( 0.28) 0.94      38.6     818.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	346.40	9.57	2.706	0.30(0.16)	0.52	148.8	800.00
2	304.56	13.17	2.149	0.30(0.17)	0.57	168.1	818.00
3	283.29	14.35	1.983	0.30(0.17)	0.58	171.0	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 346.40 Tc(MIN.) = 9.57
EFFECTIVE AREA(ACRES) = 148.77 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 171.0
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 817.00 = 3814.00 FEET.

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 171.0 TC(MIN.) = 9.57
EFFECTIVE AREA(ACRES) = 148.77 AREA-AVERAGED Fm(INCH/HR)= 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.521
PEAK FLOW RATE(CFS) = 346.40

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	346.40	9.57	2.706	0.30(0.16)	0.52	148.8	800.00
2	304.56	13.17	2.149	0.30(0.17)	0.57	168.1	818.00
3	283.29	14.35	1.983	0.30(0.17)	0.58	171.0	810.00

==========

==========

END OF RATIONAL METHOD ANALYSIS

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

                        Michael Baker International
                      5 Hutton Centre Drive, Suite 500
                              Santa Ana, CA
                                  92707

 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-4 SUBAREA E                                                       *
* RATIONAL METHOD - REGIONAL RAINFALL                                      *
* 25-YR EV JUNE 2018 ROKAMOTO                                              *
 ****************************************************************************

  FILE NAME: 4E25EVRL.DAT
  TIME/DATE OF STUDY: 09:29 06/26/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  4.986
   2)   10.00;  3.244
   3)   15.00;  2.468
   4)   20.00;  2.035
   5)   25.00;  1.773
   6)   30.00;  1.553
   7)   40.00;  1.354
   8)   50.00;  1.201
   9)   60.00;  1.077
  10)   90.00;  0.909
  11)  120.00;  0.800
  12)  180.00;  0.670
  13)  360.00;  0.498
  14) 1200.00;  0.220
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    485.00  DOWNSTREAM(FEET) =    455.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.986
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30      0.900    56    8.00
  COMMERCIAL                 B        0.80      0.30      0.100    56    5.00
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30      0.900    56    8.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.473
  SUBAREA RUNOFF(CFS) =      6.54
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      6.54

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    801.10 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  455.00  DOWNSTREAM ELEVATION(FEET) =  451.00
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      12.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   14.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.43   Tc(MIN.) =    6.43
```

```
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.489
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.10      0.30     0.100    56
 COMMERCIAL                 B        2.10      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.293
 SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =   11.49
 EFFECTIVE AREA(ACRES) =      4.40    AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
 TOTAL AREA(ACRES) =        4.4        PEAK FLOW RATE(CFS) =      17.35

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.13
 FLOW VELOCITY(FEET/SEC.) =  3.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.55
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    801.10 =     600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    801.10 TO NODE    802.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  451.00  DOWNSTREAM ELEVATION(FEET) =  445.00
 STREET LENGTH(FEET) =   391.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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) =      27.93
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.51
   HALFSTREET FLOOD WIDTH(FEET) =   19.49
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.89
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.99
 STREET FLOW TRAVEL TIME(MIN.) =   1.67   Tc(MIN.) =    8.10
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.905
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.60      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
 COMMERCIAL                 B        3.00      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 COMMERCIAL                 B        1.70      0.30     0.100    56
 RESIDENTIAL
```



```
 ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.205
 SUBAREA AREA(ACRES) =    6.10      SUBAREA RUNOFF(CFS) =   21.10
 EFFECTIVE AREA(ACRES) =     10.50    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.27
 TOTAL AREA(ACRES) =       10.5        PEAK FLOW RATE(CFS) =      36.15

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.60
 FLOW VELOCITY(FEET/SEC.) =  4.14   DEPTH*VELOCITY(FT*FT/SEC.) =   2.27
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =     991.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    802.00 TO NODE    808.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   445.00  DOWNSTREAM(FEET) =   398.00
 FLOW LENGTH(FEET) =   843.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.52
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      36.15
 PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =    8.90
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    808.00 =    1834.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.90
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.626
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.00      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        4.20      0.30     0.900    56
 COMMERCIAL                 B        5.30      0.30     0.100    56
 COMMERCIAL                 B        7.10      0.30     0.100    56
 COMMERCIAL                 B        8.60      0.30     0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.329
 SUBAREA AREA(ACRES) =   29.40      SUBAREA RUNOFF(CFS) =   93.34
 EFFECTIVE AREA(ACRES) =     39.90   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
 TOTAL AREA(ACRES) =       39.9       PEAK FLOW RATE(CFS) =     126.84

****************************************************************************
 FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
  MAINLINE Tc(MIN.) =    8.90
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.626
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.30      0.30     0.900    56
  COMMERCIAL                 B        5.60      0.30     0.100    56
  COMMERCIAL                 B        8.30      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.196
  SUBAREA AREA(ACRES) =   15.80      SUBAREA RUNOFF(CFS) =   50.73
  EFFECTIVE AREA(ACRES) =     55.70   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.28
  TOTAL AREA(ACRES) =       55.7       PEAK FLOW RATE(CFS) =     177.57

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 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.) =    8.90
  RAINFALL INTENSITY(INCH/HR) =   3.63
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.28
  EFFECTIVE STREAM AREA(ACRES) =      55.70
  TOTAL STREAM AREA(ACRES) =      55.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     177.57

****************************************************************************
  FLOW PROCESS FROM NODE    810.00 TO NODE    811.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   307.00
  ELEVATION DATA: UPSTREAM(FEET) =    785.00  DOWNSTREAM(FEET) =    705.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.547
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63    9.13
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66    9.13
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.20      0.30     1.000    63    9.13
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.50      0.30     1.000    66    9.13
```



```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.63
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.63

****************************************************************************
  FLOW PROCESS FROM NODE    811.00 TO NODE    812.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    705.00  DOWNSTREAM(FEET) =    525.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   695.00   CHANNEL SLOPE =  0.2590
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.181
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.10      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.10      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.20      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.54
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.09
  AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   1.27
  Tc(MIN.) =   10.40
  SUBAREA AREA(ACRES) =     8.40       SUBAREA RUNOFF(CFS) =   21.78
  EFFECTIVE AREA(ACRES) =      9.30     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        9.3         PEAK FLOW RATE(CFS) =      24.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.87   FLOW VELOCITY(FEET/SEC.) =  10.51
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    812.00 =    1002.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    812.00 TO NODE    813.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    460.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1010.00   CHANNEL SLOPE =  0.0644
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.813
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
```

```
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.70      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.20      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.80      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.30      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      40.44
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.10
  AVERAGE FLOW DEPTH(FEET) =   1.38   TRAVEL TIME(MIN.) =   2.37
  Tc(MIN.) =   12.78
  SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   32.57
  EFFECTIVE AREA(ACRES) =     23.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       23.7         PEAK FLOW RATE(CFS) =      53.60

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.53   FLOW VELOCITY(FEET/SEC.) =   7.63
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    813.00 =    2012.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    813.00 TO NODE    813.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.78
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.813
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B       10.40      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   10.40      SUBAREA RUNOFF(CFS) =   23.52
  EFFECTIVE AREA(ACRES) =     34.10   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       34.1       PEAK FLOW RATE(CFS) =      77.13

****************************************************************************
  FLOW PROCESS FROM NODE    813.00 TO NODE    808.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   398.00
  FLOW LENGTH(FEET) =  1046.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.51
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      77.13
  PIPE TRAVEL TIME(MIN.) =   0.81    Tc(MIN.) =   13.59
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    808.00 =    3058.00 FEET.

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



```
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 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.) =   13.59
  RAINFALL INTENSITY(INCH/HR) =   2.69
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      34.10
  TOTAL STREAM AREA(ACRES) =      34.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      77.13

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      177.57    8.90    3.626  0.30( 0.08) 0.28      55.7     800.00
      2       77.13   13.59    2.687  0.30( 0.30) 1.00      34.1     810.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      247.98    8.90    3.626  0.30( 0.15) 0.49      78.0     800.00
      2      207.64   13.59    2.687  0.30( 0.17) 0.55      89.8     810.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     247.98    Tc(MIN.) =     8.90
  EFFECTIVE AREA(ACRES) =      78.05   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       89.8
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    808.00 =    3058.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    809.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   398.00  DOWNSTREAM(FEET) =   341.00
  FLOW LENGTH(FEET) =   756.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.99
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     247.98
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    9.31
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    809.00 =    3814.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 MAINLINE Tc(MIN.) =    9.31
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.484
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 APARTMENTS                 B        5.60      0.30     0.200    56
 APARTMENTS                 B       12.30      0.30     0.200    56
 COMMERCIAL                 B        0.50      0.30     0.100    56
 COMMERCIAL                 B        5.40      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        4.70      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        4.20      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.372
 SUBAREA AREA(ACRES) =   32.70      SUBAREA RUNOFF(CFS) =   99.26
 EFFECTIVE AREA(ACRES) =    110.75   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      122.5       PEAK FLOW RATE(CFS) =     333.76

****************************************************************************
 FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.31
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.484
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        9.90      0.30     0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    9.90      SUBAREA RUNOFF(CFS) =   30.78
 EFFECTIVE AREA(ACRES) =    120.65   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =      132.4       PEAK FLOW RATE(CFS) =     364.54

****************************************************************************
 FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 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.) =    9.31
 RAINFALL INTENSITY(INCH/HR) =   3.48
 AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.42
 EFFECTIVE STREAM AREA(ACRES) =     120.65
 TOTAL STREAM AREA(ACRES) =     132.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     364.54

****************************************************************************
 FLOW PROCESS FROM NODE    818.00 TO NODE    819.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```



```
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   323.00
 ELEVATION DATA: UPSTREAM(FEET) =    625.00  DOWNSTREAM(FEET) =    517.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.864
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.640
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63    8.86
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.30      0.30     1.000    66    8.86
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        0.60      0.30     1.000    63    8.86
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      3.01
 TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      3.01

****************************************************************************
 FLOW PROCESS FROM NODE    819.00 TO NODE    820.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    517.00  DOWNSTREAM(FEET) =    395.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1167.00   CHANNEL SLOPE =  0.1045
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.956
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.10      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
 COMMERCIAL                 B        1.30      0.30     0.100    56
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.80      0.30     1.000    66
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        2.40      0.30     1.000    66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        3.20      0.30     1.000    63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.845
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.66
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.51
 AVERAGE FLOW DEPTH(FEET) =   0.84   TRAVEL TIME(MIN.) =   2.99
 Tc(MIN.) =   11.85
 SUBAREA AREA(ACRES) =     8.70       SUBAREA RUNOFF(CFS) =   21.16
 EFFECTIVE AREA(ACRES) =      9.70     AREA-AVERAGED Fm(INCH/HR) =   0.26
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.86
 TOTAL AREA(ACRES) =        9.7         PEAK FLOW RATE(CFS) =      23.56

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  1.03   FLOW VELOCITY(FEET/SEC.) =   7.44
  LONGEST FLOWPATH FROM NODE    818.00 TO NODE    820.00 =    1490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.85
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.956
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.00      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        7.10      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   11.10      SUBAREA RUNOFF(CFS) =   26.54
  EFFECTIVE AREA(ACRES) =     20.80   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =       20.8       PEAK FLOW RATE(CFS) =      50.09

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.85
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.956
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.40      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.80      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.60      0.30     1.000    63
  COMMERCIAL                 B        1.00      0.30     0.100    56
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.50      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.913
  SUBAREA AREA(ACRES) =   10.40      SUBAREA RUNOFF(CFS) =   25.11
  EFFECTIVE AREA(ACRES) =     31.20   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.93
  TOTAL AREA(ACRES) =       31.2       PEAK FLOW RATE(CFS) =      75.20

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.85
```



```
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.956
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        4.60      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.60      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.997
  SUBAREA AREA(ACRES) =    7.40      SUBAREA RUNOFF(CFS) =   17.70
  EFFECTIVE AREA(ACRES) =     38.60   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =       38.6       PEAK FLOW RATE(CFS) =      92.90

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    817.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   340.00
  FLOW LENGTH(FEET) =  1232.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.13
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      92.90
  PIPE TRAVEL TIME(MIN.) =   1.02    Tc(MIN.) =   12.87
  LONGEST FLOWPATH FROM NODE    818.00 TO NODE    817.00 =    2722.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    817.00 TO NODE    817.00 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.) =   12.87
  RAINFALL INTENSITY(INCH/HR) =   2.80
  AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.94
  EFFECTIVE STREAM AREA(ACRES) =      38.60
  TOTAL STREAM AREA(ACRES) =      38.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      92.90

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      364.54    9.31    3.484  0.30( 0.13) 0.42     120.6     800.00
      1      295.36   14.01    2.621  0.30( 0.14) 0.47     132.4     810.00
      2       92.90   12.87    2.798  0.30( 0.28) 0.94      38.6     818.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	450.06	9.31	3.484	0.30(0.16)	0.52	148.6	800.00
2	405.04	12.87	2.798	0.30(0.17)	0.57	168.1	818.00
3	381.73	14.01	2.621	0.30(0.17)	0.58	171.0	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 450.06 Tc(MIN.) = 9.31
EFFECTIVE AREA(ACRES) = 148.56 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 171.0
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 817.00 = 3814.00 FEET.

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 171.0 TC(MIN.) = 9.31
EFFECTIVE AREA(ACRES) = 148.56 AREA-AVERAGED Fm(INCH/HR)= 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.521
PEAK FLOW RATE(CFS) = 450.06

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	450.06	9.31	3.484	0.30(0.16)	0.52	148.6	800.00
2	405.04	12.87	2.798	0.30(0.17)	0.57	168.1	818.00
3	381.73	14.01	2.621	0.30(0.17)	0.58	171.0	810.00

==========
==========

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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                          Analysis prepared by:

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                              Santa Ana, CA
                                  92707

 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-4 SUBAREA E                                                    *
* RATIONAL METHOD - REGIONAL RAINFALL                                   *
* 50-YR EV JUNE 2018 ROKAMOTO                                          *
 ************************************************************************

  FILE NAME: 4E50EVRL.DAT
  TIME/DATE OF STUDY: 09:02 06/26/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  5.516
   2)   10.00;  3.520
   3)   15.00;  2.687
   4)   20.00;  2.242
   5)   25.00;  1.935
   6)   30.00;  1.742
   7)   40.00;  1.473
   8)   50.00;  1.311
   9)   60.00;  1.211
  10)   90.00;  1.008
  11)  120.00;  0.877
  12)  180.00;  0.757
  13)  360.00;  0.563
  14) 1200.00;  0.248
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    485.00  DOWNSTREAM(FEET) =    455.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  5.516
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30      0.900    56    8.00
  COMMERCIAL                 B        0.80      0.30      0.100    56    5.00
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30      0.900    56    8.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.473
  SUBAREA RUNOFF(CFS) =      7.25
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      7.25

**************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    801.10 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  455.00  DOWNSTREAM ELEVATION(FEET) =  451.00
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      13.62
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.65
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.37
  STREET FLOW TRAVEL TIME(MIN.) =   1.39   Tc(MIN.) =    6.39
```

```
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.960
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.10      0.30     0.100    56
 COMMERCIAL                 B        2.10      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.293
 SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =   12.72
 EFFECTIVE AREA(ACRES) =      4.40    AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
 TOTAL AREA(ACRES) =        4.4        PEAK FLOW RATE(CFS) =      19.22

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.84
 FLOW VELOCITY(FEET/SEC.) =  3.53   DEPTH*VELOCITY(FT*FT/SEC.) =   1.63
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    801.10 =     600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    801.10 TO NODE    802.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  451.00  DOWNSTREAM ELEVATION(FEET) =  445.00
 STREET LENGTH(FEET) =   391.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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) =      30.89
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.52
   HALFSTREET FLOOD WIDTH(FEET) =   20.27
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.00
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.10
 STREET FLOW TRAVEL TIME(MIN.) =   1.63   Tc(MIN.) =    8.02
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.309
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.60      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
 COMMERCIAL                 B        3.00      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 COMMERCIAL                 B        1.70      0.30     0.100    56
 RESIDENTIAL
```



```
 ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.205
 SUBAREA AREA(ACRES) =    6.10      SUBAREA RUNOFF(CFS) =   23.32
 EFFECTIVE AREA(ACRES) =     10.50    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.27
 TOTAL AREA(ACRES) =       10.5        PEAK FLOW RATE(CFS) =      39.96

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.56   HALFSTREET FLOOD WIDTH(FEET) =  22.46
 FLOW VELOCITY(FEET/SEC.) =  4.25   DEPTH*VELOCITY(FT*FT/SEC.) =   2.40
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =     991.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    802.00 TO NODE    808.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   445.00  DOWNSTREAM(FEET) =   398.00
 FLOW LENGTH(FEET) =   843.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.87
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      39.96
 PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =    8.81
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    808.00 =    1834.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.81
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.995
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.00      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        4.20      0.30     0.900    56
 COMMERCIAL                 B        5.30      0.30     0.100    56
 COMMERCIAL                 B        7.10      0.30     0.100    56
 COMMERCIAL                 B        8.60      0.30     0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.329
 SUBAREA AREA(ACRES) =   29.40      SUBAREA RUNOFF(CFS) =  103.10
 EFFECTIVE AREA(ACRES) =     39.90   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
 TOTAL AREA(ACRES) =       39.9       PEAK FLOW RATE(CFS) =     140.09

****************************************************************************
 FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==========================================================================
  MAINLINE Tc(MIN.) =    8.81
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.995
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.30      0.30     0.900    56
  COMMERCIAL                 B        5.60      0.30     0.100    56
  COMMERCIAL                 B        8.30      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.196
  SUBAREA AREA(ACRES) =   15.80      SUBAREA RUNOFF(CFS) =   55.97
  EFFECTIVE AREA(ACRES) =     55.70   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.28
  TOTAL AREA(ACRES) =       55.7       PEAK FLOW RATE(CFS) =     196.07

**************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 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.) =    8.81
  RAINFALL INTENSITY(INCH/HR) =   4.00
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.28
  EFFECTIVE STREAM AREA(ACRES) =      55.70
  TOTAL STREAM AREA(ACRES) =      55.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     196.07

**************************************************************************
  FLOW PROCESS FROM NODE    810.00 TO NODE    811.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   307.00
  ELEVATION DATA: UPSTREAM(FEET) =    785.00  DOWNSTREAM(FEET) =    705.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.867
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63    9.13
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66    9.13
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.20      0.30     1.000    63    9.13
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.50      0.30     1.000    66    9.13
```



```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.89
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.89

**************************************************************************
  FLOW PROCESS FROM NODE    811.00 TO NODE    812.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    705.00  DOWNSTREAM(FEET) =    525.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   695.00   CHANNEL SLOPE =  0.2590
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.457
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.10      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.10      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.20      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.84
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.29
  AVERAGE FLOW DEPTH(FEET) =   0.73   TRAVEL TIME(MIN.) =   1.25
  Tc(MIN.) =   10.38
  SUBAREA AREA(ACRES) =     8.40       SUBAREA RUNOFF(CFS) =   23.87
  EFFECTIVE AREA(ACRES) =      9.30     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        9.3         PEAK FLOW RATE(CFS) =      26.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.91   FLOW VELOCITY(FEET/SEC.) =  10.75
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    812.00 =    1002.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    812.00 TO NODE    813.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    460.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1010.00   CHANNEL SLOPE =  0.0644
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.070
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
```

```
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.70      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.20      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.80      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.30      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      44.43
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.25
  AVERAGE FLOW DEPTH(FEET) =   1.43   TRAVEL TIME(MIN.) =   2.32
  Tc(MIN.) =   12.70
  SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   35.90
  EFFECTIVE AREA(ACRES) =     23.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       23.7         PEAK FLOW RATE(CFS) =      59.09

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.59   FLOW VELOCITY(FEET/SEC.) =   7.79
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    813.00 =    2012.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    813.00 TO NODE    813.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.70
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.070
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B       10.40      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   10.40      SUBAREA RUNOFF(CFS) =   25.93
  EFFECTIVE AREA(ACRES) =     34.10   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       34.1       PEAK FLOW RATE(CFS) =      85.02

****************************************************************************
  FLOW PROCESS FROM NODE    813.00 TO NODE    808.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   398.00
  FLOW LENGTH(FEET) =  1046.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.83
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      85.02
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   13.50
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    808.00 =    3058.00 FEET.

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



```
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 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.) =   13.50
  RAINFALL INTENSITY(INCH/HR) =   2.94
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      34.10
  TOTAL STREAM AREA(ACRES) =      34.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      85.02

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      196.07    8.81    3.995  0.30( 0.08) 0.28      55.7     800.00
      2       85.02   13.50    2.937  0.30( 0.30) 1.00      34.1     810.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      273.82    8.81    3.995  0.30( 0.15) 0.49      78.0     800.00
      2      228.06   13.50    2.937  0.30( 0.17) 0.55      89.8     810.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     273.82    Tc(MIN.) =     8.81
  EFFECTIVE AREA(ACRES) =      77.96   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       89.8
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    808.00 =    3058.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    809.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   398.00  DOWNSTREAM(FEET) =   341.00
  FLOW LENGTH(FEET) =   756.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.12
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     273.82
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =    9.20
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    809.00 =    3814.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =    9.20
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.838
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        5.60      0.30     0.200    56
  APARTMENTS                 B       12.30      0.30     0.200    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  COMMERCIAL                 B        5.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.70      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.372
  SUBAREA AREA(ACRES) =   32.70      SUBAREA RUNOFF(CFS) =  109.68
  EFFECTIVE AREA(ACRES) =    110.66   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      122.5       PEAK FLOW RATE(CFS) =     368.78

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.20
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.838
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        9.90      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    9.90      SUBAREA RUNOFF(CFS) =   33.93
  EFFECTIVE AREA(ACRES) =    120.56   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      132.4       PEAK FLOW RATE(CFS) =     402.71

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 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.) =    9.20
  RAINFALL INTENSITY(INCH/HR) =   3.84
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =     120.56
  TOTAL STREAM AREA(ACRES) =     132.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     402.71

****************************************************************************
  FLOW PROCESS FROM NODE    818.00 TO NODE    819.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```



```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   323.00
  ELEVATION DATA: UPSTREAM(FEET) =    625.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.864
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.973
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63    8.86
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66    8.86
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.60      0.30     1.000    63    8.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.31
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      3.31

****************************************************************************
  FLOW PROCESS FROM NODE    819.00 TO NODE    820.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    517.00  DOWNSTREAM(FEET) =    395.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1167.00   CHANNEL SLOPE =  0.1045
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.223
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.80      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.40      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.20      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.845
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     15.01
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.66
  AVERAGE FLOW DEPTH(FEET) =   0.87   TRAVEL TIME(MIN.) =   2.92
  Tc(MIN.) =   11.79
  SUBAREA AREA(ACRES) =     8.70      SUBAREA RUNOFF(CFS) =   23.25
  EFFECTIVE AREA(ACRES) =     9.70     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.86
  TOTAL AREA(ACRES) =      9.7         PEAK FLOW RATE(CFS) =     25.88

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  1.06   FLOW VELOCITY(FEET/SEC.) =   7.63
  LONGEST FLOWPATH FROM NODE    818.00 TO NODE    820.00 =    1490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.79
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.223
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.00      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        7.10      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   11.10      SUBAREA RUNOFF(CFS) =   29.20
  EFFECTIVE AREA(ACRES) =     20.80   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =       20.8       PEAK FLOW RATE(CFS) =      55.08

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.79
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.223
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.40      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.80      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.60      0.30     1.000    63
  COMMERCIAL                 B        1.00      0.30     0.100    56
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.50      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.913
  SUBAREA AREA(ACRES) =   10.40      SUBAREA RUNOFF(CFS) =   27.60
  EFFECTIVE AREA(ACRES) =     31.20   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.93
  TOTAL AREA(ACRES) =       31.2       PEAK FLOW RATE(CFS) =      82.67

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.79
```



```
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.223
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        4.60      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.60      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.997
  SUBAREA AREA(ACRES) =    7.40      SUBAREA RUNOFF(CFS) =   19.47
  EFFECTIVE AREA(ACRES) =     38.60   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =       38.6       PEAK FLOW RATE(CFS) =     102.14

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    817.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   340.00
  FLOW LENGTH(FEET) =  1232.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.33
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     102.14
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =   12.80
  LONGEST FLOWPATH FROM NODE    818.00 TO NODE    817.00 =    2722.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    817.00 TO NODE    817.00 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.) =   12.80
  RAINFALL INTENSITY(INCH/HR) =   3.05
  AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.94
  EFFECTIVE STREAM AREA(ACRES) =      38.60
  TOTAL STREAM AREA(ACRES) =      38.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     102.14

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      402.71    9.20    3.838  0.30( 0.13) 0.42     120.6     800.00
      1      324.89   13.91    2.869  0.30( 0.14) 0.47     132.4     810.00
      2      102.14   12.80    3.054  0.30( 0.28) 0.94      38.6     818.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	496.95	9.20	3.838	0.30(0.16)	0.52	148.3	800.00
2	445.44	12.80	3.054	0.30(0.17)	0.57	168.2	818.00
3	420.20	13.91	2.869	0.30(0.17)	0.58	171.0	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 496.95 Tc(MIN.) = 9.20
EFFECTIVE AREA(ACRES) = 148.32 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 171.0
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 817.00 = 3814.00 FEET.

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 171.0 TC(MIN.) = 9.20
EFFECTIVE AREA(ACRES) = 148.32 AREA-AVERAGED Fm(INCH/HR)= 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.520
PEAK FLOW RATE(CFS) = 496.95

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	496.95	9.20	3.838	0.30(0.16)	0.52	148.3	800.00
2	445.44	12.80	3.054	0.30(0.17)	0.57	168.2	818.00
3	420.20	13.91	2.869	0.30(0.17)	0.58	171.0	810.00

==========

==========

END OF RATIONAL METHOD ANALYSIS

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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                                  92707

 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA E                                                    *
* RATIONAL METHOD - REGIONAL RAINFALL                                   *
* 100-YR EV JUNE 2018 ROKAMOTO                                         *
 ************************************************************************

  FILE NAME: 4E00EVRL.DAT
  TIME/DATE OF STUDY: 11:31 06/26/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  6.102
   2)   10.00;  3.901
   3)   15.00;  3.005
   4)   20.00;  2.465
   5)   25.00;  2.129
   6)   30.00;  1.900
   7)   40.00;  1.644
   8)   50.00;  1.419
   9)   60.00;  1.320
  10)   90.00;  1.119
  11)  120.00;  0.983
  12)  180.00;  0.826
  13)  360.00;  0.617
  14) 1200.00;  0.271
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    485.00  DOWNSTREAM(FEET) =    455.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.102
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56    8.00
  COMMERCIAL                 B        0.80      0.30     0.100    56    5.00
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56    8.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.473
  SUBAREA RUNOFF(CFS) =      8.05
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      8.05

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    801.10 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  455.00  DOWNSTREAM ELEVATION(FEET) =  451.00
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  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) =      15.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.45
  STREET FLOW TRAVEL TIME(MIN.) =   1.36   Tc(MIN.) =    6.36
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.505
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.10      0.30     0.100    56
 COMMERCIAL                 B        2.10      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.293
 SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =   14.14
 EFFECTIVE AREA(ACRES) =      4.40    AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
 TOTAL AREA(ACRES) =        4.4        PEAK FLOW RATE(CFS) =      21.38

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.62
 FLOW VELOCITY(FEET/SEC.) =  3.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.72
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    801.10 =     600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    801.10 TO NODE    802.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  451.00  DOWNSTREAM ELEVATION(FEET) =  445.00
 STREET LENGTH(FEET) =   391.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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) =      34.43
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.54
   HALFSTREET FLOOD WIDTH(FEET) =   21.21
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.09
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.21
 STREET FLOW TRAVEL TIME(MIN.) =   1.59   Tc(MIN.) =    7.95
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.804
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.60      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
 COMMERCIAL                 B        3.00      0.30     0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 COMMERCIAL                 B        1.70      0.30     0.100    56
 RESIDENTIAL
```



```
 ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.205
 SUBAREA AREA(ACRES) =    6.10      SUBAREA RUNOFF(CFS) =   26.03
 EFFECTIVE AREA(ACRES) =     10.50    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.27
 TOTAL AREA(ACRES) =       10.5        PEAK FLOW RATE(CFS) =      44.64

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.58   HALFSTREET FLOOD WIDTH(FEET) =  23.48
 FLOW VELOCITY(FEET/SEC.) =  4.36   DEPTH*VELOCITY(FT*FT/SEC.) =   2.54
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =     991.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    802.00 TO NODE    808.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   445.00  DOWNSTREAM(FEET) =   398.00
 FLOW LENGTH(FEET) =   843.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.20
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      44.64
 PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =    8.72
 LONGEST FLOWPATH FROM NODE    800.00 TO NODE    808.00 =    1834.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.72
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.464
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.00      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        4.20      0.30     0.900    56
 COMMERCIAL                 B        5.30      0.30     0.100    56
 COMMERCIAL                 B        7.10      0.30     0.100    56
 COMMERCIAL                 B        8.60      0.30     0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.329
 SUBAREA AREA(ACRES) =   29.40      SUBAREA RUNOFF(CFS) =  115.50
 EFFECTIVE AREA(ACRES) =     39.90   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
 TOTAL AREA(ACRES) =       39.9       PEAK FLOW RATE(CFS) =     156.93

****************************************************************************
 FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
  MAINLINE Tc(MIN.) =    8.72
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.464
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.60      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.30      0.30     0.900    56
  COMMERCIAL                 B        5.60      0.30     0.100    56
  COMMERCIAL                 B        8.30      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.196
  SUBAREA AREA(ACRES) =   15.80      SUBAREA RUNOFF(CFS) =   62.64
  EFFECTIVE AREA(ACRES) =     55.70   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.28
  TOTAL AREA(ACRES) =       55.7       PEAK FLOW RATE(CFS) =     219.57

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 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.) =    8.72
  RAINFALL INTENSITY(INCH/HR) =   4.46
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.28
  EFFECTIVE STREAM AREA(ACRES) =      55.70
  TOTAL STREAM AREA(ACRES) =      55.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     219.57

****************************************************************************
  FLOW PROCESS FROM NODE    810.00 TO NODE    811.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   307.00
  ELEVATION DATA: UPSTREAM(FEET) =    785.00  DOWNSTREAM(FEET) =    705.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.284
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63    9.13
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66    9.13
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.20      0.30     1.000    63    9.13
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.50      0.30     1.000    66    9.13
```



```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.23
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      3.23

****************************************************************************
  FLOW PROCESS FROM NODE    811.00 TO NODE    812.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    705.00  DOWNSTREAM(FEET) =    525.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   695.00   CHANNEL SLOPE =  0.2590
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.841
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.10      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.10      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.20      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.59
  AVERAGE FLOW DEPTH(FEET) =   0.76   TRAVEL TIME(MIN.) =   1.21
  Tc(MIN.) =   10.34
  SUBAREA AREA(ACRES) =     8.40       SUBAREA RUNOFF(CFS) =   26.77
  EFFECTIVE AREA(ACRES) =      9.30     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        9.3         PEAK FLOW RATE(CFS) =      29.63

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.94   FLOW VELOCITY(FEET/SEC.) =  11.10
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    812.00 =    1002.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    812.00 TO NODE    813.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    460.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1010.00   CHANNEL SLOPE =  0.0644
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.437
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
```

```
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.70      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.20      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.80      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.30      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      50.00
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.48
  AVERAGE FLOW DEPTH(FEET) =   1.49   TRAVEL TIME(MIN.) =   2.25
  Tc(MIN.) =   12.59
  SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   40.66
  EFFECTIVE AREA(ACRES) =     23.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       23.7         PEAK FLOW RATE(CFS) =      66.92

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.67   FLOW VELOCITY(FEET/SEC.) =   8.04
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    813.00 =    2012.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    813.00 TO NODE    813.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.59
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.437
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B       10.40      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   10.40      SUBAREA RUNOFF(CFS) =   29.37
  EFFECTIVE AREA(ACRES) =     34.10   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       34.1       PEAK FLOW RATE(CFS) =      96.29

****************************************************************************
  FLOW PROCESS FROM NODE    813.00 TO NODE    808.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.00  DOWNSTREAM(FEET) =   398.00
  FLOW LENGTH(FEET) =  1046.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.79
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      96.29
  PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =   13.35
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    808.00 =    3058.00 FEET.

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



```
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 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.) =   13.35
  RAINFALL INTENSITY(INCH/HR) =   3.30
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      34.10
  TOTAL STREAM AREA(ACRES) =      34.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      96.29

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      219.57    8.72    4.464  0.30( 0.08) 0.28      55.7     800.00
      2       96.29   13.35    3.300  0.30( 0.30) 1.00      34.1     810.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      306.85    8.72    4.464  0.30( 0.15) 0.49      78.0     800.00
      2      257.52   13.35    3.300  0.30( 0.17) 0.55      89.8     810.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     306.85    Tc(MIN.) =     8.72
  EFFECTIVE AREA(ACRES) =      77.97   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       89.8
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    808.00 =    3058.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    809.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   398.00  DOWNSTREAM(FEET) =   341.00
  FLOW LENGTH(FEET) =   756.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  35.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.50
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     306.85
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =    9.11
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    809.00 =    3814.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =    9.11
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.293
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        5.60      0.30     0.200    56
  APARTMENTS                 B       12.30      0.30     0.200    56
  COMMERCIAL                 B        0.50      0.30     0.100    56
  COMMERCIAL                 B        5.40      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.70      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.372
  SUBAREA AREA(ACRES) =   32.70      SUBAREA RUNOFF(CFS) =  123.06
  EFFECTIVE AREA(ACRES) =    110.67   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      122.5       PEAK FLOW RATE(CFS) =     414.12

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.11
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.293
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        9.90      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    9.90      SUBAREA RUNOFF(CFS) =   37.98
  EFFECTIVE AREA(ACRES) =    120.57   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      132.4       PEAK FLOW RATE(CFS) =     452.10

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 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.) =    9.11
  RAINFALL INTENSITY(INCH/HR) =   4.29
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =     120.57
  TOTAL STREAM AREA(ACRES) =     132.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     452.10

****************************************************************************
  FLOW PROCESS FROM NODE    818.00 TO NODE    819.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```



```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   323.00
  ELEVATION DATA: UPSTREAM(FEET) =    625.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.864
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.401
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63    8.86
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66    8.86
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.60      0.30     1.000    63    8.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.69
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      3.69

****************************************************************************
  FLOW PROCESS FROM NODE    819.00 TO NODE    820.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    517.00  DOWNSTREAM(FEET) =    395.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1167.00   CHANNEL SLOPE =  0.1045
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  20.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.596
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.80      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.40      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.20      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.845
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     16.84
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.85
  AVERAGE FLOW DEPTH(FEET) =   0.91   TRAVEL TIME(MIN.) =   2.84
  Tc(MIN.) =   11.70
  SUBAREA AREA(ACRES) =     8.70      SUBAREA RUNOFF(CFS) =   26.17
  EFFECTIVE AREA(ACRES) =     9.70     AREA-AVERAGED Fm(INCH/HR) =   0.26
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.86
  TOTAL AREA(ACRES) =       9.7         PEAK FLOW RATE(CFS) =      29.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  1.11   FLOW VELOCITY(FEET/SEC.) =   7.87
  LONGEST FLOWPATH FROM NODE    818.00 TO NODE    820.00 =    1490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.70
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.596
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.00      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        7.10      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   11.10      SUBAREA RUNOFF(CFS) =   32.93
  EFFECTIVE AREA(ACRES) =     20.80   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =       20.8       PEAK FLOW RATE(CFS) =      62.06

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.70
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.596
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.40      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.80      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.60      0.30     1.000    63
  COMMERCIAL                 B        1.00      0.30     0.100    56
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.50      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.913
  SUBAREA AREA(ACRES) =   10.40      SUBAREA RUNOFF(CFS) =   31.09
  EFFECTIVE AREA(ACRES) =     31.20   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.93
  TOTAL AREA(ACRES) =       31.2       PEAK FLOW RATE(CFS) =      93.16

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.70
```



```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.596
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        4.60      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.60      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.997
  SUBAREA AREA(ACRES) =    7.40      SUBAREA RUNOFF(CFS) =   21.96
  EFFECTIVE AREA(ACRES) =     38.60   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =       38.6       PEAK FLOW RATE(CFS) =     115.11

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    817.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   340.00
  FLOW LENGTH(FEET) =  1232.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.27
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     115.11
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =   12.67
  LONGEST FLOWPATH FROM NODE    818.00 TO NODE    817.00 =    2722.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    817.00 TO NODE    817.00 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.) =   12.67
  RAINFALL INTENSITY(INCH/HR) =   3.42
  AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.94
  EFFECTIVE STREAM AREA(ACRES) =      38.60
  TOTAL STREAM AREA(ACRES) =      38.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     115.11

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      452.10    9.11    4.293  0.30( 0.13) 0.42     120.6     800.00
      1      367.62   13.76    3.228  0.30( 0.14) 0.47     132.4     810.00
      2      115.11   12.67    3.423  0.30( 0.28) 0.94      38.6     818.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	557.82	9.11	4.293	0.30(0.16)	0.52	148.3	800.00
2	502.56	12.67	3.423	0.30(0.17)	0.57	168.2	818.00
3	475.57	13.76	3.228	0.30(0.17)	0.58	171.0	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 557.82 Tc(MIN.) = 9.11
EFFECTIVE AREA(ACRES) = 148.33 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 171.0
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 817.00 = 3814.00 FEET.

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 171.0 TC(MIN.) = 9.11
EFFECTIVE AREA(ACRES) = 148.33 AREA-AVERAGED Fm(INCH/HR)= 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.520
PEAK FLOW RATE(CFS) = 557.82

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	557.82	9.11	4.293	0.30(0.16)	0.52	148.3	800.00
2	502.56	12.67	3.423	0.30(0.17)	0.57	168.2	818.00
3	475.57	13.76	3.228	0.30(0.17)	0.58	171.0	810.00

==========
==========

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                        Analysis prepared by:

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 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-4 SUBAREA F                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 2-YR EV AUG 2018 CCHIU                                               *
 **********************************************************************

  FILE NAME: 4F02EVRL.DAT
  TIME/DATE OF STUDY: 07:18 08/08/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  1.873
   2)   10.00;  1.249
   3)   15.00;  0.951
   4)   20.00;  0.777
   5)   25.00;  0.669
   6)   30.00;  0.593
   7)   40.00;  0.511
   8)   50.00;  0.454
   9)   60.00;  0.400
  10)   90.00;  0.346
  11)  120.00;  0.290
  12)  180.00;  0.236
  13)  360.00;  0.180
  14) 1200.00;  0.084
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =    496.00  DOWNSTREAM(FEET) =    485.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.762
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.025
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       -        0.70      0.60     1.000    56   13.76
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        0.50      0.60     1.000    56   13.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.46
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      0.46

**************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   459.00
  FLOW LENGTH(FEET) =  1090.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.89
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.46
  PIPE TRAVEL TIME(MIN.) =   4.67    Tc(MIN.) =   18.44
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =    1404.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 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.) =   18.44
  RAINFALL INTENSITY(INCH/HR) =   0.83
  AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60
```

```
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       1.20
  TOTAL STREAM AREA(ACRES) =       1.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.46

****************************************************************************
  FLOW PROCESS FROM NODE    910.00 TO NODE    911.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =    785.00  DOWNSTREAM(FEET) =    612.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.142
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.481
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      -        0.10      0.60     1.000    56    8.14
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      -        0.50      0.60     1.000    56    8.14
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        1.00      0.60     1.000    56    8.14
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.27
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      1.27

****************************************************************************
  FLOW PROCESS FROM NODE    911.00 TO NODE    912.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    612.00  DOWNSTREAM(FEET) =    525.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   458.00   CHANNEL SLOPE =  0.1900
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.307
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.00      0.60     1.000     -
  USER-DEFINED               -        0.60      0.60     1.000     -
  USER-DEFINED               -        2.30      0.60     1.000     -
  USER-DEFINED               -        1.00      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.84
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.49
  AVERAGE FLOW DEPTH(FEET) =   0.41   TRAVEL TIME(MIN.) =   1.39
  Tc(MIN.) =    9.53
  SUBAREA AREA(ACRES) =     4.90       SUBAREA RUNOFF(CFS) =    3.12
  EFFECTIVE AREA(ACRES) =      6.50     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
```



```
  TOTAL AREA(ACRES) =        6.5         PEAK FLOW RATE(CFS) =       4.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =   6.04
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    912.00 =     786.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    912.00 TO NODE    913.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    470.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   618.00   CHANNEL SLOPE =  0.0890
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.164
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     1.000     -
  USER-DEFINED               -        4.60      0.60     1.000     -
  USER-DEFINED               -        4.00      0.60     1.000     -
  USER-DEFINED               -        0.60      0.60     1.000     -
  USER-DEFINED               -        2.70      0.60     1.000     -
  USER-DEFINED               -        5.10      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.44
  AVERAGE FLOW DEPTH(FEET) =   0.72   TRAVEL TIME(MIN.) =   1.89
  Tc(MIN.) =   11.43
  SUBAREA AREA(ACRES) =    17.10       SUBAREA RUNOFF(CFS) =    8.68
  EFFECTIVE AREA(ACRES) =     23.60     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       23.6         PEAK FLOW RATE(CFS) =      11.98

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.82   FLOW VELOCITY(FEET/SEC.) =   5.92
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    913.00 =    1404.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    913.00 TO NODE    902.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   459.00
  FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.56
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.98
  PIPE TRAVEL TIME(MIN.) =   1.96    Tc(MIN.) =   13.39
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    902.00 =    2294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 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.) =   13.39
  RAINFALL INTENSITY(INCH/HR) =   1.05
  AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      23.60
  TOTAL STREAM AREA(ACRES) =      23.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.98

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        0.46   18.44    0.831  0.60( 0.60) 1.00       1.2     900.00
      2       11.98   13.39    1.047  0.60( 0.60) 1.00      23.6     910.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.44   13.39    1.047  0.60( 0.60) 1.00      24.5     910.00
      2        6.66   18.44    0.831  0.60( 0.60) 1.00      24.8     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.44    Tc(MIN.) =    13.39
  EFFECTIVE AREA(ACRES) =      24.47   AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       24.8
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    902.00 =    2294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.39
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.047
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.60     1.000     -
  USER-DEFINED               -        5.50      0.60     0.100     -
  USER-DEFINED               -        0.20      0.60     1.000     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  USER-DEFINED               -        0.10      0.60     1.000     -
  USER-DEFINED               -        1.00      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.175
  SUBAREA AREA(ACRES) =     7.10      SUBAREA RUNOFF(CFS) =     6.02
  EFFECTIVE AREA(ACRES) =     31.57   AREA-AVERAGED Fm(INCH/HR) =  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.81
```



```
  TOTAL AREA(ACRES) =       31.9       PEAK FLOW RATE(CFS) =      15.87

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.39
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.047
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.60     1.000     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  USER-DEFINED               -        3.20      0.60     1.000     -
  USER-DEFINED               -        3.40      0.60     0.100     -
  USER-DEFINED               -        3.30      0.60     1.000     -
  USER-DEFINED               -        0.70      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.712
  SUBAREA AREA(ACRES) =   10.90      SUBAREA RUNOFF(CFS) =     6.08
  EFFECTIVE AREA(ACRES) =     42.47   AREA-AVERAGED Fm(INCH/HR) =  0.47
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =       42.8       PEAK FLOW RATE(CFS) =      21.95

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   459.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =   654.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.95
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =   14.14
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    903.00 =    2948.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.14
  RAINFALL INTENSITY(INCH/HR) =   1.00
  AREA-AVERAGED Fm(INCH/HR) =  0.47
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.79
  EFFECTIVE STREAM AREA(ACRES) =      42.47
  TOTAL STREAM AREA(ACRES) =      42.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.95

****************************************************************************
  FLOW PROCESS FROM NODE    920.00 TO NODE    921.00 IS CODE =  21
```

```
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   286.00
  ELEVATION DATA: UPSTREAM(FEET) =    860.00  DOWNSTREAM(FEET) =    712.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.737
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.531
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        0.20      0.60     1.000    56    7.74
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        0.70      0.60     1.000    56    7.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.75
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      0.75

******************************************************************************
  FLOW PROCESS FROM NODE    921.00 TO NODE    922.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    712.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   594.00   CHANNEL SLOPE =  0.1886
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.338
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.20      0.60     1.000     -
  USER-DEFINED                -        1.00      0.60     1.000     -
  USER-DEFINED                -        1.40      0.60     1.000     -
  USER-DEFINED                -        4.40      0.60     1.000     -
  USER-DEFINED                -        6.70      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.37
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.38
  AVERAGE FLOW DEPTH(FEET) =   0.53   TRAVEL TIME(MIN.) =   1.55
  Tc(MIN.) =    9.29
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =    9.10
  EFFECTIVE AREA(ACRES) =     14.60     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       14.6         PEAK FLOW RATE(CFS) =       9.70

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.66   FLOW VELOCITY(FEET/SEC.) =   7.44
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    922.00 =     880.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    922.00 TO NODE    923.00 IS CODE =  51
```



```
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    600.00  DOWNSTREAM(FEET) =    550.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   604.00   CHANNEL SLOPE =  0.0828
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.186
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.70      0.60     1.000     -
  USER-DEFINED                -        1.40      0.60     1.000     -
  USER-DEFINED                -        5.40      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.70
  AVERAGE FLOW DEPTH(FEET) =   0.83   TRAVEL TIME(MIN.) =   1.77
  Tc(MIN.) =   11.05
  SUBAREA AREA(ACRES) =     7.50       SUBAREA RUNOFF(CFS) =    3.96
  EFFECTIVE AREA(ACRES) =     22.10     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       22.1         PEAK FLOW RATE(CFS) =      11.66

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.83   FLOW VELOCITY(FEET/SEC.) =   5.69
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    923.00 =    1484.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    923.00 TO NODE    924.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    550.00  DOWNSTREAM(FEET) =    495.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   849.00   CHANNEL SLOPE =  0.0648
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.034
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.60      0.60     1.000     -
  USER-DEFINED                -        0.80      0.60     1.000     -
  USER-DEFINED                -        0.80      0.60     1.000     -
  USER-DEFINED                -        1.10      0.60     1.000     -
  USER-DEFINED                -        5.20      0.60     1.000     -
  USER-DEFINED                -        6.30      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.54
  AVERAGE FLOW DEPTH(FEET) =   0.94   TRAVEL TIME(MIN.) =   2.55
  Tc(MIN.) =   13.61
  SUBAREA AREA(ACRES) =    14.80       SUBAREA RUNOFF(CFS) =    5.78
  EFFECTIVE AREA(ACRES) =     36.90     AREA-AVERAGED Fm(INCH/HR) =   0.60
```

```
 AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       36.9         PEAK FLOW RATE(CFS) =      14.42

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.94   FLOW VELOCITY(FEET/SEC.) =   5.49
 LONGEST FLOWPATH FROM NODE    920.00 TO NODE    924.00 =    2333.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    924.00 TO NODE    924.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.61
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.034
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -       9.70      0.60     1.000     -
 USER-DEFINED               -      17.00      0.60     1.000     -
 USER-DEFINED               -      36.60      0.60     1.000     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =   63.30      SUBAREA RUNOFF(CFS) =   24.73
 EFFECTIVE AREA(ACRES) =    100.20   AREA-AVERAGED Fm(INCH/HR) =  0.60
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =      100.2       PEAK FLOW RATE(CFS) =      39.15

****************************************************************************
 FLOW PROCESS FROM NODE    924.00 TO NODE    925.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    457.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   607.00   CHANNEL SLOPE =  0.0626
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.949
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -       0.10      0.60     1.000     -
 USER-DEFINED               -       0.30      0.60     1.000     -
 USER-DEFINED               -       0.60      0.60     1.000     -
 USER-DEFINED               -       0.70      0.60     1.000     -
 USER-DEFINED               -       0.90      0.60     1.000     -
 USER-DEFINED               -       0.90      0.60     1.000     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      39.70
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.99
 AVERAGE FLOW DEPTH(FEET) =   1.38   TRAVEL TIME(MIN.) =   1.45
 Tc(MIN.) =   15.05
 SUBAREA AREA(ACRES) =     3.50       SUBAREA RUNOFF(CFS) =    1.10
 EFFECTIVE AREA(ACRES) =    103.70     AREA-AVERAGED Fm(INCH/HR) =   0.60
 AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =      103.7         PEAK FLOW RATE(CFS) =      39.15
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```



```
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.37   FLOW VELOCITY(FEET/SEC.) =   6.97
 LONGEST FLOWPATH FROM NODE    920.00 TO NODE    925.00 =    2940.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    925.00 TO NODE    925.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.05
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.949
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -       3.80      0.60     1.000     -
 USER-DEFINED               -       4.20      0.60     1.000     -
 USER-DEFINED               -       5.10      0.60     1.000     -
 USER-DEFINED               -       7.00      0.60     1.000     -
 USER-DEFINED               -      12.00      0.60     1.000     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =   32.10      SUBAREA RUNOFF(CFS) =   10.09
 EFFECTIVE AREA(ACRES) =    135.80   AREA-AVERAGED Fm(INCH/HR) =  0.60
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =      135.8       PEAK FLOW RATE(CFS) =      42.68

****************************************************************************
 FLOW PROCESS FROM NODE    925.00 TO NODE    926.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    440.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   884.00   CHANNEL SLOPE =  0.0192
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.838
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -       0.50      0.60     1.000     -
 USER-DEFINED               -       0.70      0.60     1.000     -
 USER-DEFINED               -       2.30      0.60     1.000     -
 USER-DEFINED               -       2.40      0.60     1.000     -
 USER-DEFINED               -       2.50      0.60     1.000     -
 USER-DEFINED               -       3.20      0.60     1.000     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      43.93
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.61
 AVERAGE FLOW DEPTH(FEET) =   1.78   TRAVEL TIME(MIN.) =   3.20
 Tc(MIN.) =   18.25
 SUBAREA AREA(ACRES) =    11.60       SUBAREA RUNOFF(CFS) =    2.48
 EFFECTIVE AREA(ACRES) =    147.40     AREA-AVERAGED Fm(INCH/HR) =   0.60
 AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =      147.4         PEAK FLOW RATE(CFS) =      42.68
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.77   FLOW VELOCITY(FEET/SEC.) =   4.57
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    926.00 =    3824.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    926.00 TO NODE    926.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.25
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.838
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        7.40      0.60     1.000     -
  USER-DEFINED                -       12.40      0.60     1.000     -
  USER-DEFINED                -       28.20      0.60     1.000     -
  USER-DEFINED                -       31.40      0.60     1.000     -
  USER-DEFINED                -       42.40      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =  121.80      SUBAREA RUNOFF(CFS) =   26.09
  EFFECTIVE AREA(ACRES) =    269.20   AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      269.2       PEAK FLOW RATE(CFS) =      57.66

****************************************************************************
  FLOW PROCESS FROM NODE    926.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =  1341.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.34
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.66
  PIPE TRAVEL TIME(MIN.) =   2.16    Tc(MIN.) =   20.41
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    903.00 =    5165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   20.41
  RAINFALL INTENSITY(INCH/HR) =   0.77
  AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =     269.20
  TOTAL STREAM AREA(ACRES) =     269.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      57.66
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    930.00 TO NODE    931.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    715.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.954
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.504
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       -        0.60      0.60     1.000    56    7.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.49
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      0.49

****************************************************************************
  FLOW PROCESS FROM NODE    931.00 TO NODE    932.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    517.00  DOWNSTREAM(FEET) =    430.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   443.00   CHANNEL SLOPE =  0.1964
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.330
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.10      0.60     0.900     -
  USER-DEFINED                -        0.40      0.60     0.100     -
  USER-DEFINED                -        0.30      0.60     1.000     -
  USER-DEFINED                -        4.30      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.927
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.27
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.28
  AVERAGE FLOW DEPTH(FEET) =   0.38   TRAVEL TIME(MIN.) =   1.40
  Tc(MIN.) =    9.35
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =    3.55
  EFFECTIVE AREA(ACRES) =      5.70     AREA-AVERAGED Fm(INCH/HR) =   0.56
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   0.94
  TOTAL AREA(ACRES) =        5.7         PEAK FLOW RATE(CFS) =       3.94

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.47   FLOW VELOCITY(FEET/SEC.) =   6.00
  LONGEST FLOWPATH FROM NODE    930.00 TO NODE    932.00 =     773.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    932.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =   254.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.27
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.94
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =   10.03
  LONGEST FLOWPATH FROM NODE    930.00 TO NODE    903.00 =    1027.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.03
  RAINFALL INTENSITY(INCH/HR) =   1.25
  AREA-AVERAGED Fm(INCH/HR) =  0.56
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.94
  EFFECTIVE STREAM AREA(ACRES) =       5.70
  TOTAL STREAM AREA(ACRES) =       5.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.94

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.95   14.14    1.002  0.60( 0.47) 0.79      42.5     910.00
      1       13.78   19.25    0.803  0.60( 0.47) 0.79      42.8     900.00
      2       57.66   20.41    0.768  0.60( 0.60) 1.00     269.2     920.00
      3        3.94   10.03    1.247  0.60( 0.56) 0.94       5.7     930.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       83.55   10.03    1.247  0.60( 0.58) 0.96     168.1     930.00
      2       82.14   14.14    1.002  0.60( 0.58) 0.96     234.7     910.00
      3       72.83   19.25    0.803  0.60( 0.58) 0.97     302.4     900.00
      4       71.17   20.41    0.768  0.60( 0.58) 0.97     317.7     920.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      83.55    Tc(MIN.) =    10.03
  EFFECTIVE AREA(ACRES) =     168.05   AREA-AVERAGED Fm(INCH/HR) =  0.58
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.96
  TOTAL AREA(ACRES) =      317.7
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    903.00 =    5165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.03
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.247
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.50      0.60      0.900     -
  USER-DEFINED               -        2.10      0.60      0.900     -
  USER-DEFINED               -        3.00      0.60      0.900     -
  USER-DEFINED               -        5.90      0.60      0.100     -
  USER-DEFINED               -        7.70      0.60      0.100     -
  USER-DEFINED               -       13.60      0.60      0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.237
  SUBAREA AREA(ACRES) =   32.80      SUBAREA RUNOFF(CFS) =   32.63
  EFFECTIVE AREA(ACRES) =    200.85   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.84
  TOTAL AREA(ACRES) =      350.5       PEAK FLOW RATE(CFS) =     134.21

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    904.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   426.00  DOWNSTREAM(FEET) =   370.00
  FLOW LENGTH(FEET) =   896.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.11
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     134.21
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   10.62
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    904.00 =    6061.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    904.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.62
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.212
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.80      0.60      0.100     -
  USER-DEFINED               -        0.60      0.60      0.100     -
  USER-DEFINED               -        0.10      0.60      1.000     -
  USER-DEFINED               -        2.40      0.60      0.900     -
  USER-DEFINED               -        2.20      0.60      0.900     -
  USER-DEFINED               -        0.30      0.60      0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
  SUBAREA AREA(ACRES) =    9.40      SUBAREA RUNOFF(CFS) =    7.58
  EFFECTIVE AREA(ACRES) =    210.25   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.83
  TOTAL AREA(ACRES) =      359.9       PEAK FLOW RATE(CFS) =     135.38
```

```
****************************************************************************
  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) =   370.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =   872.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.86
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     135.38
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =   11.29
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    905.00 =    6933.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.29
  RAINFALL INTENSITY(INCH/HR) =   1.17
  AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.83
  EFFECTIVE STREAM AREA(ACRES) =     210.25
  TOTAL STREAM AREA(ACRES) =     359.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     135.38

****************************************************************************
  FLOW PROCESS FROM NODE    940.00 TO NODE    941.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   304.00
  ELEVATION DATA: UPSTREAM(FEET) =    858.00  DOWNSTREAM(FEET) =    675.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.692
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.537
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      -        0.10      0.60     1.000    56    7.69
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        1.10      0.60     1.000    56    7.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.01
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      1.01

****************************************************************************
  FLOW PROCESS FROM NODE    941.00 TO NODE    942.00 IS CODE =  51
```



```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    405.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1008.00   CHANNEL SLOPE =  0.2679
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.264
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     1.000     -
  USER-DEFINED               -        0.80      0.60     1.000     -
  USER-DEFINED               -        1.10      0.60     1.000     -
  USER-DEFINED               -        1.50      0.60     1.000     -
  USER-DEFINED               -        3.60      0.60     1.000     -
  USER-DEFINED               -       10.20      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.31
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.67
  AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   2.19
  Tc(MIN.) =    9.88
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   10.34
  EFFECTIVE AREA(ACRES) =     18.50     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       18.5          PEAK FLOW RATE(CFS) =      11.05

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.65   FLOW VELOCITY(FEET/SEC.) =   8.84
  LONGEST FLOWPATH FROM NODE    940.00 TO NODE    942.00 =    1312.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    942.00 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) =   405.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1041.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.05
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =   11.09
  LONGEST FLOWPATH FROM NODE    940.00 TO NODE    905.00 =    2353.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.09
  RAINFALL INTENSITY(INCH/HR) =   1.18
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      18.50
  TOTAL STREAM AREA(ACRES) =      18.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.05

****************************************************************************
  FLOW PROCESS FROM NODE    950.00 TO NODE    951.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =   1053.00  DOWNSTREAM(FEET) =    990.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.965
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.253
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        0.40      0.60     1.000    56    9.96
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        1.00      0.60     1.000    56    9.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.82
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      0.82

****************************************************************************
  FLOW PROCESS FROM NODE    951.00 TO NODE    952.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    990.00  DOWNSTREAM(FEET) =    950.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   439.00   CHANNEL SLOPE =  0.0911
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.124
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.10      0.60     1.000     -
  USER-DEFINED                -        0.40      0.60     1.000     -
  USER-DEFINED                -        0.60      0.60     1.000     -
  USER-DEFINED                -        0.70      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.25
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.44
  AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   2.13
  Tc(MIN.) =   12.09
  SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    0.85
  EFFECTIVE AREA(ACRES) =      3.20     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
```



```
  TOTAL AREA(ACRES) =        3.2         PEAK FLOW RATE(CFS) =       1.51

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   3.55
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    952.00 =     767.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    952.00 TO NODE    953.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    950.00  DOWNSTREAM(FEET) =    675.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   810.00   CHANNEL SLOPE =  0.3395
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.018
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.60      0.60     1.000     -
  USER-DEFINED                -        1.50      0.60     1.000     -
  USER-DEFINED                -        1.70      0.60     1.000     -
  USER-DEFINED                -        3.40      0.60     1.000     -
  USER-DEFINED                -        7.20      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.25
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.59
  AVERAGE FLOW DEPTH(FEET) =   0.43   TRAVEL TIME(MIN.) =   1.78
  Tc(MIN.) =   13.87
  SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =    5.42
  EFFECTIVE AREA(ACRES) =     17.60     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       17.6         PEAK FLOW RATE(CFS) =       6.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.51   FLOW VELOCITY(FEET/SEC.) =   8.36
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    953.00 =    1577.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    953.00 TO NODE    954.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    475.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   955.00   CHANNEL SLOPE =  0.2094
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.920
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.10      0.60     1.000     -
  USER-DEFINED                -        0.10      0.60     1.000     -
  USER-DEFINED                -        0.60      0.60     1.000     -
  USER-DEFINED                -        2.10      0.60     1.000     -
```

```
  USER-DEFINED               -        8.90      0.60     1.000     -
  USER-DEFINED               -       14.80      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.48
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.86
  AVERAGE FLOW DEPTH(FEET) =   0.67   TRAVEL TIME(MIN.) =   2.02
  Tc(MIN.) =   15.90
  SUBAREA AREA(ACRES) =    26.60       SUBAREA RUNOFF(CFS) =    7.66
  EFFECTIVE AREA(ACRES) =     44.20     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       44.2         PEAK FLOW RATE(CFS) =      12.72

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.71   FLOW VELOCITY(FEET/SEC.) =   8.31
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    954.00 =    2532.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    954.00 TO NODE    955.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   814.00   CHANNEL SLOPE =  0.0799
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.841
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     1.000     -
  USER-DEFINED               -        0.40      0.60     1.000     -
  USER-DEFINED               -        0.40      0.60     1.000     -
  USER-DEFINED               -        2.90      0.60     1.000     -
  USER-DEFINED               -        5.20      0.60     1.000     -
  USER-DEFINED               -        9.50      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.74
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.00
  AVERAGE FLOW DEPTH(FEET) =   0.91   TRAVEL TIME(MIN.) =   2.26
  Tc(MIN.) =   18.16
  SUBAREA AREA(ACRES) =    18.50       SUBAREA RUNOFF(CFS) =    4.01
  EFFECTIVE AREA(ACRES) =     62.70     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       62.7         PEAK FLOW RATE(CFS) =      13.61

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.88   FLOW VELOCITY(FEET/SEC.) =   5.85
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    955.00 =    3346.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    955.00 TO NODE    956.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```



```
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    375.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   643.00   CHANNEL SLOPE =  0.0544
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.772
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.60     1.000     -
  USER-DEFINED               -        0.50      0.60     1.000     -
  USER-DEFINED               -        1.20      0.60     1.000     -
  USER-DEFINED               -        3.60      0.60     1.000     -
  USER-DEFINED               -        3.80      0.60     1.000     -
  USER-DEFINED               -        6.10      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.80
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.20
  AVERAGE FLOW DEPTH(FEET) =   0.97   TRAVEL TIME(MIN.) =   2.06
  Tc(MIN.) =   20.22
  SUBAREA AREA(ACRES) =    15.40       SUBAREA RUNOFF(CFS) =    2.39
  EFFECTIVE AREA(ACRES) =     78.10     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       78.1         PEAK FLOW RATE(CFS) =      13.61
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.94   FLOW VELOCITY(FEET/SEC.) =   5.10
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    956.00 =    3989.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.22
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.772
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       14.30      0.60     1.000     -
  USER-DEFINED               -       21.60      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   35.90       SUBAREA RUNOFF(CFS) =    5.57
  EFFECTIVE AREA(ACRES) =    114.00   AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      114.0       PEAK FLOW RATE(CFS) =      17.69

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.22
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.772
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED              -        0.30      0.60      1.000     -
  USER-DEFINED              -        0.30      0.60      1.000     -
  USER-DEFINED              -        0.60      0.60      1.000     -
  USER-DEFINED              -        2.30      0.60      1.000     -
  USER-DEFINED              -        3.20      0.60      1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    6.70      SUBAREA RUNOFF(CFS) =    1.04
  EFFECTIVE AREA(ACRES) =    120.70   AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      120.7       PEAK FLOW RATE(CFS) =      18.73

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 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) =   375.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1304.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.45
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.73
  PIPE TRAVEL TIME(MIN.) =   1.75    Tc(MIN.) =   21.97
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    905.00 =    5293.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   21.97
  RAINFALL INTENSITY(INCH/HR) =   0.73
  AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =     120.70
  TOTAL STREAM AREA(ACRES) =     120.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.73

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      135.38   11.29    1.172  0.60( 0.50) 0.83     210.3     930.00
      1      115.39   15.44    0.936  0.60( 0.52) 0.86     276.9     910.00
      1       79.84   20.68    0.762  0.60( 0.53) 0.89     344.6     900.00
      1       71.64   21.88    0.736  0.60( 0.54) 0.89     359.9     920.00
      2       11.05   11.09    1.184  0.60( 0.60) 1.00      18.5     940.00
      3       18.73   21.97    0.735  0.60( 0.60) 1.00     120.7     950.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.
```



```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      165.10   11.09    1.184  0.60( 0.53) 0.88     285.9     940.00
      2      164.93   11.29    1.172  0.60( 0.53) 0.88     290.8     930.00
      3      140.46   15.44    0.936  0.60( 0.54) 0.90     380.3     910.00
      4      101.64   20.68    0.762  0.60( 0.55) 0.92     476.8     900.00
      5       92.95   21.88    0.736  0.60( 0.55) 0.92     498.6     920.00
      6       92.28   21.97    0.735  0.60( 0.55) 0.92     499.1     950.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     165.10    Tc(MIN.) =    11.09
  EFFECTIVE AREA(ACRES) =     285.92   AREA-AVERAGED Fm(INCH/HR) =  0.53
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.88
  TOTAL AREA(ACRES) =      499.1
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    905.00 =    6933.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.09
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.184
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED              -       12.30      0.60      0.100     -
  USER-DEFINED              -       26.80      0.60      0.100     -
  USER-DEFINED              -        2.00      0.60      0.100     -
  USER-DEFINED              -        2.70      0.60      0.900     -
  USER-DEFINED              -        0.80      0.60      0.900     -
  USER-DEFINED              -        2.10      0.60      0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.196
  SUBAREA AREA(ACRES) =   46.70      SUBAREA RUNOFF(CFS) =   44.83
  EFFECTIVE AREA(ACRES) =    332.62   AREA-AVERAGED Fm(INCH/HR) =  0.47
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.78
  TOTAL AREA(ACRES) =      545.8       PEAK FLOW RATE(CFS) =     214.43

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.09
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.184
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED              -        8.00      0.60      0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.00      SUBAREA RUNOFF(CFS) =    8.09
  EFFECTIVE AREA(ACRES) =    340.62   AREA-AVERAGED Fm(INCH/HR) =  0.46
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =      553.8       PEAK FLOW RATE(CFS) =     222.53
============================================================================
```

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 553.8 TC(MIN.) = 11.09
EFFECTIVE AREA(ACRES) = 340.62 AREA-AVERAGED Fm(INCH/HR)= 0.46
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.764
PEAK FLOW RATE(CFS) = 222.53

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	222.53	11.09	1.184	0.60(0.46)	0.76	340.6	940.00
2	221.70	11.29	1.172	0.60(0.46)	0.77	345.5	930.00
3	176.56	15.44	0.936	0.60(0.48)	0.81	435.0	910.00
4	122.82	20.68	0.762	0.60(0.51)	0.84	531.5	900.00
5	113.09	21.88	0.736	0.60(0.51)	0.85	553.3	920.00
6	112.26	21.97	0.735	0.60(0.51)	0.85	553.8	950.00

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                        Analysis prepared by:

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 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-4 SUBAREA F                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 5-YR EV AUG 2018 CCHIU                                               *
 **********************************************************************

  FILE NAME: 4F05EVRL.DAT
  TIME/DATE OF STUDY: 07:08 08/08/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    5.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  2.739
   2)   10.00;  1.815
   3)   15.00;  1.325
   4)   20.00;  1.135
   5)   25.00;  0.989
   6)   30.00;  0.885
   7)   40.00;  0.759
   8)   50.00;  0.676
   9)   60.00;  0.615
  10)   90.00;  0.513
  11)  120.00;  0.455
  12)  180.00;  0.383
  13)  360.00;  0.284
  14) 1200.00;  0.125
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =    496.00  DOWNSTREAM(FEET) =    485.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.762
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.446
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       -        0.70      0.50     1.000    56   13.76
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        0.50      0.50     1.000    56   13.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.02
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      1.02

**************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   459.00
  FLOW LENGTH(FEET) =  1090.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.93
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.02
  PIPE TRAVEL TIME(MIN.) =   3.68    Tc(MIN.) =   17.45
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =    1404.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 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.) =   17.45
  RAINFALL INTENSITY(INCH/HR) =   1.23
  AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50
```

```
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       1.20
  TOTAL STREAM AREA(ACRES) =       1.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.02

****************************************************************************
  FLOW PROCESS FROM NODE    910.00 TO NODE    911.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =    785.00  DOWNSTREAM(FEET) =    612.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.142
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.158
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      -        0.10      0.50     1.000    56    8.14
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      -        0.50      0.50     1.000    56    8.14
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        1.00      0.50     1.000    56    8.14
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.39
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      2.39

****************************************************************************
  FLOW PROCESS FROM NODE    911.00 TO NODE    912.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    612.00  DOWNSTREAM(FEET) =    525.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   458.00   CHANNEL SLOPE =  0.1900
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.940
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.00      0.50     1.000     -
  USER-DEFINED               -        0.60      0.50     1.000     -
  USER-DEFINED               -        2.30      0.50     1.000     -
  USER-DEFINED               -        1.00      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.57
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.44
  AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   1.18
  Tc(MIN.) =    9.33
  SUBAREA AREA(ACRES) =     4.90       SUBAREA RUNOFF(CFS) =    6.35
  EFFECTIVE AREA(ACRES) =      6.50     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
```



```
  TOTAL AREA(ACRES) =        6.5         PEAK FLOW RATE(CFS) =       8.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.62   FLOW VELOCITY(FEET/SEC.) =   7.24
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    912.00 =     786.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    912.00 TO NODE    913.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    470.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   618.00   CHANNEL SLOPE =  0.0890
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.726
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     1.000     -
  USER-DEFINED               -        4.60      0.50     1.000     -
  USER-DEFINED               -        4.00      0.50     1.000     -
  USER-DEFINED               -        0.60      0.50     1.000     -
  USER-DEFINED               -        2.70      0.50     1.000     -
  USER-DEFINED               -        5.10      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.88
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.51
  AVERAGE FLOW DEPTH(FEET) =   0.96   TRAVEL TIME(MIN.) =   1.58
  Tc(MIN.) =   10.91
  SUBAREA AREA(ACRES) =    17.10       SUBAREA RUNOFF(CFS) =   18.87
  EFFECTIVE AREA(ACRES) =     23.60     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       23.6         PEAK FLOW RATE(CFS) =      26.04

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.10   FLOW VELOCITY(FEET/SEC.) =   7.15
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    913.00 =    1404.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    913.00 TO NODE    902.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   459.00
  FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.12
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.04
  PIPE TRAVEL TIME(MIN.) =   1.63    Tc(MIN.) =   12.53
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    902.00 =    2294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 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.) =   12.53
  RAINFALL INTENSITY(INCH/HR) =   1.57
  AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      23.60
  TOTAL STREAM AREA(ACRES) =      23.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      26.04

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.02   17.45    1.232  0.50( 0.50) 1.00       1.2     900.00
      2       26.04   12.53    1.567  0.50( 0.50) 1.00      23.6     910.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       27.06   12.53    1.567  0.50( 0.50) 1.00      24.5     910.00
      2       18.89   17.45    1.232  0.50( 0.50) 1.00      24.8     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.06    Tc(MIN.) =    12.53
  EFFECTIVE AREA(ACRES) =      24.46   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       24.8
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    902.00 =    2294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.53
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.567
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.50     1.000     -
  USER-DEFINED               -        5.50      0.50     0.100     -
  USER-DEFINED               -        0.20      0.50     1.000     -
  USER-DEFINED               -        0.10      0.50     0.900     -
  USER-DEFINED               -        0.10      0.50     1.000     -
  USER-DEFINED               -        1.00      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.175
  SUBAREA AREA(ACRES) =     7.10      SUBAREA RUNOFF(CFS) =     9.45
  EFFECTIVE AREA(ACRES) =     31.56   AREA-AVERAGED Fm(INCH/HR) =  0.41
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.81
```



```
  TOTAL AREA(ACRES) =       31.9       PEAK FLOW RATE(CFS) =      32.93

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.53
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.567
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.20      0.50     1.000     -
  USER-DEFINED               -        0.10      0.50     0.900     -
  USER-DEFINED               -        3.20      0.50     1.000     -
  USER-DEFINED               -        3.40      0.50     0.100     -
  USER-DEFINED               -        3.30      0.50     1.000     -
  USER-DEFINED               -        0.70      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.712
  SUBAREA AREA(ACRES) =   10.90      SUBAREA RUNOFF(CFS) =   11.88
  EFFECTIVE AREA(ACRES) =     42.46   AREA-AVERAGED Fm(INCH/HR) =  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =       42.8       PEAK FLOW RATE(CFS) =      44.81

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   459.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =   654.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.43
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.81
  PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   13.16
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    903.00 =    2948.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.16
  RAINFALL INTENSITY(INCH/HR) =   1.51
  AREA-AVERAGED Fm(INCH/HR) =  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.79
  EFFECTIVE STREAM AREA(ACRES) =      42.46
  TOTAL STREAM AREA(ACRES) =      42.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      44.81

****************************************************************************
  FLOW PROCESS FROM NODE    920.00 TO NODE    921.00 IS CODE =  21
```

```
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   286.00
  ELEVATION DATA: UPSTREAM(FEET) =    860.00  DOWNSTREAM(FEET) =    712.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.737
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.233
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        0.20      0.50     1.000    56    7.74
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        0.70      0.50     1.000    56    7.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.40
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      1.40

******************************************************************************
  FLOW PROCESS FROM NODE    921.00 TO NODE    922.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    712.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   594.00   CHANNEL SLOPE =  0.1886
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.992
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.20      0.50     1.000     -
  USER-DEFINED                -        1.00      0.50     1.000     -
  USER-DEFINED                -        1.40      0.50     1.000     -
  USER-DEFINED                -        4.40      0.50     1.000     -
  USER-DEFINED                -        6.70      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.66
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.60
  AVERAGE FLOW DEPTH(FEET) =   0.68   TRAVEL TIME(MIN.) =   1.30
  Tc(MIN.) =    9.04
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   18.40
  EFFECTIVE AREA(ACRES) =     14.60     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       14.6         PEAK FLOW RATE(CFS) =      19.61

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.86   FLOW VELOCITY(FEET/SEC.) =   8.85
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    922.00 =     880.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    922.00 TO NODE    923.00 IS CODE =  51
```



```
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    600.00  DOWNSTREAM(FEET) =    550.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   604.00   CHANNEL SLOPE =  0.0828
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.765
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.70      0.50     1.000     -
  USER-DEFINED                -        1.40      0.50     1.000     -
  USER-DEFINED                -        5.40      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      23.88
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.84
  AVERAGE FLOW DEPTH(FEET) =   1.08   TRAVEL TIME(MIN.) =   1.47
  Tc(MIN.) =   10.51
  SUBAREA AREA(ACRES) =     7.50       SUBAREA RUNOFF(CFS) =    8.54
  EFFECTIVE AREA(ACRES) =     22.10     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       22.1         PEAK FLOW RATE(CFS) =      25.15

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.10   FLOW VELOCITY(FEET/SEC.) =   6.91
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    923.00 =    1484.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    923.00 TO NODE    924.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    550.00  DOWNSTREAM(FEET) =    495.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   849.00   CHANNEL SLOPE =  0.0648
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.559
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.60      0.50     1.000     -
  USER-DEFINED                -        0.80      0.50     1.000     -
  USER-DEFINED                -        0.80      0.50     1.000     -
  USER-DEFINED                -        1.10      0.50     1.000     -
  USER-DEFINED                -        5.20      0.50     1.000     -
  USER-DEFINED                -        6.30      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      32.22
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.73
  AVERAGE FLOW DEPTH(FEET) =   1.26   TRAVEL TIME(MIN.) =   2.10
  Tc(MIN.) =   12.62
  SUBAREA AREA(ACRES) =    14.80       SUBAREA RUNOFF(CFS) =   14.10
  EFFECTIVE AREA(ACRES) =     36.90     AREA-AVERAGED Fm(INCH/HR) =   0.50
```

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  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       36.9         PEAK FLOW RATE(CFS) =      35.15

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.31   FLOW VELOCITY(FEET/SEC.) =   6.85
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    924.00 =    2333.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    924.00 TO NODE    924.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.62
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.559
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       9.70      0.50     1.000     -
  USER-DEFINED               -      17.00      0.50     1.000     -
  USER-DEFINED               -      36.60      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   63.30      SUBAREA RUNOFF(CFS) =   60.30
  EFFECTIVE AREA(ACRES) =    100.20   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      100.2       PEAK FLOW RATE(CFS) =      95.46

****************************************************************************
  FLOW PROCESS FROM NODE    924.00 TO NODE    925.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    457.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   607.00   CHANNEL SLOPE =  0.0626
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.445
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       0.10      0.50     1.000     -
  USER-DEFINED               -       0.30      0.50     1.000     -
  USER-DEFINED               -       0.60      0.50     1.000     -
  USER-DEFINED               -       0.70      0.50     1.000     -
  USER-DEFINED               -       0.90      0.50     1.000     -
  USER-DEFINED               -       0.90      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      96.95
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.72
  AVERAGE FLOW DEPTH(FEET) =   1.93   TRAVEL TIME(MIN.) =   1.16
  Tc(MIN.) =   13.78
  SUBAREA AREA(ACRES) =     3.50       SUBAREA RUNOFF(CFS) =    2.98
  EFFECTIVE AREA(ACRES) =    103.70     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =      103.7         PEAK FLOW RATE(CFS) =      95.46
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```



```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.91   FLOW VELOCITY(FEET/SEC.) =   8.70
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    925.00 =    2940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    925.00 TO NODE    925.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.78
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.445
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       3.80      0.50     1.000     -
  USER-DEFINED               -       4.20      0.50     1.000     -
  USER-DEFINED               -       5.10      0.50     1.000     -
  USER-DEFINED               -       7.00      0.50     1.000     -
  USER-DEFINED               -      12.00      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   32.10      SUBAREA RUNOFF(CFS) =   27.29
  EFFECTIVE AREA(ACRES) =    135.80   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      135.8       PEAK FLOW RATE(CFS) =     115.47

****************************************************************************
  FLOW PROCESS FROM NODE    925.00 TO NODE    926.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    440.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   884.00   CHANNEL SLOPE =  0.0192
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.277
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       0.50      0.50     1.000     -
  USER-DEFINED               -       0.70      0.50     1.000     -
  USER-DEFINED               -       2.30      0.50     1.000     -
  USER-DEFINED               -       2.40      0.50     1.000     -
  USER-DEFINED               -       2.50      0.50     1.000     -
  USER-DEFINED               -       3.20      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     119.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.91
  AVERAGE FLOW DEPTH(FEET) =   2.60   TRAVEL TIME(MIN.) =   2.49
  Tc(MIN.) =   16.27
  SUBAREA AREA(ACRES) =    11.60       SUBAREA RUNOFF(CFS) =    8.11
  EFFECTIVE AREA(ACRES) =    147.40     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =      147.4         PEAK FLOW RATE(CFS) =     115.47
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

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  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.56   FLOW VELOCITY(FEET/SEC.) =   5.87
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    926.00 =    3824.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    926.00 TO NODE    926.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.27
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.277
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        7.40      0.50     1.000     -
  USER-DEFINED                -       12.40      0.50     1.000     -
  USER-DEFINED                -       28.20      0.50     1.000     -
  USER-DEFINED                -       31.40      0.50     1.000     -
  USER-DEFINED                -       42.40      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =  121.80      SUBAREA RUNOFF(CFS) =   85.13
  EFFECTIVE AREA(ACRES) =    269.20   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      269.2       PEAK FLOW RATE(CFS) =     188.14

****************************************************************************
  FLOW PROCESS FROM NODE    926.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =  1341.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  43.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.66
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     188.14
  PIPE TRAVEL TIME(MIN.) =   1.64    Tc(MIN.) =   17.91
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    903.00 =    5165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.91
  RAINFALL INTENSITY(INCH/HR) =   1.21
  AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =     269.20
  TOTAL STREAM AREA(ACRES) =     269.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     188.14
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    930.00 TO NODE    931.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    715.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.954
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.193
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       -        0.60      0.50     1.000    56    7.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.91
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      0.91

****************************************************************************
  FLOW PROCESS FROM NODE    931.00 TO NODE    932.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    517.00  DOWNSTREAM(FEET) =    430.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   443.00   CHANNEL SLOPE =  0.1964
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.974
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.10      0.50     0.900     -
  USER-DEFINED                -        0.40      0.50     0.100     -
  USER-DEFINED                -        0.30      0.50     1.000     -
  USER-DEFINED                -        4.30      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.927
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.21
  AVERAGE FLOW DEPTH(FEET) =   0.49   TRAVEL TIME(MIN.) =   1.19
  Tc(MIN.) =    9.14
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =    6.93
  EFFECTIVE AREA(ACRES) =      5.70     AREA-AVERAGED Fm(INCH/HR) =   0.47
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   0.94
  TOTAL AREA(ACRES) =        5.7         PEAK FLOW RATE(CFS) =       7.72

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.60   FLOW VELOCITY(FEET/SEC.) =   7.16
  LONGEST FLOWPATH FROM NODE    930.00 TO NODE    932.00 =     773.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    932.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
```

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 426.00
FLOW LENGTH(FEET) = 254.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.45
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.72
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 9.71
LONGEST FLOWPATH FROM NODE 930.00 TO NODE 903.00 = 1027.00 FEET.

****

FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 9.71
RAINFALL INTENSITY(INCH/HR) = 1.87
AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.94
EFFECTIVE STREAM AREA(ACRES) = 5.70
TOTAL STREAM AREA(ACRES) = 5.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.72

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	44.81	13.16	1.505	0.50(0.39)	0.79	42.5	910.00
1	32.24	18.13	1.206	0.50(0.40)	0.79	42.8	900.00
2	188.14	17.91	1.215	0.50(0.50)	1.00	269.2	920.00
3	7.72	9.71	1.868	0.50(0.47)	0.94	5.7	930.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	240.58	9.71	1.868	0.50(0.48)	0.96	183.0	930.00
2	238.67	13.16	1.505	0.50(0.48)	0.96	246.0	910.00
3	225.07	17.91	1.215	0.50(0.49)	0.97	317.7	920.00
4	222.23	18.13	1.206	0.50(0.49)	0.97	317.7	900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 240.58 Tc(MIN.) = 9.71
EFFECTIVE AREA(ACRES) = 183.03 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 317.7
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 903.00 = 5165.00 FEET.

****

FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.71
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.868
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.900	-
USER-DEFINED	-	2.10	0.50	0.900	-
USER-DEFINED	-	3.00	0.50	0.900	-
USER-DEFINED	-	5.90	0.50	0.100	-
USER-DEFINED	-	7.70	0.50	0.100	-
USER-DEFINED	-	13.60	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.237
SUBAREA AREA(ACRES) = 32.80 SUBAREA RUNOFF(CFS) = 51.66
EFFECTIVE AREA(ACRES) = 215.83 AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 350.5 PEAK FLOW RATE(CFS) = 280.21

****

FLOW PROCESS FROM NODE 903.00 TO NODE 904.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 426.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 896.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 36.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.60
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 280.21
PIPE TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 10.22
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 904.00 = 6061.00 FEET.

****

FLOW PROCESS FROM NODE 904.00 TO NODE 904.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.22
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.794
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.80	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	2.40	0.50	0.900	-
USER-DEFINED	-	2.20	0.50	0.900	-
USER-DEFINED	-	0.30	0.50	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.527
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 12.95
EFFECTIVE AREA(ACRES) = 225.23 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 359.9 PEAK FLOW RATE(CFS) = 280.21
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```
****************************************************************************
  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) =   370.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =   872.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  37.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.45
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     280.21
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   10.76
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    905.00 =    6933.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.76
  RAINFALL INTENSITY(INCH/HR) =   1.74
  AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.84
  EFFECTIVE STREAM AREA(ACRES) =     225.23
  TOTAL STREAM AREA(ACRES) =     359.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     280.21

****************************************************************************
  FLOW PROCESS FROM NODE    940.00 TO NODE    941.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   304.00
  ELEVATION DATA: UPSTREAM(FEET) =    858.00  DOWNSTREAM(FEET) =    675.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.692
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.242
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      -        0.10      0.50     1.000    56    7.69
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        1.10      0.50     1.000    56    7.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.88
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      1.88

****************************************************************************
  FLOW PROCESS FROM NODE    941.00 TO NODE    942.00 IS CODE =  51
```



```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    405.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1008.00   CHANNEL SLOPE =  0.2679
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.898
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     1.000     -
  USER-DEFINED               -        0.80      0.50     1.000     -
  USER-DEFINED               -        1.10      0.50     1.000     -
  USER-DEFINED               -        1.50      0.50     1.000     -
  USER-DEFINED               -        3.60      0.50     1.000     -
  USER-DEFINED               -       10.20      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.90
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.04
  AVERAGE FLOW DEPTH(FEET) =   0.69   TRAVEL TIME(MIN.) =   1.86
  Tc(MIN.) =    9.55
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   21.77
  EFFECTIVE AREA(ACRES) =     18.50     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       18.5          PEAK FLOW RATE(CFS) =      23.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.86   FLOW VELOCITY(FEET/SEC.) =  10.56
  LONGEST FLOWPATH FROM NODE    940.00 TO NODE    942.00 =    1312.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    942.00 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) =   405.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1041.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.28
  PIPE TRAVEL TIME(MIN.) =   1.02    Tc(MIN.) =   10.57
  LONGEST FLOWPATH FROM NODE    940.00 TO NODE    905.00 =    2353.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.57
  RAINFALL INTENSITY(INCH/HR) =   1.76
  AREA-AVERAGED Fm(INCH/HR) =  0.50
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      18.50
  TOTAL STREAM AREA(ACRES) =      18.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.28

****************************************************************************
  FLOW PROCESS FROM NODE    950.00 TO NODE    951.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =   1053.00  DOWNSTREAM(FEET) =    990.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.965
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.822
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        0.40      0.50     1.000    56    9.96
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        1.00      0.50     1.000    56    9.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.66
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      1.66

****************************************************************************
  FLOW PROCESS FROM NODE    951.00 TO NODE    952.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    990.00  DOWNSTREAM(FEET) =    950.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   439.00   CHANNEL SLOPE =  0.0911
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.642
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.10      0.50     1.000     -
  USER-DEFINED                -        0.40      0.50     1.000     -
  USER-DEFINED                -        0.60      0.50     1.000     -
  USER-DEFINED                -        0.70      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.59
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.07
  AVERAGE FLOW DEPTH(FEET) =   0.46   TRAVEL TIME(MIN.) =   1.80
  Tc(MIN.) =   11.76
  SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    1.85
  EFFECTIVE AREA(ACRES) =      3.20     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.2         PEAK FLOW RATE(CFS) =       3.29
```



```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.51   FLOW VELOCITY(FEET/SEC.) =   4.28
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    952.00 =     767.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    952.00 TO NODE    953.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    950.00  DOWNSTREAM(FEET) =    675.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   810.00   CHANNEL SLOPE =  0.3395
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.500
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.60      0.50     1.000     -
  USER-DEFINED                -        1.50      0.50     1.000     -
  USER-DEFINED                -        1.70      0.50     1.000     -
  USER-DEFINED                -        3.40      0.50     1.000     -
  USER-DEFINED                -        7.20      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.30
  AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   1.45
  Tc(MIN.) =   13.21
  SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   12.96
  EFFECTIVE AREA(ACRES) =     17.60     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       17.6         PEAK FLOW RATE(CFS) =      15.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.71   FLOW VELOCITY(FEET/SEC.) =  10.40
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    953.00 =    1577.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    953.00 TO NODE    954.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    475.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   955.00   CHANNEL SLOPE =  0.2094
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.342
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        0.10      0.50     1.000     -
  USER-DEFINED                -        0.10      0.50     1.000     -
  USER-DEFINED                -        0.60      0.50     1.000     -
  USER-DEFINED                -        2.10      0.50     1.000     -
  USER-DEFINED                -        8.90      0.50     1.000     -
```

```
  USER-DEFINED               -       14.80      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.89
  AVERAGE FLOW DEPTH(FEET) =   0.94   TRAVEL TIME(MIN.) =   1.61
  Tc(MIN.) =   14.82
  SUBAREA AREA(ACRES) =    26.60       SUBAREA RUNOFF(CFS) =   20.16
  EFFECTIVE AREA(ACRES) =     44.20     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       44.2          PEAK FLOW RATE(CFS) =      33.50

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.03   FLOW VELOCITY(FEET/SEC.) =  10.58
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    954.00 =    2532.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    954.00 TO NODE    955.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   814.00   CHANNEL SLOPE =  0.0799
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.264
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       0.10      0.50     1.000     -
  USER-DEFINED               -       0.40      0.50     1.000     -
  USER-DEFINED               -       0.40      0.50     1.000     -
  USER-DEFINED               -       2.90      0.50     1.000     -
  USER-DEFINED               -       5.20      0.50     1.000     -
  USER-DEFINED               -       9.50      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      39.86
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.66
  AVERAGE FLOW DEPTH(FEET) =   1.32   TRAVEL TIME(MIN.) =   1.77
  Tc(MIN.) =   16.59
  SUBAREA AREA(ACRES) =    18.50       SUBAREA RUNOFF(CFS) =   12.72
  EFFECTIVE AREA(ACRES) =     62.70     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       62.7          PEAK FLOW RATE(CFS) =      43.13

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.36   FLOW VELOCITY(FEET/SEC.) =   7.83
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    955.00 =    3346.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    955.00 TO NODE    956.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    375.00
```



```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   643.00   CHANNEL SLOPE =  0.0544
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.206
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       0.20      0.50     1.000     -
  USER-DEFINED               -       0.50      0.50     1.000     -
  USER-DEFINED               -       1.20      0.50     1.000     -
  USER-DEFINED               -       3.60      0.50     1.000     -
  USER-DEFINED               -       3.80      0.50     1.000     -
  USER-DEFINED               -       6.10      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      48.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.97
  AVERAGE FLOW DEPTH(FEET) =   1.52   TRAVEL TIME(MIN.) =   1.54
  Tc(MIN.) =   18.13
  SUBAREA AREA(ACRES) =    15.40       SUBAREA RUNOFF(CFS) =    9.78
  EFFECTIVE AREA(ACRES) =     78.10     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       78.1          PEAK FLOW RATE(CFS) =      49.61

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.54   FLOW VELOCITY(FEET/SEC.) =   7.01
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    956.00 =    3989.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.13
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.206
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       14.30      0.50     1.000     -
  USER-DEFINED               -       21.60      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   35.90      SUBAREA RUNOFF(CFS) =   22.80
  EFFECTIVE AREA(ACRES) =    114.00   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      114.0       PEAK FLOW RATE(CFS) =      72.41

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.13
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.206
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       0.30      0.50     1.000     -
```

```
  USER-DEFINED               -        0.30      0.50     1.000     -
  USER-DEFINED               -        0.60      0.50     1.000     -
  USER-DEFINED               -        2.30      0.50     1.000     -
  USER-DEFINED               -        3.20      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =     6.70      SUBAREA RUNOFF(CFS) =     4.26
  EFFECTIVE AREA(ACRES) =    120.70   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      120.7       PEAK FLOW RATE(CFS) =      76.67

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 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) =   375.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1304.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.52
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      76.67
  PIPE TRAVEL TIME(MIN.) =   1.24    Tc(MIN.) =   19.37
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    905.00 =    5293.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.37
  RAINFALL INTENSITY(INCH/HR) =   1.16
  AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =     120.70
  TOTAL STREAM AREA(ACRES) =     120.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      76.67

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      280.21   10.76    1.740  0.50( 0.42) 0.84     225.2     930.00
      1      267.72   14.22    1.402  0.50( 0.43) 0.87     288.2     910.00
      1      242.57   18.99    1.173  0.50( 0.45) 0.89     359.9     920.00
      1      239.65   19.23    1.164  0.50( 0.45) 0.89     359.9     900.00
      2       23.28   10.57    1.759  0.50( 0.50) 1.00      18.5     940.00
      3       76.67   19.37    1.159  0.50( 0.50) 1.00     120.7     950.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```



```
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      379.05   10.57    1.759  0.50( 0.44) 0.88     305.4     940.00
      2      379.80   10.76    1.740  0.50( 0.44) 0.88     310.8     930.00
      3      361.06   14.22    1.402  0.50( 0.45) 0.90     395.3     910.00
      4      331.68   18.99    1.173  0.50( 0.46) 0.92     496.7     920.00
      5      328.60   19.23    1.164  0.50( 0.46) 0.92     498.2     900.00
      6      326.69   19.37    1.159  0.50( 0.46) 0.92     499.1     950.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     379.80    Tc(MIN.) =    10.76
  EFFECTIVE AREA(ACRES) =     310.80   AREA-AVERAGED Fm(INCH/HR) =  0.44
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.88
  TOTAL AREA(ACRES) =      499.1
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    905.00 =    6933.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.76
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.740
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -       12.30      0.50      0.100     -
  USER-DEFINED                -       26.80      0.50      0.100     -
  USER-DEFINED                -        2.00      0.50      0.100     -
  USER-DEFINED                -        2.70      0.50      0.900     -
  USER-DEFINED                -        0.80      0.50      0.900     -
  USER-DEFINED                -        2.10      0.50      0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.196
  SUBAREA AREA(ACRES) =   46.70      SUBAREA RUNOFF(CFS) =    69.02
  EFFECTIVE AREA(ACRES) =    357.50   AREA-AVERAGED Fm(INCH/HR) =  0.40
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =      545.8       PEAK FLOW RATE(CFS) =     432.26

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.76
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.740
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        8.00      0.50      0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.00      SUBAREA RUNOFF(CFS) =    12.17
  EFFECTIVE AREA(ACRES) =    365.50   AREA-AVERAGED Fm(INCH/HR) =  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.78
  TOTAL AREA(ACRES) =      553.8       PEAK FLOW RATE(CFS) =     444.43
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      553.8  TC(MIN.) =     10.76
```

EFFECTIVE AREA(ACRES) = 365.50 AREA-AVERAGED Fm(INCH/HR)= 0.39
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.778
PEAK FLOW RATE(CFS) = 444.43

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	444.42	10.57	1.759	0.50(0.39)	0.78	360.1	940.00
2	444.43	10.76	1.740	0.50(0.39)	0.78	365.5	930.00
3	402.75	14.22	1.402	0.50(0.41)	0.81	450.0	910.00
4	371.69	18.99	1.173	0.50(0.42)	0.85	551.4	920.00
5	368.10	19.23	1.164	0.50(0.42)	0.85	552.9	900.00
6	365.93	19.37	1.159	0.50(0.42)	0.85	553.8	950.00

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                        Analysis prepared by:

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 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-4 SUBAREA F                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 10-YR EV AUG 2018 CCHIU                                              *
 **********************************************************************

  FILE NAME: 4F10EVRL.DAT
  TIME/DATE OF STUDY: 07:03 08/08/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  3.913
   2)   10.00;  2.593
   3)   15.00;  1.893
   4)   20.00;  1.621
   5)   25.00;  1.412
   6)   30.00;  1.265
   7)   40.00;  1.084
   8)   50.00;  0.966
   9)   60.00;  0.879
  10)   90.00;  0.733
  11)  120.00;  0.650
  12)  180.00;  0.547
  13)  360.00;  0.406
  14) 1200.00;  0.179
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =    496.00  DOWNSTREAM(FEET) =    485.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.762
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.066
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.70      0.30     1.000    63   13.76
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.50      0.30     1.000    66   13.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.91
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      1.91

**************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   459.00
  FLOW LENGTH(FEET) =  1090.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.93
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.91
  PIPE TRAVEL TIME(MIN.) =   3.06    Tc(MIN.) =   16.82
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =    1404.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 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.) =   16.82
  RAINFALL INTENSITY(INCH/HR) =   1.79
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
```

```
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       1.20
  TOTAL STREAM AREA(ACRES) =       1.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.91

****************************************************************************
  FLOW PROCESS FROM NODE    910.00 TO NODE    911.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =    785.00  DOWNSTREAM(FEET) =    612.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.142
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.084
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63    8.14
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.50      0.30     1.000    63    8.14
  NATURAL FAIR COVER
  "OPEN BROUSH"              B        1.00      0.30     1.000    66    8.14
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.01
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      4.01

****************************************************************************
  FLOW PROCESS FROM NODE    911.00 TO NODE    912.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    612.00  DOWNSTREAM(FEET) =    525.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   458.00   CHANNEL SLOPE =  0.1900
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.814
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.00      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.60      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        2.30      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.00      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.47
  AVERAGE FLOW DEPTH(FEET) =   0.65   TRAVEL TIME(MIN.) =   1.02
```



```
  Tc(MIN.) =    9.16
  SUBAREA AREA(ACRES) =     4.90       SUBAREA RUNOFF(CFS) =   11.09
  EFFECTIVE AREA(ACRES) =      6.50     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        6.5          PEAK FLOW RATE(CFS) =      14.70

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.77   FLOW VELOCITY(FEET/SEC.) =   8.32
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    912.00 =     786.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    912.00 TO NODE    913.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    470.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   618.00   CHANNEL SLOPE =  0.0890
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.519
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.60      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        4.00      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.60      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        2.70      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.10      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      31.80
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.54
  AVERAGE FLOW DEPTH(FEET) =   1.19   TRAVEL TIME(MIN.) =   1.37
  Tc(MIN.) =   10.53
  SUBAREA AREA(ACRES) =    17.10       SUBAREA RUNOFF(CFS) =   34.15
  EFFECTIVE AREA(ACRES) =     23.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       23.6          PEAK FLOW RATE(CFS) =      47.13

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.38   FLOW VELOCITY(FEET/SEC.) =   8.30
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    913.00 =    1404.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    913.00 TO NODE    902.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   459.00
```

```
  FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.53
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.13
  PIPE TRAVEL TIME(MIN.) =   1.41    Tc(MIN.) =   11.94
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    902.00 =    2294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 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.) =   11.94
  RAINFALL INTENSITY(INCH/HR) =   2.32
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      23.60
  TOTAL STREAM AREA(ACRES) =      23.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.13

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.91   16.82    1.794  0.30( 0.30) 1.00       1.2     900.00
      2       47.13   11.94    2.322  0.30( 0.30) 1.00      23.6     910.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       48.96   11.94    2.322  0.30( 0.30) 1.00      24.5     910.00
      2       36.73   16.82    1.794  0.30( 0.30) 1.00      24.8     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.96    Tc(MIN.) =    11.94
  EFFECTIVE AREA(ACRES) =      24.45   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       24.8
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    902.00 =    2294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.322
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
```



```
  "CHAPARRAL,BROADLEAF"      B        0.20      0.30     1.000    63
  COMMERCIAL                 B        5.50      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.20      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63
  COMMERCIAL                 B        1.00      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.175
  SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =   14.50
  EFFECTIVE AREA(ACRES) =     31.55   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.81
  TOTAL AREA(ACRES) =       31.9       PEAK FLOW RATE(CFS) =      58.99

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.322
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.20      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.20      0.30     1.000    63
  COMMERCIAL                 B        3.40      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.30      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.712
  SUBAREA AREA(ACRES) =   10.90      SUBAREA RUNOFF(CFS) =   20.68
  EFFECTIVE AREA(ACRES) =     42.45   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =       42.8       PEAK FLOW RATE(CFS) =      79.67

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   459.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =   654.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.18
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      79.67
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   12.48
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    903.00 =    2948.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.48
  RAINFALL INTENSITY(INCH/HR) =   2.25
  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.79
  EFFECTIVE STREAM AREA(ACRES) =      42.45
  TOTAL STREAM AREA(ACRES) =      42.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      79.67

****************************************************************************
  FLOW PROCESS FROM NODE    920.00 TO NODE    921.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   286.00
  ELEVATION DATA: UPSTREAM(FEET) =    860.00  DOWNSTREAM(FEET) =    712.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.737
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.190
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        0.20      0.30     1.000    66    7.74
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        0.70      0.30     1.000    66    7.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.34
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.34

****************************************************************************
  FLOW PROCESS FROM NODE    921.00 TO NODE    922.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    712.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   594.00   CHANNEL SLOPE =  0.1886
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.892
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        0.20      0.30     1.000    65
  NATURAL FAIR COVER
```



```
  "CHAPARRAL,BROADLEAF"       B        1.00      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        1.40      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        4.40      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        6.70      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.75
  AVERAGE FLOW DEPTH(FEET) =   0.84   TRAVEL TIME(MIN.) =   1.13
  Tc(MIN.) =    8.87
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   31.96
  EFFECTIVE AREA(ACRES) =     14.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       14.6          PEAK FLOW RATE(CFS) =      34.05

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.06   FLOW VELOCITY(FEET/SEC.) =  10.18
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    922.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    922.00 TO NODE    923.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    600.00  DOWNSTREAM(FEET) =    550.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   604.00   CHANNEL SLOPE =  0.0828
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.572
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        0.70      0.30     1.000    63
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        1.40      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        5.40      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      41.72
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.86
  AVERAGE FLOW DEPTH(FEET) =   1.33   TRAVEL TIME(MIN.) =   1.28
  Tc(MIN.) =   10.15
  SUBAREA AREA(ACRES) =     7.50       SUBAREA RUNOFF(CFS) =   15.34
  EFFECTIVE AREA(ACRES) =     22.10     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       22.1          PEAK FLOW RATE(CFS) =      45.19

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.37   FLOW VELOCITY(FEET/SEC.) =   8.02
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    923.00 =    1484.00 FEET.

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 FLOW PROCESS FROM NODE    923.00 TO NODE    924.00 IS CODE =  51
--------------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    550.00  DOWNSTREAM(FEET) =    495.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   849.00   CHANNEL SLOPE =  0.0648
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.318
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.60      0.30     1.000    65
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.80      0.30     1.000    65
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.80      0.30     1.000    66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        1.10      0.30     1.000    63
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        5.20      0.30     1.000    65
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        6.30      0.30     1.000    63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      58.64
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.81
 AVERAGE FLOW DEPTH(FEET) =   1.58   TRAVEL TIME(MIN.) =   1.81
 Tc(MIN.) =   11.96
 SUBAREA AREA(ACRES) =    14.80       SUBAREA RUNOFF(CFS) =   26.88
 EFFECTIVE AREA(ACRES) =     36.90     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       36.9         PEAK FLOW RATE(CFS) =      67.03

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.67   FLOW VELOCITY(FEET/SEC.) =   8.05
 LONGEST FLOWPATH FROM NODE    920.00 TO NODE    924.00 =    2333.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    924.00 TO NODE    924.00 IS CODE =  81
--------------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
 MAINLINE Tc(MIN.) =   11.96
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.318
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        9.70      0.30     1.000    66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B       17.00      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"               B       36.60      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
```



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 SUBAREA AREA(ACRES) =   63.30      SUBAREA RUNOFF(CFS) =  114.99
 EFFECTIVE AREA(ACRES) =    100.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =      100.2       PEAK FLOW RATE(CFS) =     182.02

****************************************************************************
 FLOW PROCESS FROM NODE    924.00 TO NODE    925.00 IS CODE =  51
--------------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    457.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   607.00   CHANNEL SLOPE =  0.0626
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.180
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.30      0.30     1.000    65
 NATURAL FAIR COVER
 "GRASS"                    B        0.60      0.30     1.000    69
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.70      0.30     1.000    66
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.90      0.30     1.000    65
 NATURAL FAIR COVER
 "GRASS"                    B        0.90      0.30     1.000    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     184.98
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.26
 AVERAGE FLOW DEPTH(FEET) =   2.45   TRAVEL TIME(MIN.) =   0.99
 Tc(MIN.) =   12.95
 SUBAREA AREA(ACRES) =     3.50       SUBAREA RUNOFF(CFS) =    5.92
 EFFECTIVE AREA(ACRES) =    103.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =      103.7         PEAK FLOW RATE(CFS) =     182.02
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  2.44   FLOW VELOCITY(FEET/SEC.) =  10.22
 LONGEST FLOWPATH FROM NODE    920.00 TO NODE    925.00 =    2940.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    925.00 TO NODE    925.00 IS CODE =  81
--------------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
 MAINLINE Tc(MIN.) =   12.95
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.180
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
```

```
"OPEN BRUSH"                B        3.80      0.30     1.000    66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"       B        4.20      0.30     1.000    63
NATURAL FAIR COVER
"WOODLAND,GRASS"            B        5.10      0.30     1.000    65
NATURAL FAIR COVER
"OPEN BRUSH"                B        7.00      0.30     1.000    66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"       B       12.00      0.30     1.000    63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   32.10      SUBAREA RUNOFF(CFS) =   54.32
EFFECTIVE AREA(ACRES) =    135.80   AREA-AVERAGED Fm(INCH/HR) =  0.30
AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =      135.8       PEAK FLOW RATE(CFS) =     229.81

****************************************************************************
 FLOW PROCESS FROM NODE    925.00 TO NODE    926.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    440.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   884.00   CHANNEL SLOPE =  0.0192
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.891
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "GRASS"                    B        0.50      0.30     1.000    69
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        0.70      0.30     1.000    63
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        2.30      0.30     1.000    65
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        2.40      0.30     1.000    66
 NATURAL FAIR COVER
 "GRASS"                    B        2.50      0.30     1.000    69
 NATURAL FAIR COVER
 "GRASS"                    B        3.20      0.30     1.000    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     238.11
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.03
 AVERAGE FLOW DEPTH(FEET) =   3.36   TRAVEL TIME(MIN.) =   2.10
 Tc(MIN.) =   15.04
 SUBAREA AREA(ACRES) =    11.60       SUBAREA RUNOFF(CFS) =   16.61
 EFFECTIVE AREA(ACRES) =    147.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =      147.4         PEAK FLOW RATE(CFS) =     229.81
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  3.32   FLOW VELOCITY(FEET/SEC.) =   6.97
 LONGEST FLOWPATH FROM NODE    920.00 TO NODE    926.00 =    3824.00 FEET.
```



```
****************************************************************************
 FLOW PROCESS FROM NODE    926.00 TO NODE    926.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.04
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.891
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        7.40      0.30     1.000    65
 NATURAL FAIR COVER
 "OPEN BRUSH"               B       12.40      0.30     1.000    66
 NATURAL FAIR COVER
 "OPEN BRUSH"               B       28.20      0.30     1.000    66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B       31.40      0.30     1.000    63
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B       42.40      0.30     1.000    63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =  121.80      SUBAREA RUNOFF(CFS) =  174.37
 EFFECTIVE AREA(ACRES) =    269.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =      269.2       PEAK FLOW RATE(CFS) =     385.38

****************************************************************************
 FLOW PROCESS FROM NODE    926.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   426.00
 FLOW LENGTH(FEET) =  1341.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  72.0 INCH PIPE IS  55.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.51
 ESTIMATED PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     385.38
 PIPE TRAVEL TIME(MIN.) =   1.35    Tc(MIN.) =   16.40
 LONGEST FLOWPATH FROM NODE    920.00 TO NODE    903.00 =    5165.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   16.40
 RAINFALL INTENSITY(INCH/HR) =   1.82
 AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  1.00
 EFFECTIVE STREAM AREA(ACRES) =     269.20
 TOTAL STREAM AREA(ACRES) =     269.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     385.38
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    930.00 TO NODE    931.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    715.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.954
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.133
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.60      0.30     1.000    63    7.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.53
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.53

****************************************************************************
  FLOW PROCESS FROM NODE    931.00 TO NODE    932.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    517.00  DOWNSTREAM(FEET) =    430.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   443.00   CHANNEL SLOPE =  0.1964
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.858
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.30      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.30      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.927
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.47
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.09
  AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   1.04
  Tc(MIN.) =    8.99
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =   11.84
  EFFECTIVE AREA(ACRES) =      5.70     AREA-AVERAGED Fm(INCH/HR) =   0.28
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.94
  TOTAL AREA(ACRES) =        5.7         PEAK FLOW RATE(CFS) =      13.22

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   8.15
  LONGEST FLOWPATH FROM NODE    930.00 TO NODE    932.00 =     773.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    932.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =   254.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.49
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.22
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    9.49
  LONGEST FLOWPATH FROM NODE    930.00 TO NODE    903.00 =    1027.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.49
  RAINFALL INTENSITY(INCH/HR) =   2.73
  AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.94
  EFFECTIVE STREAM AREA(ACRES) =       5.70
  TOTAL STREAM AREA(ACRES) =       5.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.22

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       79.67   12.48    2.246  0.30( 0.24) 0.79      42.5     910.00
      1       59.97   17.40    1.762  0.30( 0.24) 0.79      42.8     900.00
      2      385.38   16.40    1.817  0.30( 0.30) 1.00     269.2     920.00
      3       13.22    9.49    2.727  0.30( 0.28) 0.94       5.7     930.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      445.26    9.49    2.727  0.30( 0.29) 0.96     193.8     930.00
      2      466.52   12.48    2.246  0.30( 0.29) 0.96     253.0     910.00
      3      457.68   16.40    1.817  0.30( 0.29) 0.97     317.6     920.00
      4      439.46   17.40    1.762  0.30( 0.29) 0.97     317.7     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     466.52    Tc(MIN.) =    12.48
  EFFECTIVE AREA(ACRES) =     253.01   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.96
  TOTAL AREA(ACRES) =      317.7
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    903.00 =    5165.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.48
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.246
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.00      0.30     0.900    56
  COMMERCIAL                 B        5.90      0.30     0.100    56
  COMMERCIAL                 B        7.70      0.30     0.100    56
  COMMERCIAL                 B       13.60      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.237
  SUBAREA AREA(ACRES) =   32.80      SUBAREA RUNOFF(CFS) =   64.21
  EFFECTIVE AREA(ACRES) =    285.81   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.88
  TOTAL AREA(ACRES) =      350.5       PEAK FLOW RATE(CFS) =     509.87

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    904.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   426.00  DOWNSTREAM(FEET) =   370.00
  FLOW LENGTH(FEET) =   896.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  44.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  34.58
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     509.87
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   12.91
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    904.00 =    6061.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    904.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.91
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.186
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.80      0.30     0.100    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  RESIDENTIAL
```



```
  ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
  SUBAREA AREA(ACRES) =    9.40      SUBAREA RUNOFF(CFS) =   17.15
  EFFECTIVE AREA(ACRES) =    295.21   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =      359.9       PEAK FLOW RATE(CFS) =     511.47

****************************************************************************
  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) =   370.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =   872.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  47.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.70
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     511.47
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   13.38
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    905.00 =    6933.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.38
  RAINFALL INTENSITY(INCH/HR) =   2.12
  AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.87
  EFFECTIVE STREAM AREA(ACRES) =     295.21
  TOTAL STREAM AREA(ACRES) =     359.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     511.47

****************************************************************************
  FLOW PROCESS FROM NODE    940.00 TO NODE    941.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   304.00
  ELEVATION DATA: UPSTREAM(FEET) =    858.00  DOWNSTREAM(FEET) =    675.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.692
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.202
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63    7.69
```

```
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.10      0.30     1.000    66    7.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.13
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      3.13

****************************************************************************
  FLOW PROCESS FROM NODE    941.00 TO NODE    942.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    405.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1008.00   CHANNEL SLOPE =  0.2679
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.776
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.80      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.10      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        1.50      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.60      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B       10.20      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      22.54
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.41
  AVERAGE FLOW DEPTH(FEET) =   0.85   TRAVEL TIME(MIN.) =   1.61
  Tc(MIN.) =    9.31
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   38.55
  EFFECTIVE AREA(ACRES) =     18.50     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       18.5         PEAK FLOW RATE(CFS) =      41.23

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.06   FLOW VELOCITY(FEET/SEC.) =  12.15
  LONGEST FLOWPATH FROM NODE    940.00 TO NODE    942.00 =    1312.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    942.00 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) =   405.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1041.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.93
```



```
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.23
  PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =   10.18
  LONGEST FLOWPATH FROM NODE    940.00 TO NODE    905.00 =    2353.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.18
  RAINFALL INTENSITY(INCH/HR) =   2.57
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      18.50
  TOTAL STREAM AREA(ACRES) =      18.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      41.23

****************************************************************************
  FLOW PROCESS FROM NODE    950.00 TO NODE    951.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =   1053.00  DOWNSTREAM(FEET) =    990.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.965
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.602
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.40      0.30     1.000    66    9.96
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.00      0.30     1.000    66    9.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.90
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      2.90

****************************************************************************
  FLOW PROCESS FROM NODE    951.00 TO NODE    952.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    990.00  DOWNSTREAM(FEET) =    950.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   439.00   CHANNEL SLOPE =  0.0911
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.381
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"              B        0.10      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"              B        0.40      0.30     1.000    66
  NATURAL FAIR COVER
  "GRASS"                   B        0.60      0.30     1.000    69
  NATURAL FAIR COVER
  "GRASS"                   B        0.70      0.30     1.000    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.59
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.72
  AVERAGE FLOW DEPTH(FEET) =   0.57   TRAVEL TIME(MIN.) =   1.55
  Tc(MIN.) =   11.52
  SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    3.37
  EFFECTIVE AREA(ACRES) =      3.20     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.2         PEAK FLOW RATE(CFS) =       5.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.63   FLOW VELOCITY(FEET/SEC.) =   5.03
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    952.00 =     767.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    952.00 TO NODE    953.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    950.00  DOWNSTREAM(FEET) =    675.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   810.00   CHANNEL SLOPE =  0.3395
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.207
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.60      0.30     1.000    63
  NATURAL FAIR COVER
  "GRASS"                    B        1.50      0.30     1.000    69
  NATURAL FAIR COVER
  "GRASS"                    B        1.70      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.40      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        7.20      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.37
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.87
  AVERAGE FLOW DEPTH(FEET) =   0.75   TRAVEL TIME(MIN.) =   1.24
  Tc(MIN.) =   12.76
  SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   24.71
  EFFECTIVE AREA(ACRES) =     17.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       17.6         PEAK FLOW RATE(CFS) =      30.21
```



```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.91   FLOW VELOCITY(FEET/SEC.) =  12.29
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    953.00 =    1577.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    953.00 TO NODE    954.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    475.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   955.00   CHANNEL SLOPE =  0.2094
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.017
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.60      0.30     1.000    66
  NATURAL FAIR COVER
  "GRASS"                    B        2.10      0.30     1.000    69
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        8.90      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B       14.80      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      50.77
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.70
  AVERAGE FLOW DEPTH(FEET) =   1.20   TRAVEL TIME(MIN.) =   1.36
  Tc(MIN.) =   14.12
  SUBAREA AREA(ACRES) =    26.60       SUBAREA RUNOFF(CFS) =   41.09
  EFFECTIVE AREA(ACRES) =     44.20     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       44.2         PEAK FLOW RATE(CFS) =      68.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.35   FLOW VELOCITY(FEET/SEC.) =  12.57
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    954.00 =    2532.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    954.00 TO NODE    955.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   814.00   CHANNEL SLOPE =  0.0799
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.860
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "GRASS"                    B        0.10      0.30     1.000    69
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        0.40      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.40      0.30     1.000    66
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        2.90      0.30     1.000    66
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        5.20      0.30     1.000    66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        9.50      0.30     1.000    63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      81.28
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.16
 AVERAGE FLOW DEPTH(FEET) =   1.72   TRAVEL TIME(MIN.) =   1.48
 Tc(MIN.) =   15.60
 SUBAREA AREA(ACRES) =    18.50       SUBAREA RUNOFF(CFS) =   25.98
 EFFECTIVE AREA(ACRES) =     62.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       62.7         PEAK FLOW RATE(CFS) =      88.06

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.77   FLOW VELOCITY(FEET/SEC.) =   9.34
 LONGEST FLOWPATH FROM NODE    950.00 TO NODE    955.00 =    3346.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    955.00 TO NODE    956.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    375.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   643.00   CHANNEL SLOPE =  0.0544
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.790
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        0.20      0.30     1.000    63
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.50      0.30     1.000    65
 NATURAL FAIR COVER
 "GRASS"                    B        1.20      0.30     1.000    69
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        3.60      0.30     1.000    65
 NATURAL FAIR COVER
 "GRASS"                    B        3.80      0.30     1.000    69
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        6.10      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      98.39
```



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 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.31
 AVERAGE FLOW DEPTH(FEET) =   1.99   TRAVEL TIME(MIN.) =   1.29
 Tc(MIN.) =   16.89
 SUBAREA AREA(ACRES) =    15.40       SUBAREA RUNOFF(CFS) =   20.66
 EFFECTIVE AREA(ACRES) =     78.10     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       78.1         PEAK FLOW RATE(CFS) =     104.75

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  2.03   FLOW VELOCITY(FEET/SEC.) =   8.45
 LONGEST FLOWPATH FROM NODE    950.00 TO NODE    956.00 =    3989.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.89
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.790
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B       14.30      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"               B       21.60      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =   35.90      SUBAREA RUNOFF(CFS) =   48.15
 EFFECTIVE AREA(ACRES) =    114.00   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =      114.0       PEAK FLOW RATE(CFS) =     152.91

****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.89
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.790
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.30      0.30     1.000    66
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.30      0.30     1.000    66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        0.60      0.30     1.000    63
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        2.30      0.30     1.000    65
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        3.20      0.30     1.000    63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    6.70      SUBAREA RUNOFF(CFS) =    8.99
 EFFECTIVE AREA(ACRES) =    120.70   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
```

```
  TOTAL AREA(ACRES) =      120.7       PEAK FLOW RATE(CFS) =     161.89

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 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) =   375.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1304.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.89
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     161.89
  PIPE TRAVEL TIME(MIN.) =   1.04    Tc(MIN.) =   17.93
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    905.00 =    5293.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.93
  RAINFALL INTENSITY(INCH/HR) =   1.73
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =     120.70
  TOTAL STREAM AREA(ACRES) =     120.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     161.89

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      503.74   10.40    2.537  0.30( 0.25) 0.84     236.0     930.00
      1      511.47   13.38    2.119  0.30( 0.26) 0.87     295.2     910.00
      1      494.12   17.31    1.768  0.30( 0.27) 0.89     359.8     920.00
      1      476.45   18.32    1.713  0.30( 0.27) 0.89     359.9     900.00
      2       41.23   10.18    2.568  0.30( 0.30) 1.00      18.5     940.00
      3      161.89   17.93    1.734  0.30( 0.30) 1.00     120.7     950.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      686.30   10.18    2.568  0.30( 0.27) 0.89     318.0     940.00
      2      690.92   10.40    2.537  0.30( 0.27) 0.89     324.6     930.00
      3      697.90   13.38    2.119  0.30( 0.27) 0.90     403.8     910.00
      4      680.76   17.31    1.768  0.30( 0.28) 0.92     494.8     920.00
      5      671.19   17.93    1.734  0.30( 0.28) 0.92     499.1     950.00
      6      661.64   18.32    1.713  0.30( 0.28) 0.92     499.1     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```



```
  PEAK FLOW RATE(CFS) =     697.90    Tc(MIN.) =    13.38
  EFFECTIVE AREA(ACRES) =     403.81   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      499.1
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    905.00 =    6933.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.38
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.119
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B       12.30      0.30      0.100    56
  COMMERCIAL                 B       26.80      0.30      0.100    56
  COMMERCIAL                 B        2.00      0.30      0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.70      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.80      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30      0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.196
  SUBAREA AREA(ACRES) =   46.70      SUBAREA RUNOFF(CFS) =   86.61
  EFFECTIVE AREA(ACRES) =    450.51   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.83
  TOTAL AREA(ACRES) =      545.8       PEAK FLOW RATE(CFS) =     758.30

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      764.37   10.18    2.568  0.30( 0.24) 0.80     364.7     940.00
      2      767.55   10.40    2.537  0.30( 0.24) 0.80     371.3     930.00
      3      758.30   13.38    2.119  0.30( 0.25) 0.83     450.5     910.00
      4      735.90   17.31    1.768  0.30( 0.26) 0.86     541.5     920.00
      5      724.87   17.93    1.734  0.30( 0.26) 0.86     545.8     950.00
      6      714.54   18.32    1.713  0.30( 0.26) 0.86     545.8     900.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     767.55  Tc(MIN.) =   10.40
  AREA-AVERAGED Fm(INCH/HR) =  0.24  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.80  EFFECTIVE AREA(ACRES) =     371.26

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.40
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.537
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        8.00      0.30      0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.00      SUBAREA RUNOFF(CFS) =   18.05
  EFFECTIVE AREA(ACRES) =    379.26   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =      553.8       PEAK FLOW RATE(CFS) =     785.60
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      553.8  TC(MIN.) =     10.40
  EFFECTIVE AREA(ACRES) =    379.26  AREA-AVERAGED Fm(INCH/HR)=  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.785
  PEAK FLOW RATE(CFS)   =     785.60

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      782.65   10.18    2.568  0.30( 0.24) 0.78     372.7     940.00
      2      785.60   10.40    2.537  0.30( 0.24) 0.79     379.3     930.00
      3      773.34   13.38    2.119  0.30( 0.25) 0.82     458.5     910.00
      4      748.41   17.31    1.768  0.30( 0.25) 0.85     549.5     920.00
      5      737.13   17.93    1.734  0.30( 0.25) 0.85     553.8     950.00
      6      726.65   18.32    1.713  0.30( 0.25) 0.85     553.8     900.00
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-4 SUBAREA F                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 25-YR EV AUG 2018 CCHIU                                              *
 **********************************************************************

  FILE NAME: 4F25EVRL.DAT
  TIME/DATE OF STUDY: 07:01 08/08/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  4.986
   2)   10.00;  3.244
   3)   15.00;  2.468
   4)   20.00;  2.035
   5)   25.00;  1.773
   6)   30.00;  1.553
   7)   40.00;  1.354
   8)   50.00;  1.201
   9)   60.00;  1.077
  10)   90.00;  0.909
  11)  120.00;  0.800
  12)  180.00;  0.670
  13)  360.00;  0.498
  14) 1200.00;  0.220
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =    496.00  DOWNSTREAM(FEET) =    485.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.762
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.660
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.70      0.30     1.000    63   13.76
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.50      0.30     1.000    66   13.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.55
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      2.55

**************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   459.00
  FLOW LENGTH(FEET) =  1090.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.45
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.55
  PIPE TRAVEL TIME(MIN.) =   2.82    Tc(MIN.) =   16.58
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =    1404.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 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) =   2.33
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
```

```
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       1.20
  TOTAL STREAM AREA(ACRES) =       1.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.55

****************************************************************************
  FLOW PROCESS FROM NODE    910.00 TO NODE    911.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =    785.00  DOWNSTREAM(FEET) =    612.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.142
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.891
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63    8.14
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.50      0.30     1.000    63    8.14
  NATURAL FAIR COVER
  "OPEN BROUSH"              B        1.00      0.30     1.000    66    8.14
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      5.17
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      5.17

****************************************************************************
  FLOW PROCESS FROM NODE    911.00 TO NODE    912.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    612.00  DOWNSTREAM(FEET) =    525.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   458.00   CHANNEL SLOPE =  0.1900
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.555
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.00      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.60      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        2.30      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.00      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.91
  AVERAGE FLOW DEPTH(FEET) =   0.72   TRAVEL TIME(MIN.) =   0.97
```



```
  Tc(MIN.) =    9.11
  SUBAREA AREA(ACRES) =     4.90       SUBAREA RUNOFF(CFS) =   14.35
  EFFECTIVE AREA(ACRES) =      6.50     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        6.5         PEAK FLOW RATE(CFS) =      19.04

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.85   FLOW VELOCITY(FEET/SEC.) =   8.79
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    912.00 =     786.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    912.00 TO NODE    913.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    470.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   618.00   CHANNEL SLOPE =  0.0890
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.184
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.60      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        4.00      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.60      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        2.70      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.10      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      41.26
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.04
  AVERAGE FLOW DEPTH(FEET) =   1.31   TRAVEL TIME(MIN.) =   1.28
  Tc(MIN.) =   10.39
  SUBAREA AREA(ACRES) =    17.10       SUBAREA RUNOFF(CFS) =   44.38
  EFFECTIVE AREA(ACRES) =     23.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       23.6         PEAK FLOW RATE(CFS) =      61.25

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.52   FLOW VELOCITY(FEET/SEC.) =   8.89
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    913.00 =    1404.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    913.00 TO NODE    902.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   459.00
```

```
  FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.21
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.25
  PIPE TRAVEL TIME(MIN.) =   1.32    Tc(MIN.) =   11.71
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    902.00 =    2294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 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.) =   11.71
  RAINFALL INTENSITY(INCH/HR) =   2.98
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      23.60
  TOTAL STREAM AREA(ACRES) =      23.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      61.25

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.55   16.58    2.331  0.30( 0.30) 1.00       1.2     900.00
      2       61.25   11.71    2.978  0.30( 0.30) 1.00      23.6     910.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       63.63   11.71    2.978  0.30( 0.30) 1.00      24.4     910.00
      2       49.00   16.58    2.331  0.30( 0.30) 1.00      24.8     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.63    Tc(MIN.) =    11.71
  EFFECTIVE AREA(ACRES) =      24.45   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       24.8
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    902.00 =    2294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.71
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.978
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
```



```
  "CHAPARRAL,BROADLEAF"      B        0.20      0.30     1.000    63
  COMMERCIAL                 B        5.50      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.20      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63
  COMMERCIAL                 B        1.00      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.175
  SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =   18.70
  EFFECTIVE AREA(ACRES) =     31.55   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.81
  TOTAL AREA(ACRES) =       31.9       PEAK FLOW RATE(CFS) =      77.63

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.71
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.978
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.20      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.20      0.30     1.000    63
  COMMERCIAL                 B        3.40      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.30      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.712
  SUBAREA AREA(ACRES) =   10.90      SUBAREA RUNOFF(CFS) =   27.12
  EFFECTIVE AREA(ACRES) =     42.45   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =       42.8       PEAK FLOW RATE(CFS) =     104.76

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   459.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =   654.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.55
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     104.76
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   12.22
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    903.00 =    2948.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.22
  RAINFALL INTENSITY(INCH/HR) =   2.90
  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.79
  EFFECTIVE STREAM AREA(ACRES) =      42.45
  TOTAL STREAM AREA(ACRES) =      42.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     104.76

****************************************************************************
  FLOW PROCESS FROM NODE    920.00 TO NODE    921.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   286.00
  ELEVATION DATA: UPSTREAM(FEET) =    860.00  DOWNSTREAM(FEET) =    712.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.737
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.032
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.20      0.30     1.000    66    7.74
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.70      0.30     1.000    66    7.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.02
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      3.02

****************************************************************************
  FLOW PROCESS FROM NODE    921.00 TO NODE    922.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    712.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   594.00   CHANNEL SLOPE =  0.1886
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.659
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.20      0.30     1.000    65
  NATURAL FAIR COVER
```



```
  "CHAPARRAL,BROADLEAF"      B        1.00      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.40      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.40      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.70      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      23.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.25
  AVERAGE FLOW DEPTH(FEET) =   0.93   TRAVEL TIME(MIN.) =   1.07
  Tc(MIN.) =    8.81
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   41.42
  EFFECTIVE AREA(ACRES) =     14.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       14.6         PEAK FLOW RATE(CFS) =      44.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.16   FLOW VELOCITY(FEET/SEC.) =  10.85
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    922.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    922.00 TO NODE    923.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    600.00  DOWNSTREAM(FEET) =    550.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   604.00   CHANNEL SLOPE =  0.0828
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.242
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.70      0.30     1.000    63
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        1.40      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.40      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      54.09
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.37
  AVERAGE FLOW DEPTH(FEET) =   1.47   TRAVEL TIME(MIN.) =   1.20
  Tc(MIN.) =   10.01
  SUBAREA AREA(ACRES) =     7.50       SUBAREA RUNOFF(CFS) =   19.86
  EFFECTIVE AREA(ACRES) =     22.10     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       22.1         PEAK FLOW RATE(CFS) =      58.52

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.51   FLOW VELOCITY(FEET/SEC.) =   8.58
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    923.00 =    1484.00 FEET.

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```

```
 FLOW PROCESS FROM NODE    923.00 TO NODE    924.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    550.00  DOWNSTREAM(FEET) =    495.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   849.00   CHANNEL SLOPE =  0.0648
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.980
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.60      0.30     1.000    65
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.80      0.30     1.000    65
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.80      0.30     1.000    66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        1.10      0.30     1.000    63
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        5.20      0.30     1.000    65
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        6.30      0.30     1.000    63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      76.38
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.37
 AVERAGE FLOW DEPTH(FEET) =   1.74   TRAVEL TIME(MIN.) =   1.69
 Tc(MIN.) =   11.70
 SUBAREA AREA(ACRES) =    14.80       SUBAREA RUNOFF(CFS) =   35.70
 EFFECTIVE AREA(ACRES) =     36.90     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       36.9         PEAK FLOW RATE(CFS) =      89.00

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.85   FLOW VELOCITY(FEET/SEC.) =   8.68
 LONGEST FLOWPATH FROM NODE    920.00 TO NODE    924.00 =    2333.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    924.00 TO NODE    924.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.70
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.980
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        9.70      0.30     1.000    66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B       17.00      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"               B       36.60      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
```



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 SUBAREA AREA(ACRES) =   63.30      SUBAREA RUNOFF(CFS) =  152.68
 EFFECTIVE AREA(ACRES) =    100.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =      100.2       PEAK FLOW RATE(CFS) =     241.68

****************************************************************************
 FLOW PROCESS FROM NODE    924.00 TO NODE    925.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    457.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   607.00   CHANNEL SLOPE =  0.0626
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.837
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.30      0.30     1.000    65
 NATURAL FAIR COVER
 "GRASS"                    B        0.60      0.30     1.000    69
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.70      0.30     1.000    66
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.90      0.30     1.000    65
 NATURAL FAIR COVER
 "GRASS"                    B        0.90      0.30     1.000    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     245.68
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.02
 AVERAGE FLOW DEPTH(FEET) =   2.73   TRAVEL TIME(MIN.) =   0.92
 Tc(MIN.) =   12.62
 SUBAREA AREA(ACRES) =     3.50       SUBAREA RUNOFF(CFS) =    7.99
 EFFECTIVE AREA(ACRES) =    103.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =      103.7         PEAK FLOW RATE(CFS) =     241.68
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  2.71   FLOW VELOCITY(FEET/SEC.) =  11.01
 LONGEST FLOWPATH FROM NODE    920.00 TO NODE    925.00 =    2940.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    925.00 TO NODE    925.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.62
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.837
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
```

```
  "OPEN BRUSH"                B        3.80      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        4.20      0.30     1.000    63
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        5.10      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        7.00      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B       12.00      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   32.10      SUBAREA RUNOFF(CFS) =   73.31
  EFFECTIVE AREA(ACRES) =    135.80   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      135.8       PEAK FLOW RATE(CFS) =     310.13

****************************************************************************
  FLOW PROCESS FROM NODE    925.00 TO NODE    926.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    440.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   884.00   CHANNEL SLOPE =  0.0192
  CHANNEL BASE(FEET) =    0.00    "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.535
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                     B        0.50      0.30     1.000    69
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        0.70      0.30     1.000    63
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        2.30      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        2.40      0.30     1.000    66
  NATURAL FAIR COVER
  "GRASS"                     B        2.50      0.30     1.000    69
  NATURAL FAIR COVER
  "GRASS"                     B        3.20      0.30     1.000    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     321.80
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.57
  AVERAGE FLOW DEPTH(FEET) =   3.76   TRAVEL TIME(MIN.) =   1.95
  Tc(MIN.) =   14.57
  SUBAREA AREA(ACRES) =    11.60       SUBAREA RUNOFF(CFS) =   23.34
  EFFECTIVE AREA(ACRES) =    147.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =      147.4         PEAK FLOW RATE(CFS) =     310.13
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  3.71   FLOW VELOCITY(FEET/SEC.) =   7.51
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    926.00 =    3824.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    926.00 TO NODE    926.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.57
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.535
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        7.40      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"                B       12.40      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"                B       28.20      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B       31.40      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B       42.40      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =  121.80      SUBAREA RUNOFF(CFS) =  245.05
  EFFECTIVE AREA(ACRES) =    269.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      269.2       PEAK FLOW RATE(CFS) =     541.59

****************************************************************************
  FLOW PROCESS FROM NODE    926.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =  1341.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  81.0 INCH PIPE IS  63.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.89
  ESTIMATED PIPE DIAMETER(INCH) =  81.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     541.59
  PIPE TRAVEL TIME(MIN.) =   1.25    Tc(MIN.) =   15.82
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    903.00 =    5165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.82
  RAINFALL INTENSITY(INCH/HR) =   2.40
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =     269.20
  TOTAL STREAM AREA(ACRES) =     269.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     541.59
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    930.00 TO NODE    931.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    715.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.954
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.957
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.60      0.30     1.000    63    7.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.97
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.97

****************************************************************************
  FLOW PROCESS FROM NODE    931.00 TO NODE    932.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    517.00  DOWNSTREAM(FEET) =    430.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   443.00   CHANNEL SLOPE =  0.1964
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.616
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.30      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.30      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.927
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.54
  AVERAGE FLOW DEPTH(FEET) =   0.65   TRAVEL TIME(MIN.) =   0.98
  Tc(MIN.) =    8.93
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =   15.32
  EFFECTIVE AREA(ACRES) =      5.70     AREA-AVERAGED Fm(INCH/HR) =   0.28
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.94
  TOTAL AREA(ACRES) =        5.7         PEAK FLOW RATE(CFS) =      17.11

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.81   FLOW VELOCITY(FEET/SEC.) =   8.66
  LONGEST FLOWPATH FROM NODE    930.00 TO NODE    932.00 =     773.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    932.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =   254.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.88
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.11
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    9.41
  LONGEST FLOWPATH FROM NODE    930.00 TO NODE    903.00 =    1027.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.41
  RAINFALL INTENSITY(INCH/HR) =   3.45
  AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.94
  EFFECTIVE STREAM AREA(ACRES) =       5.70
  TOTAL STREAM AREA(ACRES) =       5.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      17.11

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      104.76   12.22    2.900  0.30( 0.24) 0.79      42.4     910.00
      1       80.67   17.12    2.284  0.30( 0.24) 0.79      42.8     900.00
      2      541.59   15.82    2.397  0.30( 0.30) 1.00     269.2     920.00
      3       17.11    9.41    3.450  0.30( 0.28) 0.94       5.7     930.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      598.34    9.41    3.450  0.30( 0.29) 0.96     198.6     930.00
      2      637.51   12.22    2.900  0.30( 0.29) 0.96     256.1     910.00
      3      640.10   15.82    2.397  0.30( 0.29) 0.97     317.6     920.00
      4      603.91   17.12    2.284  0.30( 0.29) 0.97     317.7     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     640.10    Tc(MIN.) =    15.82
  EFFECTIVE AREA(ACRES) =     317.61   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.97
  TOTAL AREA(ACRES) =      317.7
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    903.00 =    5165.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.82
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.397
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.00      0.30     0.900    56
  COMMERCIAL                 B        5.90      0.30     0.100    56
  COMMERCIAL                 B        7.70      0.30     0.100    56
  COMMERCIAL                 B       13.60      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.237
  SUBAREA AREA(ACRES) =   32.80      SUBAREA RUNOFF(CFS) =   68.68
  EFFECTIVE AREA(ACRES) =    350.41   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      350.5       PEAK FLOW RATE(CFS) =     670.74

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      664.58    9.41    3.450  0.30( 0.26) 0.86     231.4     930.00
      2      685.30   12.22    2.900  0.30( 0.26) 0.88     288.9     910.00
      3      670.74   15.82    2.397  0.30( 0.27) 0.90     350.4     920.00
      4      635.28   17.12    2.284  0.30( 0.27) 0.90     350.5     900.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     685.30  Tc(MIN.) =   12.22
  AREA-AVERAGED Fm(INCH/HR) =  0.26  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.88  EFFECTIVE AREA(ACRES) =     288.89

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    904.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   426.00  DOWNSTREAM(FEET) =   370.00
  FLOW LENGTH(FEET) =   896.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  50.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  37.03
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     685.30
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   12.62
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    904.00 =    6061.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    904.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   12.62
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.837
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.80      0.30     0.100    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
  SUBAREA AREA(ACRES) =    9.40      SUBAREA RUNOFF(CFS) =   22.67
  EFFECTIVE AREA(ACRES) =    298.29   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =      359.9       PEAK FLOW RATE(CFS) =     691.70

****************************************************************************
  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) =   370.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =   872.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  69.0 INCH PIPE IS  51.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.48
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     691.70
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   13.05
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    905.00 =    6933.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.05
  RAINFALL INTENSITY(INCH/HR) =   2.77
  AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.87
  EFFECTIVE STREAM AREA(ACRES) =     298.29
  TOTAL STREAM AREA(ACRES) =     359.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     691.70

****************************************************************************
  FLOW PROCESS FROM NODE    940.00 TO NODE    941.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   304.00
  ELEVATION DATA: UPSTREAM(FEET) =    858.00  DOWNSTREAM(FEET) =    675.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.692
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.048
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63    7.69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.10      0.30     1.000    66    7.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.05
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      4.05

****************************************************************************
  FLOW PROCESS FROM NODE    941.00 TO NODE    942.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    405.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1008.00   CHANNEL SLOPE =  0.2679
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.525
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.80      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.10      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        1.50      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.60      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B       10.20      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      29.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.20
  AVERAGE FLOW DEPTH(FEET) =   0.93   TRAVEL TIME(MIN.) =   1.50
  Tc(MIN.) =    9.19
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   50.22
  EFFECTIVE AREA(ACRES) =     18.50     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       18.5         PEAK FLOW RATE(CFS) =      53.70

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.17   FLOW VELOCITY(FEET/SEC.) =  13.03
```



```
  LONGEST FLOWPATH FROM NODE    940.00 TO NODE    942.00 =    1312.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    942.00 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) =   405.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1041.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.83
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.70
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =   10.03
  LONGEST FLOWPATH FROM NODE    940.00 TO NODE    905.00 =    2353.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.03
  RAINFALL INTENSITY(INCH/HR) =   3.24
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      18.50
  TOTAL STREAM AREA(ACRES) =      18.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      53.70

****************************************************************************
  FLOW PROCESS FROM NODE    950.00 TO NODE    951.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =   1053.00  DOWNSTREAM(FEET) =    990.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.965
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.256
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.40      0.30     1.000    66    9.96
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.00      0.30     1.000    66    9.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.72
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      3.72

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

```
 FLOW PROCESS FROM NODE    951.00 TO NODE    952.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    990.00  DOWNSTREAM(FEET) =    950.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   439.00   CHANNEL SLOPE =  0.0911
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.023
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"                B        0.10      0.30     1.000    66
 NATURAL FAIR COVER
 "OPEN BRUSH"                B        0.40      0.30     1.000    66
 NATURAL FAIR COVER
 "GRASS"                     B        0.60      0.30     1.000    69
 NATURAL FAIR COVER
 "GRASS"                     B        0.70      0.30     1.000    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.93
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.01
 AVERAGE FLOW DEPTH(FEET) =   0.63   TRAVEL TIME(MIN.) =   1.46
 Tc(MIN.) =   11.43
 SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    4.41
 EFFECTIVE AREA(ACRES) =      3.20     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        3.2         PEAK FLOW RATE(CFS) =       7.84

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   5.38
 LONGEST FLOWPATH FROM NODE    950.00 TO NODE    952.00 =     767.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    952.00 TO NODE    953.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    950.00  DOWNSTREAM(FEET) =    675.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   810.00   CHANNEL SLOPE =  0.3395
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.843
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"       B        0.60      0.30     1.000    63
 NATURAL FAIR COVER
 "GRASS"                     B        1.50      0.30     1.000    69
 NATURAL FAIR COVER
 "GRASS"                     B        1.70      0.30     1.000    69
 NATURAL FAIR COVER
 "OPEN BRUSH"                B        3.40      0.30     1.000    66
```



```
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"       B        7.20      0.30     1.000    63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      24.33
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.65
 AVERAGE FLOW DEPTH(FEET) =   0.83   TRAVEL TIME(MIN.) =   1.16
 Tc(MIN.) =   12.59
 SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   32.95
 EFFECTIVE AREA(ACRES) =     17.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       17.6         PEAK FLOW RATE(CFS) =      40.28

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.01   FLOW VELOCITY(FEET/SEC.) =  13.16
 LONGEST FLOWPATH FROM NODE    950.00 TO NODE    953.00 =    1577.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    953.00 TO NODE    954.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    475.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   955.00   CHANNEL SLOPE =  0.2094
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.647
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "GRASS"                     B        0.10      0.30     1.000    69
 NATURAL FAIR COVER
 "OPEN BRUSH"                B        0.10      0.30     1.000    66
 NATURAL FAIR COVER
 "OPEN BRUSH"                B        0.60      0.30     1.000    66
 NATURAL FAIR COVER
 "GRASS"                     B        2.10      0.30     1.000    69
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"       B        8.90      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"                B       14.80      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      68.38
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.59
 AVERAGE FLOW DEPTH(FEET) =   1.35   TRAVEL TIME(MIN.) =   1.26
 Tc(MIN.) =   13.85
 SUBAREA AREA(ACRES) =    26.60       SUBAREA RUNOFF(CFS) =   56.18
 EFFECTIVE AREA(ACRES) =     44.20     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       44.2         PEAK FLOW RATE(CFS) =      93.34

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.51   FLOW VELOCITY(FEET/SEC.) =  13.58
 LONGEST FLOWPATH FROM NODE    950.00 TO NODE    954.00 =    2532.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    954.00 TO NODE    955.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   814.00   CHANNEL SLOPE =  0.0799
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.449
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.40      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.40      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.90      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.20      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        9.50      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     111.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.90
  AVERAGE FLOW DEPTH(FEET) =   1.94   TRAVEL TIME(MIN.) =   1.37
  Tc(MIN.) =   15.22
  SUBAREA AREA(ACRES) =    18.50       SUBAREA RUNOFF(CFS) =   35.78
  EFFECTIVE AREA(ACRES) =     62.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       62.7         PEAK FLOW RATE(CFS) =     121.27

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.00   FLOW VELOCITY(FEET/SEC.) =  10.15
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    955.00 =    3346.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    955.00 TO NODE    956.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    375.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   643.00   CHANNEL SLOPE =  0.0544
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.346
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.20      0.30     1.000    63
  NATURAL FAIR COVER
```



```
  "WOODLAND,GRASS"           B        0.50      0.30     1.000    65
  NATURAL FAIR COVER
  "GRASS"                    B        1.20      0.30     1.000    69
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        3.60      0.30     1.000    65
  NATURAL FAIR COVER
  "GRASS"                    B        3.80      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.10      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     135.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.01
  AVERAGE FLOW DEPTH(FEET) =   2.24   TRAVEL TIME(MIN.) =   1.19
  Tc(MIN.) =   16.41
  SUBAREA AREA(ACRES) =    15.40       SUBAREA RUNOFF(CFS) =   28.36
  EFFECTIVE AREA(ACRES) =     78.10     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       78.1         PEAK FLOW RATE(CFS) =     143.81

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.29   FLOW VELOCITY(FEET/SEC.) =   9.17
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    956.00 =    3989.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.41
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.346
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B       14.30      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B       21.60      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   35.90      SUBAREA RUNOFF(CFS) =   66.11
  EFFECTIVE AREA(ACRES) =    114.00   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      114.0       PEAK FLOW RATE(CFS) =     209.92

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.41
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.346
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
  NATURAL FAIR COVER
```

```
  "OPEN BRUSH"                B        0.30      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        0.60      0.30     1.000    63
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        2.30      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        3.20      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    6.70      SUBAREA RUNOFF(CFS) =   12.34
  EFFECTIVE AREA(ACRES) =    120.70   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      120.7       PEAK FLOW RATE(CFS) =     222.26

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 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) =   375.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1304.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.72
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     222.26
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =   17.37
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    905.00 =    5293.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.37
  RAINFALL INTENSITY(INCH/HR) =   2.26
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =     120.70
  TOTAL STREAM AREA(ACRES) =     120.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     222.26

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      664.58   10.26    3.204  0.30( 0.25) 0.85     240.8     930.00
      1      691.70   13.05    2.770  0.30( 0.26) 0.87     298.3     910.00
      1      678.37   16.66    2.324  0.30( 0.27) 0.89     359.8     920.00
      1      641.89   17.97    2.211  0.30( 0.27) 0.89     359.9     900.00
      2       53.70   10.03    3.240  0.30( 0.30) 1.00      18.5     940.00
      3      222.26   17.37    2.263  0.30( 0.30) 1.00     120.7     950.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.
```



```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      903.33   10.03    3.240  0.30( 0.27) 0.89     323.5     940.00
      2      911.83   10.26    3.204  0.30( 0.27) 0.89     330.6     930.00
      3      947.03   13.05    2.770  0.30( 0.27) 0.90     407.5     910.00
      4      935.21   16.66    2.324  0.30( 0.28) 0.92     494.1     920.00
      5      916.89   17.37    2.263  0.30( 0.28) 0.92     499.1     950.00
      6      893.11   17.97    2.211  0.30( 0.28) 0.92     499.1     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     947.03    Tc(MIN.) =    13.05
  EFFECTIVE AREA(ACRES) =     407.53   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      499.1
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    905.00 =    6933.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.05
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.770
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B       12.30      0.30      0.100    56
  COMMERCIAL                 B       26.80      0.30      0.100    56
  COMMERCIAL                 B        2.00      0.30      0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.70      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.80      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30      0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.196
  SUBAREA AREA(ACRES) =   46.70      SUBAREA RUNOFF(CFS) =  113.95
  EFFECTIVE AREA(ACRES) =    454.23   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.83
  TOTAL AREA(ACRES) =      545.8       PEAK FLOW RATE(CFS) =    1030.40

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.05
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.770
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        8.00      0.30      0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.00      SUBAREA RUNOFF(CFS) =   19.73
```

```
  EFFECTIVE AREA(ACRES) =    462.23   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =      553.8       PEAK FLOW RATE(CFS) =    1050.12
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      553.8  TC(MIN.) =     13.05
  EFFECTIVE AREA(ACRES) =    462.23  AREA-AVERAGED Fm(INCH/HR)=  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.819
  PEAK FLOW RATE(CFS)   =    1050.12

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1022.51   10.03    3.240  0.30( 0.24) 0.79     378.2     940.00
      2     1028.93   10.26    3.204  0.30( 0.24) 0.79     385.3     930.00
      3     1050.12   13.05    2.770  0.30( 0.25) 0.82     462.2     910.00
      4     1022.32   16.66    2.324  0.30( 0.25) 0.85     548.8     920.00
      5     1000.98   17.37    2.263  0.30( 0.25) 0.85     553.8     950.00
      6      974.93   17.97    2.211  0.30( 0.25) 0.85     553.8     900.00
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2013 Advanced Engineering Software (aes)
             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                         Analysis prepared by:

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                          Santa Ana, CA 92707


 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-4 SUBAREA F                                                     *
* RATIONAL METHOD - REGIONAL RAINFALL                                    *
* 50-YR EV AUG 2018 CCHIU                                                *
 ************************************************************************

  FILE NAME: 4F50EVRL.DAT
  TIME/DATE OF STUDY: 06:53 08/08/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  5.516
   2)   10.00;  3.520
   3)   15.00;  2.687
   4)   20.00;  2.242
   5)   25.00;  1.935
   6)   30.00;  1.742
   7)   40.00;  1.473
   8)   50.00;  1.311
   9)   60.00;  1.211
  10)   90.00;  1.008
  11)  120.00;  0.877
  12)  180.00;  0.757
  13)  360.00;  0.563
  14) 1200.00;  0.248
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =    496.00  DOWNSTREAM(FEET) =    485.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.762
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.893
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.70      0.30     1.000    63   13.76
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.50      0.30     1.000    66   13.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.80
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      2.80

****************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   459.00
  FLOW LENGTH(FEET) =  1090.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.80
  PIPE TRAVEL TIME(MIN.) =   2.74    Tc(MIN.) =   16.50
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =    1404.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 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.) =   16.50
  RAINFALL INTENSITY(INCH/HR) =   2.55
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
```

```
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       1.20
  TOTAL STREAM AREA(ACRES) =       1.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.80

****************************************************************************
  FLOW PROCESS FROM NODE    910.00 TO NODE    911.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =    785.00  DOWNSTREAM(FEET) =    612.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.142
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.262
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63    8.14
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.50      0.30     1.000    63    8.14
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.00      0.30     1.000    66    8.14
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      5.70
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      5.70

****************************************************************************
  FLOW PROCESS FROM NODE    911.00 TO NODE    912.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    612.00  DOWNSTREAM(FEET) =    525.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   458.00   CHANNEL SLOPE =  0.1900
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.884
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.00      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.60      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        2.30      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.00      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.62
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.06
  AVERAGE FLOW DEPTH(FEET) =   0.75   TRAVEL TIME(MIN.) =   0.95
```



```
  Tc(MIN.) =    9.09
  SUBAREA AREA(ACRES) =     4.90       SUBAREA RUNOFF(CFS) =   15.80
  EFFECTIVE AREA(ACRES) =      6.50     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        6.5          PEAK FLOW RATE(CFS) =      20.97

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.88   FLOW VELOCITY(FEET/SEC.) =   9.02
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    912.00 =     786.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    912.00 TO NODE    913.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    470.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   618.00   CHANNEL SLOPE =  0.0890
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.464
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.60      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        4.00      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.60      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        2.70      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.10      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      45.33
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.25
  AVERAGE FLOW DEPTH(FEET) =   1.35   TRAVEL TIME(MIN.) =   1.25
  Tc(MIN.) =   10.34
  SUBAREA AREA(ACRES) =    17.10       SUBAREA RUNOFF(CFS) =   48.69
  EFFECTIVE AREA(ACRES) =     23.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       23.6          PEAK FLOW RATE(CFS) =      67.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.57   FLOW VELOCITY(FEET/SEC.) =   9.10
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    913.00 =    1404.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    913.00 TO NODE    902.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   459.00
```

```
  FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.33
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      67.20
  PIPE TRAVEL TIME(MIN.) =   1.31    Tc(MIN.) =   11.65
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    902.00 =    2294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 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.) =   11.65
  RAINFALL INTENSITY(INCH/HR) =   3.25
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      23.60
  TOTAL STREAM AREA(ACRES) =      23.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      67.20

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.80   16.50    2.553  0.30( 0.30) 1.00       1.2     900.00
      2       67.20   11.65    3.246  0.30( 0.30) 1.00      23.6     910.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       69.78   11.65    3.246  0.30( 0.30) 1.00      24.4     910.00
      2       54.20   16.50    2.553  0.30( 0.30) 1.00      24.8     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      69.78    Tc(MIN.) =    11.65
  EFFECTIVE AREA(ACRES) =      24.45   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       24.8
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    902.00 =    2294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.65
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.246
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
```



```
  "CHAPARRAL,BROADLEAF"      B        0.20      0.30     1.000    63
  COMMERCIAL                 B        5.50      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.20      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63
  COMMERCIAL                 B        1.00      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.175
  SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =   20.41
  EFFECTIVE AREA(ACRES) =     31.55   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.81
  TOTAL AREA(ACRES) =       31.9       PEAK FLOW RATE(CFS) =      85.22

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.65
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.246
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.20      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.20      0.30     1.000    63
  COMMERCIAL                 B        3.40      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.30      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.712
  SUBAREA AREA(ACRES) =   10.90      SUBAREA RUNOFF(CFS) =   29.75
  EFFECTIVE AREA(ACRES) =     42.45   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =       42.8       PEAK FLOW RATE(CFS) =     114.96

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   459.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =   654.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.38
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     114.96
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   12.13
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    903.00 =    2948.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.13
  RAINFALL INTENSITY(INCH/HR) =   3.16
  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.79
  EFFECTIVE STREAM AREA(ACRES) =      42.45
  TOTAL STREAM AREA(ACRES) =      42.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     114.96

****************************************************************************
  FLOW PROCESS FROM NODE    920.00 TO NODE    921.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   286.00
  ELEVATION DATA: UPSTREAM(FEET) =    860.00  DOWNSTREAM(FEET) =    712.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.737
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.423
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        0.20      0.30     1.000    66    7.74
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        0.70      0.30     1.000    66    7.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.34
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      3.34

****************************************************************************
  FLOW PROCESS FROM NODE    921.00 TO NODE    922.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    712.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   594.00   CHANNEL SLOPE =  0.1886
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.009
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        0.20      0.30     1.000    65
  NATURAL FAIR COVER
```



```
  "CHAPARRAL,BROADLEAF"       B        1.00      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        1.40      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        4.40      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        6.70      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      26.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.53
  AVERAGE FLOW DEPTH(FEET) =   0.96   TRAVEL TIME(MIN.) =   1.04
  Tc(MIN.) =    8.78
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   45.73
  EFFECTIVE AREA(ACRES) =     14.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       14.6          PEAK FLOW RATE(CFS) =      48.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.21   FLOW VELOCITY(FEET/SEC.) =  11.13
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    922.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    922.00 TO NODE    923.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    600.00  DOWNSTREAM(FEET) =    550.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   604.00   CHANNEL SLOPE =  0.0828
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.542
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        0.70      0.30     1.000    63
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        1.40      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        5.40      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      59.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.60
  AVERAGE FLOW DEPTH(FEET) =   1.52   TRAVEL TIME(MIN.) =   1.17
  Tc(MIN.) =    9.95
  SUBAREA AREA(ACRES) =     7.50       SUBAREA RUNOFF(CFS) =   21.88
  EFFECTIVE AREA(ACRES) =     22.10     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       22.1          PEAK FLOW RATE(CFS) =      64.47

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.57   FLOW VELOCITY(FEET/SEC.) =   8.75
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    923.00 =    1484.00 FEET.

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

```
 FLOW PROCESS FROM NODE    923.00 TO NODE    924.00 IS CODE =  51
--------------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    550.00  DOWNSTREAM(FEET) =    495.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   849.00   CHANNEL SLOPE =  0.0648
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.253
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.60      0.30     1.000    65
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.80      0.30     1.000    65
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.80      0.30     1.000    66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        1.10      0.30     1.000    63
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        5.20      0.30     1.000    65
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        6.30      0.30     1.000    63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      84.15
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.55
 AVERAGE FLOW DEPTH(FEET) =   1.81   TRAVEL TIME(MIN.) =   1.65
 Tc(MIN.) =   11.60
 SUBAREA AREA(ACRES) =    14.80       SUBAREA RUNOFF(CFS) =   39.34
 EFFECTIVE AREA(ACRES) =     36.90     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       36.9         PEAK FLOW RATE(CFS) =      98.08

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.92   FLOW VELOCITY(FEET/SEC.) =   8.89
 LONGEST FLOWPATH FROM NODE    920.00 TO NODE    924.00 =    2333.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    924.00 TO NODE    924.00 IS CODE =  81
--------------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
 MAINLINE Tc(MIN.) =   11.60
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.253
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        9.70      0.30     1.000    66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B       17.00      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"               B       36.60      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
```



```
 SUBAREA AREA(ACRES) =   63.30      SUBAREA RUNOFF(CFS) =  168.25
 EFFECTIVE AREA(ACRES) =    100.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =      100.2       PEAK FLOW RATE(CFS) =     266.33

****************************************************************************
 FLOW PROCESS FROM NODE    924.00 TO NODE    925.00 IS CODE =  51
--------------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    457.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   607.00   CHANNEL SLOPE =  0.0626
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.104
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.30      0.30     1.000    65
 NATURAL FAIR COVER
 "GRASS"                    B        0.60      0.30     1.000    69
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.70      0.30     1.000    66
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.90      0.30     1.000    65
 NATURAL FAIR COVER
 "GRASS"                    B        0.90      0.30     1.000    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     270.75
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.30
 AVERAGE FLOW DEPTH(FEET) =   2.83   TRAVEL TIME(MIN.) =   0.90
 Tc(MIN.) =   12.50
 SUBAREA AREA(ACRES) =     3.50       SUBAREA RUNOFF(CFS) =    8.83
 EFFECTIVE AREA(ACRES) =    103.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =      103.7         PEAK FLOW RATE(CFS) =     266.33
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  2.81   FLOW VELOCITY(FEET/SEC.) =  11.24
 LONGEST FLOWPATH FROM NODE    920.00 TO NODE    925.00 =    2940.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    925.00 TO NODE    925.00 IS CODE =  81
--------------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
 MAINLINE Tc(MIN.) =   12.50
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.104
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
```

```
  "OPEN BRUSH"                B        3.80      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        4.20      0.30     1.000    63
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        5.10      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        7.00      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B       12.00      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   32.10      SUBAREA RUNOFF(CFS) =   81.01
  EFFECTIVE AREA(ACRES) =    135.80   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      135.8       PEAK FLOW RATE(CFS) =     342.73

****************************************************************************
  FLOW PROCESS FROM NODE    925.00 TO NODE    926.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    440.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   884.00   CHANNEL SLOPE =  0.0192
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.789
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                     B        0.50      0.30     1.000    69
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        0.70      0.30     1.000    63
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        2.30      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        2.40      0.30     1.000    66
  NATURAL FAIR COVER
  "GRASS"                     B        2.50      0.30     1.000    69
  NATURAL FAIR COVER
  "GRASS"                     B        3.20      0.30     1.000    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     355.73
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.78
  AVERAGE FLOW DEPTH(FEET) =   3.90   TRAVEL TIME(MIN.) =   1.89
  Tc(MIN.) =   14.39
  SUBAREA AREA(ACRES) =    11.60       SUBAREA RUNOFF(CFS) =   25.98
  EFFECTIVE AREA(ACRES) =    147.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =      147.4         PEAK FLOW RATE(CFS) =     342.73
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  3.85   FLOW VELOCITY(FEET/SEC.) =   7.71
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    926.00 =    3824.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    926.00 TO NODE    926.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.39
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.789
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        7.40      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"                B       12.40      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"                B       28.20      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B       31.40      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B       42.40      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =  121.80      SUBAREA RUNOFF(CFS) =  272.82
  EFFECTIVE AREA(ACRES) =    269.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      269.2       PEAK FLOW RATE(CFS) =     602.99

****************************************************************************
  FLOW PROCESS FROM NODE    926.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =  1341.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  84.0 INCH PIPE IS  66.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.34
  ESTIMATED PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     602.99
  PIPE TRAVEL TIME(MIN.) =   1.22    Tc(MIN.) =   15.61
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    903.00 =    5165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.61
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =     269.20
  TOTAL STREAM AREA(ACRES) =     269.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     602.99
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    930.00 TO NODE    931.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    715.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.954
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.337
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.60      0.30     1.000    63    7.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.18
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      2.18

****************************************************************************
  FLOW PROCESS FROM NODE    931.00 TO NODE    932.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    517.00  DOWNSTREAM(FEET) =    430.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   443.00   CHANNEL SLOPE =  0.1964
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.957
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.30      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.30      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.927
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.75
  AVERAGE FLOW DEPTH(FEET) =   0.68   TRAVEL TIME(MIN.) =   0.95
  Tc(MIN.) =    8.91
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =   16.88
  EFFECTIVE AREA(ACRES) =      5.70     AREA-AVERAGED Fm(INCH/HR) =   0.28
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.94
  TOTAL AREA(ACRES) =        5.7         PEAK FLOW RATE(CFS) =      18.86

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =   8.86
  LONGEST FLOWPATH FROM NODE    930.00 TO NODE    932.00 =     773.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    932.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =   254.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.94
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.86
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    9.38
  LONGEST FLOWPATH FROM NODE    930.00 TO NODE    903.00 =    1027.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.38
  RAINFALL INTENSITY(INCH/HR) =   3.77
  AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.94
  EFFECTIVE STREAM AREA(ACRES) =       5.70
  TOTAL STREAM AREA(ACRES) =       5.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      114.96   12.13    3.165  0.30( 0.24) 0.79      42.4     910.00
      1       89.22   17.02    2.507  0.30( 0.24) 0.79      42.8     900.00
      2      602.99   15.61    2.633  0.30( 0.30) 1.00     269.2     920.00
      3       18.86    9.38    3.768  0.30( 0.28) 0.94       5.7     930.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      664.66    9.38    3.768  0.30( 0.29) 0.96     200.3     930.00
      2      706.15   12.13    3.165  0.30( 0.29) 0.96     257.4     910.00
      3      712.38   15.61    2.633  0.30( 0.29) 0.97     317.6     920.00
      4      671.73   17.02    2.507  0.30( 0.29) 0.97     317.7     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     712.38    Tc(MIN.) =    15.61
  EFFECTIVE AREA(ACRES) =     317.60   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.97
  TOTAL AREA(ACRES) =      317.7
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    903.00 =    5165.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.61
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.633
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.00      0.30     0.900    56
  COMMERCIAL                 B        5.90      0.30     0.100    56
  COMMERCIAL                 B        7.70      0.30     0.100    56
  COMMERCIAL                 B       13.60      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.237
  SUBAREA AREA(ACRES) =   32.80      SUBAREA RUNOFF(CFS) =   75.63
  EFFECTIVE AREA(ACRES) =    350.40   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      350.5       PEAK FLOW RATE(CFS) =     745.00

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      736.19    9.38    3.768  0.30( 0.26) 0.86     233.1     930.00
      2      757.52   12.13    3.165  0.30( 0.26) 0.88     290.2     910.00
      3      745.00   15.61    2.633  0.30( 0.27) 0.90     350.4     920.00
      4      705.52   17.02    2.507  0.30( 0.27) 0.90     350.5     900.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     757.52  Tc(MIN.) =   12.13
  AREA-AVERAGED Fm(INCH/HR) =  0.26  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.88  EFFECTIVE AREA(ACRES) =     290.22

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    904.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   426.00  DOWNSTREAM(FEET) =   370.00
  FLOW LENGTH(FEET) =   896.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  51.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  38.15
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     757.52
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   12.52
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    904.00 =    6061.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    904.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   12.52
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.099
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.80      0.30     0.100    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
  SUBAREA AREA(ACRES) =    9.40      SUBAREA RUNOFF(CFS) =   24.88
  EFFECTIVE AREA(ACRES) =    299.62   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =      359.9       PEAK FLOW RATE(CFS) =     765.37

****************************************************************************
  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) =   370.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =   872.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  69.0 INCH PIPE IS  56.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.72
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     765.37
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   12.96
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    905.00 =    6933.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.96
  RAINFALL INTENSITY(INCH/HR) =   3.03
  AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.87
  EFFECTIVE STREAM AREA(ACRES) =     299.62
  TOTAL STREAM AREA(ACRES) =     359.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     765.37

****************************************************************************
  FLOW PROCESS FROM NODE    940.00 TO NODE    941.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   304.00
  ELEVATION DATA: UPSTREAM(FEET) =    858.00  DOWNSTREAM(FEET) =    675.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.692
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.441
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63    7.69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.10      0.30     1.000    66    7.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.47
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      4.47

****************************************************************************
  FLOW PROCESS FROM NODE    941.00 TO NODE    942.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    405.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1008.00   CHANNEL SLOPE =  0.2679
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.853
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.80      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.10      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        1.50      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.60      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B       10.20      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      32.30
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.40
  AVERAGE FLOW DEPTH(FEET) =   0.97   TRAVEL TIME(MIN.) =   1.47
  Tc(MIN.) =    9.17
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   55.32
  EFFECTIVE AREA(ACRES) =     18.50     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       18.5         PEAK FLOW RATE(CFS) =      59.16

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.22   FLOW VELOCITY(FEET/SEC.) =  13.34
```



```
  LONGEST FLOWPATH FROM NODE    940.00 TO NODE    942.00 =    1312.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    942.00 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) =   405.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1041.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.77
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      59.16
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =    9.96
  LONGEST FLOWPATH FROM NODE    940.00 TO NODE    905.00 =    2353.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.96
  RAINFALL INTENSITY(INCH/HR) =   3.53
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      18.50
  TOTAL STREAM AREA(ACRES) =      18.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      59.16

****************************************************************************
  FLOW PROCESS FROM NODE    950.00 TO NODE    951.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =   1053.00  DOWNSTREAM(FEET) =    990.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.965
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.534
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.40      0.30     1.000    66    9.96
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.00      0.30     1.000    66    9.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.07
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      4.07

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

```
 FLOW PROCESS FROM NODE    951.00 TO NODE    952.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    990.00  DOWNSTREAM(FEET) =    950.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   439.00   CHANNEL SLOPE =  0.0911
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.287
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"                B        0.10      0.30     1.000    66
 NATURAL FAIR COVER
 "OPEN BRUSH"                B        0.40      0.30     1.000    66
 NATURAL FAIR COVER
 "GRASS"                     B        0.60      0.30     1.000    69
 NATURAL FAIR COVER
 "GRASS"                     B        0.70      0.30     1.000    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.50
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.10
 AVERAGE FLOW DEPTH(FEET) =   0.65   TRAVEL TIME(MIN.) =   1.43
 Tc(MIN.) =   11.40
 SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    4.84
 EFFECTIVE AREA(ACRES) =      3.20     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        3.2         PEAK FLOW RATE(CFS) =       8.60

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.72   FLOW VELOCITY(FEET/SEC.) =   5.50
 LONGEST FLOWPATH FROM NODE    950.00 TO NODE    952.00 =     767.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    952.00 TO NODE    953.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    950.00  DOWNSTREAM(FEET) =    675.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   810.00   CHANNEL SLOPE =  0.3395
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.098
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"       B        0.60      0.30     1.000    63
 NATURAL FAIR COVER
 "GRASS"                     B        1.50      0.30     1.000    69
 NATURAL FAIR COVER
 "GRASS"                     B        1.70      0.30     1.000    69
 NATURAL FAIR COVER
 "OPEN BRUSH"                B        3.40      0.30     1.000    66
```



```
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"       B        7.20      0.30     1.000    63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      26.75
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.92
 AVERAGE FLOW DEPTH(FEET) =   0.86   TRAVEL TIME(MIN.) =   1.13
 Tc(MIN.) =   12.53
 SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   36.27
 EFFECTIVE AREA(ACRES) =     17.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       17.6         PEAK FLOW RATE(CFS) =      44.33

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.04   FLOW VELOCITY(FEET/SEC.) =  13.60
 LONGEST FLOWPATH FROM NODE    950.00 TO NODE    953.00 =    1577.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    953.00 TO NODE    954.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    475.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   955.00   CHANNEL SLOPE =  0.2094
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.893
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "GRASS"                     B        0.10      0.30     1.000    69
 NATURAL FAIR COVER
 "OPEN BRUSH"                B        0.10      0.30     1.000    66
 NATURAL FAIR COVER
 "OPEN BRUSH"                B        0.60      0.30     1.000    66
 NATURAL FAIR COVER
 "GRASS"                     B        2.10      0.30     1.000    69
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"       B        8.90      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"                B       14.80      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      75.37
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.94
 AVERAGE FLOW DEPTH(FEET) =   1.39   TRAVEL TIME(MIN.) =   1.23
 Tc(MIN.) =   13.76
 SUBAREA AREA(ACRES) =    26.60       SUBAREA RUNOFF(CFS) =   62.09
 EFFECTIVE AREA(ACRES) =     44.20     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       44.2         PEAK FLOW RATE(CFS) =     103.17

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.57   FLOW VELOCITY(FEET/SEC.) =  13.97
 LONGEST FLOWPATH FROM NODE    950.00 TO NODE    954.00 =    2532.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    954.00 TO NODE    955.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   814.00   CHANNEL SLOPE =  0.0799
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.678
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.40      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.40      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.90      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.20      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        9.50      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     122.97
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.15
  AVERAGE FLOW DEPTH(FEET) =   2.01   TRAVEL TIME(MIN.) =   1.34
  Tc(MIN.) =   15.10
  SUBAREA AREA(ACRES) =    18.50       SUBAREA RUNOFF(CFS) =   39.60
  EFFECTIVE AREA(ACRES) =     62.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       62.7         PEAK FLOW RATE(CFS) =     134.21

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.08   FLOW VELOCITY(FEET/SEC.) =  10.36
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    955.00 =    3346.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    955.00 TO NODE    956.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    375.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   643.00   CHANNEL SLOPE =  0.0544
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.575
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.20      0.30     1.000    63
  NATURAL FAIR COVER
```



```
  "WOODLAND,GRASS"           B        0.50      0.30     1.000    65
  NATURAL FAIR COVER
  "GRASS"                    B        1.20      0.30     1.000    69
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        3.60      0.30     1.000    65
  NATURAL FAIR COVER
  "GRASS"                    B        3.80      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.10      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     149.98
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.26
  AVERAGE FLOW DEPTH(FEET) =   2.32   TRAVEL TIME(MIN.) =   1.16
  Tc(MIN.) =   16.26
  SUBAREA AREA(ACRES) =    15.40       SUBAREA RUNOFF(CFS) =   31.54
  EFFECTIVE AREA(ACRES) =     78.10     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       78.1         PEAK FLOW RATE(CFS) =     159.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.38   FLOW VELOCITY(FEET/SEC.) =   9.39
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    956.00 =    3989.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.26
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.575
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B       14.30      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B       21.60      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   35.90      SUBAREA RUNOFF(CFS) =   73.51
  EFFECTIVE AREA(ACRES) =    114.00   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      114.0       PEAK FLOW RATE(CFS) =     233.44

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.26
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.575
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
  NATURAL FAIR COVER
```

```
  "OPEN BRUSH"                B        0.30      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        0.60      0.30     1.000    63
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        2.30      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        3.20      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    6.70      SUBAREA RUNOFF(CFS) =   13.72
  EFFECTIVE AREA(ACRES) =    120.70   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      120.7       PEAK FLOW RATE(CFS) =     247.16

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 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) =   375.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1304.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  38.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.96
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     247.16
  PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =   17.20
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    905.00 =    5293.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.20
  RAINFALL INTENSITY(INCH/HR) =   2.49
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =     120.70
  TOTAL STREAM AREA(ACRES) =     120.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     247.16

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      736.19   10.20    3.486  0.30( 0.25) 0.85     242.5     930.00
      1      765.37   12.96    3.028  0.30( 0.26) 0.87     299.6     910.00
      1      754.64   16.43    2.560  0.30( 0.27) 0.89     359.8     920.00
      1      714.02   17.85    2.433  0.30( 0.27) 0.89     359.9     900.00
      2       59.16    9.96    3.535  0.30( 0.30) 1.00      18.5     940.00
      3      247.16   17.20    2.491  0.30( 0.30) 1.00     120.7     950.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.
```



```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1     1000.17    9.96    3.535  0.30( 0.27) 0.89     325.2     940.00
      2     1007.65   10.20    3.486  0.30( 0.27) 0.89     332.6     930.00
      3     1046.99   12.96    3.028  0.30( 0.27) 0.90     409.0     910.00
      4     1039.44   16.43    2.560  0.30( 0.28) 0.92     493.6     920.00
      5     1019.77   17.20    2.491  0.30( 0.28) 0.92     499.1     950.00
      6      993.71   17.85    2.433  0.30( 0.28) 0.92     499.1     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1046.99    Tc(MIN.) =    12.96
  EFFECTIVE AREA(ACRES) =     409.03   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      499.1
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    905.00 =    6933.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.96
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.028
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B       12.30      0.30     0.100    56
  COMMERCIAL                B       26.80      0.30     0.100    56
  COMMERCIAL                B        2.00      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        2.70      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.80      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        2.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.196
  SUBAREA AREA(ACRES) =   46.70      SUBAREA RUNOFF(CFS) =  124.78
  EFFECTIVE AREA(ACRES) =    455.73   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.83
  TOTAL AREA(ACRES) =      545.8       PEAK FLOW RATE(CFS) =    1139.36

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.96
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.028
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        8.00      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.00      SUBAREA RUNOFF(CFS) =   21.58
```

EFFECTIVE AREA(ACRES) = 463.73 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82
TOTAL AREA(ACRES) = 553.8 PEAK FLOW RATE(CFS) = 1160.94

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 553.8 TC(MIN.) = 12.96
EFFECTIVE AREA(ACRES) = 463.73 AREA-AVERAGED Fm(INCH/HR)= 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.820
PEAK FLOW RATE(CFS) = 1160.94

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1127.75	9.96	3.535	0.30(0.24)	0.79	379.9	940.00
2	1132.57	10.20	3.486	0.30(0.24)	0.79	387.3	930.00
3	1160.94	12.96	3.028	0.30(0.25)	0.82	463.7	910.00
4	1137.63	16.43	2.560	0.30(0.25)	0.85	548.3	920.00
5	1114.54	17.20	2.491	0.30(0.25)	0.85	553.8	950.00
6	1085.95	17.85	2.433	0.30(0.25)	0.85	553.8	900.00

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2013 Advanced Engineering Software (aes)
             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                          Analysis prepared by:

                        Michael Baker International
                      5 Hutton Centre Drive, Suite 500
                           Santa Ana, CA 92707


 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA F                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 100-YR EV AUG 2018 CCHIU                                             *
 **********************************************************************

  FILE NAME: 4F00EVRL.DAT
  TIME/DATE OF STUDY: 06:48 08/08/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  6.102
   2)   10.00;  3.901
   3)   15.00;  3.005
   4)   20.00;  2.465
   5)   25.00;  2.129
   6)   30.00;  1.900
   7)   40.00;  1.644
   8)   50.00;  1.419
   9)   60.00;  1.320
  10)   90.00;  1.119
  11)  120.00;  0.983
  12)  180.00;  0.826
  13)  360.00;  0.617
  14) 1200.00;  0.271
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =    496.00  DOWNSTREAM(FEET) =    485.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.762
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.227
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.70      0.30     1.000    63   13.76
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.50      0.30     1.000    66   13.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.16
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      3.16

**************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   459.00
  FLOW LENGTH(FEET) =  1090.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.85
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.16
  PIPE TRAVEL TIME(MIN.) =   2.65    Tc(MIN.) =   16.41
  LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =    1404.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 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.) =   16.41
  RAINFALL INTENSITY(INCH/HR) =   2.85
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
```

```
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       1.20
  TOTAL STREAM AREA(ACRES) =       1.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.16

****************************************************************************
  FLOW PROCESS FROM NODE    910.00 TO NODE    911.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =    785.00  DOWNSTREAM(FEET) =    612.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.142
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.719
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63    8.14
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.50      0.30     1.000    63    8.14
  NATURAL FAIR COVER
  "OPEN BROUSH"              B        1.00      0.30     1.000    66    8.14
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      6.36
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      6.36

****************************************************************************
  FLOW PROCESS FROM NODE    911.00 TO NODE    912.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    612.00  DOWNSTREAM(FEET) =    525.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   458.00   CHANNEL SLOPE =  0.1900
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.315
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        1.00      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.60      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        2.30      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.00      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.32
  AVERAGE FLOW DEPTH(FEET) =   0.78   TRAVEL TIME(MIN.) =   0.92
```



```
  Tc(MIN.) =    9.06
  SUBAREA AREA(ACRES) =     4.90       SUBAREA RUNOFF(CFS) =   17.71
  EFFECTIVE AREA(ACRES) =      6.50     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        6.5          PEAK FLOW RATE(CFS) =      23.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.92   FLOW VELOCITY(FEET/SEC.) =   9.28
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    912.00 =     786.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    912.00 TO NODE    913.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    470.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   618.00   CHANNEL SLOPE =  0.0890
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.852
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.60      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        4.00      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.60      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        2.70      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.10      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      50.86
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.48
  AVERAGE FLOW DEPTH(FEET) =   1.41   TRAVEL TIME(MIN.) =   1.22
  Tc(MIN.) =   10.27
  SUBAREA AREA(ACRES) =    17.10       SUBAREA RUNOFF(CFS) =   54.66
  EFFECTIVE AREA(ACRES) =     23.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       23.6          PEAK FLOW RATE(CFS) =      75.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.64   FLOW VELOCITY(FEET/SEC.) =   9.38
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    913.00 =    1404.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    913.00 TO NODE    902.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   459.00
```

```
  FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.82
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      75.44
  PIPE TRAVEL TIME(MIN.) =   1.26    Tc(MIN.) =   11.53
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    902.00 =    2294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 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.) =   11.53
  RAINFALL INTENSITY(INCH/HR) =   3.63
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      23.60
  TOTAL STREAM AREA(ACRES) =      23.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      75.44

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.16   16.41    2.852  0.30( 0.30) 1.00       1.2     900.00
      2       75.44   11.53    3.627  0.30( 0.30) 1.00      23.6     910.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       78.34   11.53    3.627  0.30( 0.30) 1.00      24.4     910.00
      2       61.04   16.41    2.852  0.30( 0.30) 1.00      24.8     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      78.34    Tc(MIN.) =    11.53
  EFFECTIVE AREA(ACRES) =      24.44   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       24.8
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    902.00 =    2294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.53
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.627
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
```



```
  "CHAPARRAL,BROADLEAF"      B        0.20      0.30     1.000    63
  COMMERCIAL                 B        5.50      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.20      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63
  COMMERCIAL                 B        1.00      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.175
  SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =   22.84
  EFFECTIVE AREA(ACRES) =     31.54   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.81
  TOTAL AREA(ACRES) =       31.9       PEAK FLOW RATE(CFS) =      96.03

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.53
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.627
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.20      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.20      0.30     1.000    63
  COMMERCIAL                 B        3.40      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.30      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.712
  SUBAREA AREA(ACRES) =   10.90      SUBAREA RUNOFF(CFS) =   33.48
  EFFECTIVE AREA(ACRES) =     42.44   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =       42.8       PEAK FLOW RATE(CFS) =     129.51

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   459.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =   654.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.79
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     129.51
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   12.01
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    903.00 =    2948.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.01
  RAINFALL INTENSITY(INCH/HR) =   3.54
  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.79
  EFFECTIVE STREAM AREA(ACRES) =      42.44
  TOTAL STREAM AREA(ACRES) =      42.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     129.51

****************************************************************************
  FLOW PROCESS FROM NODE    920.00 TO NODE    921.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   286.00
  ELEVATION DATA: UPSTREAM(FEET) =    860.00  DOWNSTREAM(FEET) =    712.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.737
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.897
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.20      0.30     1.000    66    7.74
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.70      0.30     1.000    66    7.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.72
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      3.72

****************************************************************************
  FLOW PROCESS FROM NODE    921.00 TO NODE    922.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    712.00  DOWNSTREAM(FEET) =    600.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   594.00   CHANNEL SLOPE =  0.1886
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.455
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.20      0.30     1.000    65
  NATURAL FAIR COVER
```



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  "CHAPARRAL,BROADLEAF"      B        1.00      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.40      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.40      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.70      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      29.38
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.86
  AVERAGE FLOW DEPTH(FEET) =   1.00   TRAVEL TIME(MIN.) =   1.00
  Tc(MIN.) =    8.74
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   51.23
  EFFECTIVE AREA(ACRES) =     14.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       14.6         PEAK FLOW RATE(CFS) =      54.60

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.26   FLOW VELOCITY(FEET/SEC.) =  11.43
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    922.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    922.00 TO NODE    923.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    600.00  DOWNSTREAM(FEET) =    550.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   604.00   CHANNEL SLOPE =  0.0828
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.953
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.70      0.30     1.000    63
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        1.40      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.40      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      66.94
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.83
  AVERAGE FLOW DEPTH(FEET) =   1.59   TRAVEL TIME(MIN.) =   1.14
  Tc(MIN.) =    9.88
  SUBAREA AREA(ACRES) =     7.50       SUBAREA RUNOFF(CFS) =   24.66
  EFFECTIVE AREA(ACRES) =     22.10     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       22.1         PEAK FLOW RATE(CFS) =      72.66

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.64   FLOW VELOCITY(FEET/SEC.) =   9.03
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    923.00 =    1484.00 FEET.

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```
 FLOW PROCESS FROM NODE    923.00 TO NODE    924.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    550.00  DOWNSTREAM(FEET) =    495.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   849.00   CHANNEL SLOPE =  0.0648
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.634
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.60      0.30     1.000    65
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.80      0.30     1.000    65
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.80      0.30     1.000    66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        1.10      0.30     1.000    63
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        5.20      0.30     1.000    65
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        6.30      0.30     1.000    63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      94.88
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.81
 AVERAGE FLOW DEPTH(FEET) =   1.89   TRAVEL TIME(MIN.) =   1.61
 Tc(MIN.) =   11.49
 SUBAREA AREA(ACRES) =    14.80       SUBAREA RUNOFF(CFS) =   44.41
 EFFECTIVE AREA(ACRES) =     36.90     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       36.9         PEAK FLOW RATE(CFS) =     110.74

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  2.01   FLOW VELOCITY(FEET/SEC.) =   9.14
 LONGEST FLOWPATH FROM NODE    920.00 TO NODE    924.00 =    2333.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    924.00 TO NODE    924.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.49
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.634
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        9.70      0.30     1.000    66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B       17.00      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"               B       36.60      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
```



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 SUBAREA AREA(ACRES) =   63.30      SUBAREA RUNOFF(CFS) =  189.96
 EFFECTIVE AREA(ACRES) =    100.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =      100.2       PEAK FLOW RATE(CFS) =     300.70

****************************************************************************
 FLOW PROCESS FROM NODE    924.00 TO NODE    925.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    457.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   607.00   CHANNEL SLOPE =  0.0626
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.479
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.30      0.30     1.000    65
 NATURAL FAIR COVER
 "GRASS"                    B        0.60      0.30     1.000    69
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.70      0.30     1.000    66
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.90      0.30     1.000    65
 NATURAL FAIR COVER
 "GRASS"                    B        0.90      0.30     1.000    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     305.71
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.65
 AVERAGE FLOW DEPTH(FEET) =   2.96   TRAVEL TIME(MIN.) =   0.87
 Tc(MIN.) =   12.36
 SUBAREA AREA(ACRES) =     3.50       SUBAREA RUNOFF(CFS) =   10.01
 EFFECTIVE AREA(ACRES) =    103.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =      103.7         PEAK FLOW RATE(CFS) =     300.70
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  2.94   FLOW VELOCITY(FEET/SEC.) =  11.59
 LONGEST FLOWPATH FROM NODE    920.00 TO NODE    925.00 =    2940.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    925.00 TO NODE    925.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.36
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.479
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
```

```
  "OPEN BRUSH"                B        3.80      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        4.20      0.30     1.000    63
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        5.10      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        7.00      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B       12.00      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   32.10      SUBAREA RUNOFF(CFS) =   91.84
  EFFECTIVE AREA(ACRES) =    135.80   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      135.8       PEAK FLOW RATE(CFS) =     388.52

****************************************************************************
  FLOW PROCESS FROM NODE    925.00 TO NODE    926.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    440.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   884.00   CHANNEL SLOPE =  0.0192
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.150
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                     B        0.50      0.30     1.000    69
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        0.70      0.30     1.000    63
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        2.30      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        2.40      0.30     1.000    66
  NATURAL FAIR COVER
  "GRASS"                     B        2.50      0.30     1.000    69
  NATURAL FAIR COVER
  "GRASS"                     B        3.20      0.30     1.000    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     403.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.02
  AVERAGE FLOW DEPTH(FEET) =   4.09   TRAVEL TIME(MIN.) =   1.84
  Tc(MIN.) =   14.19
  SUBAREA AREA(ACRES) =    11.60       SUBAREA RUNOFF(CFS) =   29.75
  EFFECTIVE AREA(ACRES) =    147.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =      147.4         PEAK FLOW RATE(CFS) =     388.52
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  4.04   FLOW VELOCITY(FEET/SEC.) =   7.94
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    926.00 =    3824.00 FEET.
```



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****************************************************************************
  FLOW PROCESS FROM NODE    926.00 TO NODE    926.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.19
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.150
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        7.40      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"                B       12.40      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"                B       28.20      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B       31.40      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B       42.40      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =  121.80      SUBAREA RUNOFF(CFS) =  312.38
  EFFECTIVE AREA(ACRES) =    269.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      269.2       PEAK FLOW RATE(CFS) =     690.43

****************************************************************************
  FLOW PROCESS FROM NODE    926.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =  1341.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  90.0 INCH PIPE IS  68.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.13
  ESTIMATED PIPE DIAMETER(INCH) =  90.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     690.43
  PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =   15.36
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    903.00 =    5165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.36
  RAINFALL INTENSITY(INCH/HR) =   2.97
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =     269.20
  TOTAL STREAM AREA(ACRES) =     269.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     690.43
```

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****************************************************************************
  FLOW PROCESS FROM NODE    930.00 TO NODE    931.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    715.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.954
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.802
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.60      0.30     1.000    63    7.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.43
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      2.43

****************************************************************************
  FLOW PROCESS FROM NODE    931.00 TO NODE    932.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    517.00  DOWNSTREAM(FEET) =    430.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   443.00   CHANNEL SLOPE =  0.1964
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.392
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.30      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        4.30      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.927
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     11.88
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.93
  AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   0.93
  Tc(MIN.) =    8.88
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =   18.88
  EFFECTIVE AREA(ACRES) =      5.70     AREA-AVERAGED Fm(INCH/HR) =   0.28
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.94
  TOTAL AREA(ACRES) =        5.7         PEAK FLOW RATE(CFS) =      21.09

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.87   FLOW VELOCITY(FEET/SEC.) =   9.19
  LONGEST FLOWPATH FROM NODE    930.00 TO NODE    932.00 =     773.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    932.00 TO NODE    903.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   426.00
  FLOW LENGTH(FEET) =   254.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.49
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.09
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    9.33
  LONGEST FLOWPATH FROM NODE    930.00 TO NODE    903.00 =    1027.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.33
  RAINFALL INTENSITY(INCH/HR) =   4.20
  AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.94
  EFFECTIVE STREAM AREA(ACRES) =       5.70
  TOTAL STREAM AREA(ACRES) =       5.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.09

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      129.51   12.01    3.541  0.30( 0.24) 0.79      42.4     910.00
      1      100.75   16.92    2.798  0.30( 0.24) 0.79      42.8     900.00
      2      690.43   15.36    2.966  0.30( 0.30) 1.00     269.2     920.00
      3       21.09    9.33    4.196  0.30( 0.28) 0.94       5.7     930.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      754.46    9.33    4.196  0.30( 0.29) 0.96     202.2     930.00
      2      803.24   12.01    3.541  0.30( 0.29) 0.96     258.6     910.00
      3      814.78   15.36    2.966  0.30( 0.29) 0.97     317.6     920.00
      4      761.12   16.92    2.798  0.30( 0.29) 0.97     317.7     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     814.78    Tc(MIN.) =    15.36
  EFFECTIVE AREA(ACRES) =     317.59   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.97
  TOTAL AREA(ACRES) =      317.7
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    903.00 =    5165.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.36
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.966
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.50      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        3.00      0.30     0.900    56
  COMMERCIAL                 B        5.90      0.30     0.100    56
  COMMERCIAL                 B        7.70      0.30     0.100    56
  COMMERCIAL                 B       13.60      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.237
  SUBAREA AREA(ACRES) =   32.80      SUBAREA RUNOFF(CFS) =   85.46
  EFFECTIVE AREA(ACRES) =    350.39   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =      350.5       PEAK FLOW RATE(CFS) =     850.02

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      832.68    9.33    4.196  0.30( 0.26) 0.86     235.0     930.00
      2      859.28   12.01    3.541  0.30( 0.26) 0.88     291.4     910.00
      3      850.02   15.36    2.966  0.30( 0.27) 0.90     350.4     920.00
      4      797.16   16.92    2.798  0.30( 0.27) 0.90     350.5     900.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     859.28  Tc(MIN.) =   12.01
  AREA-AVERAGED Fm(INCH/HR) =  0.26  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.88  EFFECTIVE AREA(ACRES) =     291.38

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    904.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   426.00  DOWNSTREAM(FEET) =   370.00
  FLOW LENGTH(FEET) =   896.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  69.0 INCH PIPE IS  54.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  39.32
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     859.28
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   12.39
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    904.00 =    6061.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    904.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   12.39
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.473
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.80      0.30     0.100    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.20      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
  SUBAREA AREA(ACRES) =    9.40      SUBAREA RUNOFF(CFS) =   28.05
  EFFECTIVE AREA(ACRES) =    300.78   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =      359.9       PEAK FLOW RATE(CFS) =     869.48

****************************************************************************
  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) =   370.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =   872.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  75.0 INCH PIPE IS  56.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  35.42
  ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     869.48
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   12.80
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    905.00 =    6933.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.80
  RAINFALL INTENSITY(INCH/HR) =   3.40
  AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.87
  EFFECTIVE STREAM AREA(ACRES) =     300.78
  TOTAL STREAM AREA(ACRES) =     359.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     869.48

****************************************************************************
  FLOW PROCESS FROM NODE    940.00 TO NODE    941.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   304.00
  ELEVATION DATA: UPSTREAM(FEET) =    858.00  DOWNSTREAM(FEET) =    675.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.692
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.917
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63    7.69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.10      0.30     1.000    66    7.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.99
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      4.99

****************************************************************************
  FLOW PROCESS FROM NODE    941.00 TO NODE    942.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    405.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1008.00   CHANNEL SLOPE =  0.2679
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.290
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.80      0.30     1.000    65
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.10      0.30     1.000    66
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        1.50      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        3.60      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B       10.20      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      36.21
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.79
  AVERAGE FLOW DEPTH(FEET) =   1.01   TRAVEL TIME(MIN.) =   1.43
  Tc(MIN.) =    9.12
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   62.12
  EFFECTIVE AREA(ACRES) =     18.50     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       18.5         PEAK FLOW RATE(CFS) =      66.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.27   FLOW VELOCITY(FEET/SEC.) =  13.70
```



```
  LONGEST FLOWPATH FROM NODE    940.00 TO NODE    942.00 =    1312.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    942.00 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) =   405.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1041.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.23
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      66.43
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =    9.90
  LONGEST FLOWPATH FROM NODE    940.00 TO NODE    905.00 =    2353.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.90
  RAINFALL INTENSITY(INCH/HR) =   3.95
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      18.50
  TOTAL STREAM AREA(ACRES) =      18.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      66.43

****************************************************************************
  FLOW PROCESS FROM NODE    950.00 TO NODE    951.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =   1053.00  DOWNSTREAM(FEET) =    990.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.965
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.917
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.40      0.30     1.000    66    9.96
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.00      0.30     1.000    66    9.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.56
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      4.56

****************************************************************************
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```
 FLOW PROCESS FROM NODE    951.00 TO NODE    952.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    990.00  DOWNSTREAM(FEET) =    950.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   439.00   CHANNEL SLOPE =  0.0911
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.660
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"                B        0.10      0.30     1.000    66
 NATURAL FAIR COVER
 "OPEN BRUSH"                B        0.40      0.30     1.000    66
 NATURAL FAIR COVER
 "GRASS"                     B        0.60      0.30     1.000    69
 NATURAL FAIR COVER
 "GRASS"                     B        0.70      0.30     1.000    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.28
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.31
 AVERAGE FLOW DEPTH(FEET) =   0.68   TRAVEL TIME(MIN.) =   1.38
 Tc(MIN.) =   11.34
 SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    5.44
 EFFECTIVE AREA(ACRES) =      3.20     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        3.2         PEAK FLOW RATE(CFS) =       9.68

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.75   FLOW VELOCITY(FEET/SEC.) =   5.70
 LONGEST FLOWPATH FROM NODE    950.00 TO NODE    952.00 =     767.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    952.00 TO NODE    953.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    950.00  DOWNSTREAM(FEET) =    675.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   810.00   CHANNEL SLOPE =  0.3395
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.463
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"       B        0.60      0.30     1.000    63
 NATURAL FAIR COVER
 "GRASS"                     B        1.50      0.30     1.000    69
 NATURAL FAIR COVER
 "GRASS"                     B        1.70      0.30     1.000    69
 NATURAL FAIR COVER
 "OPEN BRUSH"                B        3.40      0.30     1.000    66
```



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 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"       B        7.20      0.30     1.000    63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      30.19
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.29
 AVERAGE FLOW DEPTH(FEET) =   0.91   TRAVEL TIME(MIN.) =   1.10
 Tc(MIN.) =   12.44
 SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   41.00
 EFFECTIVE AREA(ACRES) =     17.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       17.6         PEAK FLOW RATE(CFS) =      50.11

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.09   FLOW VELOCITY(FEET/SEC.) =  13.96
 LONGEST FLOWPATH FROM NODE    950.00 TO NODE    953.00 =    1577.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    953.00 TO NODE    954.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    675.00  DOWNSTREAM(FEET) =    475.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   955.00   CHANNEL SLOPE =  0.2094
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.249
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "GRASS"                     B        0.10      0.30     1.000    69
 NATURAL FAIR COVER
 "OPEN BRUSH"                B        0.10      0.30     1.000    66
 NATURAL FAIR COVER
 "OPEN BRUSH"                B        0.60      0.30     1.000    66
 NATURAL FAIR COVER
 "GRASS"                     B        2.10      0.30     1.000    69
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"       B        8.90      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"                B       14.80      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      85.43
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  13.32
 AVERAGE FLOW DEPTH(FEET) =   1.46   TRAVEL TIME(MIN.) =   1.19
 Tc(MIN.) =   13.64
 SUBAREA AREA(ACRES) =    26.60       SUBAREA RUNOFF(CFS) =   70.61
 EFFECTIVE AREA(ACRES) =     44.20     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       44.2         PEAK FLOW RATE(CFS) =     117.32

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.65   FLOW VELOCITY(FEET/SEC.) =  14.45
 LONGEST FLOWPATH FROM NODE    950.00 TO NODE    954.00 =    2532.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    954.00 TO NODE    955.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   814.00   CHANNEL SLOPE =  0.0799
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.018
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.40      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.40      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.90      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        5.20      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        9.50      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     139.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.49
  AVERAGE FLOW DEPTH(FEET) =   2.11   TRAVEL TIME(MIN.) =   1.29
  Tc(MIN.) =   14.93
  SUBAREA AREA(ACRES) =    18.50       SUBAREA RUNOFF(CFS) =   45.25
  EFFECTIVE AREA(ACRES) =     62.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       62.7         PEAK FLOW RATE(CFS) =     153.36

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.18   FLOW VELOCITY(FEET/SEC.) =  10.76
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    955.00 =    3346.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    955.00 TO NODE    956.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    375.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   643.00   CHANNEL SLOPE =  0.0544
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.892
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.20      0.30     1.000    63
  NATURAL FAIR COVER
```



```
  "WOODLAND,GRASS"           B        0.50      0.30     1.000    65
  NATURAL FAIR COVER
  "GRASS"                    B        1.20      0.30     1.000    69
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        3.60      0.30     1.000    65
  NATURAL FAIR COVER
  "GRASS"                    B        3.80      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.10      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     171.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.56
  AVERAGE FLOW DEPTH(FEET) =   2.44   TRAVEL TIME(MIN.) =   1.12
  Tc(MIN.) =   16.05
  SUBAREA AREA(ACRES) =    15.40       SUBAREA RUNOFF(CFS) =   35.92
  EFFECTIVE AREA(ACRES) =     78.10     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       78.1         PEAK FLOW RATE(CFS) =     182.16

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.50   FLOW VELOCITY(FEET/SEC.) =   9.72
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    956.00 =    3989.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.05
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.892
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B       14.30      0.30     1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B       21.60      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   35.90      SUBAREA RUNOFF(CFS) =   83.73
  EFFECTIVE AREA(ACRES) =    114.00   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      114.0       PEAK FLOW RATE(CFS) =     265.89

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.05
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.892
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
  NATURAL FAIR COVER
```

```
  "OPEN BRUSH"                B        0.30      0.30     1.000    66
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        0.60      0.30     1.000    63
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            B        2.30      0.30     1.000    65
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"       B        3.20      0.30     1.000    63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    6.70      SUBAREA RUNOFF(CFS) =   15.63
  EFFECTIVE AREA(ACRES) =    120.70   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      120.7       PEAK FLOW RATE(CFS) =     281.52

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 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) =   375.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1304.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  39.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.86
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     281.52
  PIPE TRAVEL TIME(MIN.) =   0.91    Tc(MIN.) =   16.96
  LONGEST FLOWPATH FROM NODE    950.00 TO NODE    905.00 =    5293.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.96
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =     120.70
  TOTAL STREAM AREA(ACRES) =     120.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     281.52

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      832.68   10.13    3.878  0.30( 0.25) 0.85     244.4     930.00
      1      869.48   12.80    3.400  0.30( 0.26) 0.87     300.8     910.00
      1      860.49   16.15    2.881  0.30( 0.27) 0.89     359.8     920.00
      1      806.10   17.72    2.711  0.30( 0.27) 0.89     359.9     900.00
      2       66.43    9.90    3.946  0.30( 0.30) 1.00      18.5     940.00
      3      281.52   16.96    2.793  0.30( 0.30) 1.00     120.7     950.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.
```



```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1     1135.57    9.90    3.946  0.30( 0.27) 0.89     327.7     940.00
      2     1139.14   10.13    3.878  0.30( 0.27) 0.89     335.0     930.00
      3     1190.03   12.80    3.400  0.30( 0.27) 0.91     410.4     910.00
      4     1184.98   16.15    2.881  0.30( 0.28) 0.92     493.2     920.00
      5     1159.40   16.96    2.793  0.30( 0.28) 0.92     499.0     950.00
      6     1122.25   17.72    2.711  0.30( 0.28) 0.92     499.1     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1190.03    Tc(MIN.) =    12.80
  EFFECTIVE AREA(ACRES) =     410.35   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.91
  TOTAL AREA(ACRES) =      499.1
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    905.00 =    6933.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.80
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.400
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B       12.30      0.30     0.100    56
  COMMERCIAL                B       26.80      0.30     0.100    56
  COMMERCIAL                B        2.00      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        2.70      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.80      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        2.10      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.196
  SUBAREA AREA(ACRES) =   46.70      SUBAREA RUNOFF(CFS) =  140.42
  EFFECTIVE AREA(ACRES) =    457.05   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.83
  TOTAL AREA(ACRES) =      545.8       PEAK FLOW RATE(CFS) =    1295.65

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.80
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.400
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        8.00      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.00      SUBAREA RUNOFF(CFS) =   24.26
```

EFFECTIVE AREA(ACRES) = 465.05 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82
TOTAL AREA(ACRES) = 553.8 PEAK FLOW RATE(CFS) = 1319.92

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 553.8 TC(MIN.) = 12.80
EFFECTIVE AREA(ACRES) = 465.05 AREA-AVERAGED Fm(INCH/HR)= 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.820
PEAK FLOW RATE(CFS) = 1319.92

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1276.69	9.90	3.946	0.30(0.24)	0.79	382.4	940.00
2	1276.79	10.13	3.878	0.30(0.24)	0.79	389.7	930.00
3	1319.92	12.80	3.400	0.30(0.25)	0.82	465.1	910.00
4	1295.16	16.15	2.881	0.30(0.25)	0.85	547.9	920.00
5	1265.10	16.96	2.793	0.30(0.25)	0.85	553.7	950.00
6	1224.21	17.72	2.711	0.30(0.25)	0.85	553.8	900.00

END OF RATIONAL METHOD ANALYSIS

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                        Analysis prepared by:

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                            Santa Ana, CA
                                92707

 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA O                                                    *
* RATIONAL METHOD - REGIONAL RAINFALL                                   *
* 2-YR EV JUNE 2018 ROKAMOTO                                           *
 ************************************************************************

  FILE NAME: 3O02EVRL.DAT
  TIME/DATE OF STUDY: 10:23 06/26/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  1.873
   2)   10.00;  1.249
   3)   15.00;  0.951
   4)   20.00;  0.777
   5)   25.00;  0.669
   6)   30.00;  0.593
   7)   40.00;  0.511
   8)   50.00;  0.454
   9)   60.00;  0.400
  10)   90.00;  0.346
  11)  120.00;  0.290
  12)  180.00;  0.236
  13)  360.00;  0.180
  14) 1200.00;  0.084
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   322.00
  ELEVATION DATA: UPSTREAM(FEET) =    695.00  DOWNSTREAM(FEET) =    635.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.951
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.255
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        0.80      0.60     1.000    56    9.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.47
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      0.47

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    635.00  DOWNSTREAM(FEET) =    585.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   352.00   CHANNEL SLOPE =  0.1420
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.164
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        2.90      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.21
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.00
  AVERAGE FLOW DEPTH(FEET) =   0.32   TRAVEL TIME(MIN.) =   1.47
  Tc(MIN.) =   11.42
  SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =    1.47
  EFFECTIVE AREA(ACRES) =      3.70     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       1.88

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   4.42
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =     674.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    585.00  DOWNSTREAM(FEET) =    515.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   872.00   CHANNEL SLOPE =  0.0803
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.970
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       14.80      0.60     1.000     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.999
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.45
  AVERAGE FLOW DEPTH(FEET) =   0.58   TRAVEL TIME(MIN.) =   3.26
  Tc(MIN.) =   14.68
  SUBAREA AREA(ACRES) =    14.90       SUBAREA RUNOFF(CFS) =    4.97
  EFFECTIVE AREA(ACRES) =     18.60     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       18.6         PEAK FLOW RATE(CFS) =       6.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.65   FLOW VELOCITY(FEET/SEC.) =   4.84
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    603.00 =    1546.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    604.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    455.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   733.00   CHANNEL SLOPE =  0.0819
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.880
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     1.000     -
  USER-DEFINED               -       11.70      0.60     1.000     -
  USER-DEFINED               -        1.10      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.991
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.86
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.16
  AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   2.37
  Tc(MIN.) =   17.05
  SUBAREA AREA(ACRES) =    12.90       SUBAREA RUNOFF(CFS) =    3.31
  EFFECTIVE AREA(ACRES) =     31.50     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
```



```
  TOTAL AREA(ACRES) =       31.5         PEAK FLOW RATE(CFS) =       8.00

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.72   FLOW VELOCITY(FEET/SEC.) =   5.14
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    604.00 =    2279.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    604.00 TO NODE    605.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   325.00
  FLOW LENGTH(FEET) =  2571.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.62
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.00
  PIPE TRAVEL TIME(MIN.) =   3.69    Tc(MIN.) =   20.74
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    605.00 =    4850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.74
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.761
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.60     1.000     -
  USER-DEFINED               -        0.30      0.60     1.000     -
  USER-DEFINED               -        1.40      0.60     1.000     -
  USER-DEFINED               -        0.60      0.60     1.000     -
  USER-DEFINED               -        1.00      0.60     1.000     -
  USER-DEFINED               -        8.30      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   11.70      SUBAREA RUNOFF(CFS) =    1.70
  EFFECTIVE AREA(ACRES) =     43.20   AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       43.2       PEAK FLOW RATE(CFS) =       8.00
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.74
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.761
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.20      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    5.20      SUBAREA RUNOFF(CFS) =    1.04
  EFFECTIVE AREA(ACRES) =     48.40   AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.99
  TOTAL AREA(ACRES) =       48.4       PEAK FLOW RATE(CFS) =       8.00
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       48.4  TC(MIN.) =     20.74
  EFFECTIVE AREA(ACRES) =     48.40  AREA-AVERAGED Fm(INCH/HR)=  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap = 0.987
  PEAK FLOW RATE(CFS)   =       8.00
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                        Analysis prepared by:

                      Michael Baker International
                    5 Hutton Centre Drive, Suite 500
                            Santa Ana, CA
                                92707

 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA O                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 5-YR EV JUNE 2018 ROKAMOTO                                          *
 ***********************************************************************

  FILE NAME: 3O05EVRL.DAT
  TIME/DATE OF STUDY: 10:21 06/26/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    5.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  2.739
   2)   10.00;  1.815
   3)   15.00;  1.325
   4)   20.00;  1.135
   5)   25.00;  0.989
   6)   30.00;  0.885
   7)   40.00;  0.759
   8)   50.00;  0.676
   9)   60.00;  0.615
  10)   90.00;  0.513
  11)  120.00;  0.455
  12)  180.00;  0.383
  13)  360.00;  0.284
  14) 1200.00;  0.125
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   322.00
  ELEVATION DATA: UPSTREAM(FEET) =    695.00  DOWNSTREAM(FEET) =    635.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.951
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.824
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        0.80      0.50     1.000    56    9.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.95
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      0.95

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    635.00  DOWNSTREAM(FEET) =    585.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   352.00   CHANNEL SLOPE =  0.1420
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.701
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        2.90      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.84
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   1.21
  Tc(MIN.) =   11.16
  SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =    3.13
  EFFECTIVE AREA(ACRES) =      3.70     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       4.00

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.50   FLOW VELOCITY(FEET/SEC.) =   5.36
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =     674.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    585.00  DOWNSTREAM(FEET) =    515.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   872.00   CHANNEL SLOPE =  0.0803
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.439
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       14.80      0.50     1.000     -
  USER-DEFINED               -        0.10      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.999
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.45
  AVERAGE FLOW DEPTH(FEET) =   0.80   TRAVEL TIME(MIN.) =   2.67
  Tc(MIN.) =   13.83
  SUBAREA AREA(ACRES) =    14.90       SUBAREA RUNOFF(CFS) =   12.60
  EFFECTIVE AREA(ACRES) =     18.60     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       18.6         PEAK FLOW RATE(CFS) =      15.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.93   FLOW VELOCITY(FEET/SEC.) =   6.09
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    603.00 =    1546.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    604.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    455.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   733.00   CHANNEL SLOPE =  0.0819
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.298
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     1.000     -
  USER-DEFINED               -       11.70      0.50     1.000     -
  USER-DEFINED               -        1.10      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.991
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.54
  AVERAGE FLOW DEPTH(FEET) =   1.02   TRAVEL TIME(MIN.) =   1.87
  Tc(MIN.) =   15.70
  SUBAREA AREA(ACRES) =    12.90       SUBAREA RUNOFF(CFS) =    9.32
  EFFECTIVE AREA(ACRES) =     31.50     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
```



```
  TOTAL AREA(ACRES) =       31.5         PEAK FLOW RATE(CFS) =      22.68

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.06   FLOW VELOCITY(FEET/SEC.) =   6.69
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    604.00 =    2279.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    604.00 TO NODE    605.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   325.00
  FLOW LENGTH(FEET) =  2571.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.07
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.68
  PIPE TRAVEL TIME(MIN.) =   2.84    Tc(MIN.) =   18.54
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    605.00 =    4850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.54
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.190
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.10      0.50     1.000     -
  USER-DEFINED               -        0.30      0.50     1.000     -
  USER-DEFINED               -        1.40      0.50     1.000     -
  USER-DEFINED               -        0.60      0.50     1.000     -
  USER-DEFINED               -        1.00      0.50     1.000     -
  USER-DEFINED               -        8.30      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   11.70      SUBAREA RUNOFF(CFS) =    7.27
  EFFECTIVE AREA(ACRES) =     43.20   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       43.2       PEAK FLOW RATE(CFS) =      26.89

****************************************************************************
  FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.54
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.190
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.20      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    5.20      SUBAREA RUNOFF(CFS) =    3.46
```

```
  EFFECTIVE AREA(ACRES) =     48.40   AREA-AVERAGED Fm(INCH/HR) =  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.99
  TOTAL AREA(ACRES) =       48.4       PEAK FLOW RATE(CFS) =      30.35
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       48.4  TC(MIN.) =     18.54
  EFFECTIVE AREA(ACRES) =     48.40  AREA-AVERAGED Fm(INCH/HR)=  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap = 0.987
  PEAK FLOW RATE(CFS)   =      30.35
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                        Analysis prepared by:

                      Michael Baker International
                    5 Hutton Centre Drive, Suite 500
                             Santa Ana, CA
                                92707

 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA O                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 10-YR EV JUNE 2018 ROKAMOTO                                         *
 ***********************************************************************

  FILE NAME: 3O10EVRL.DAT
  TIME/DATE OF STUDY: 10:19 06/26/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  3.913
   2)   10.00;  2.593
   3)   15.00;  1.893
   4)   20.00;  1.621
   5)   25.00;  1.412
   6)   30.00;  1.265
   7)   40.00;  1.084
   8)   50.00;  0.966
   9)   60.00;  0.879
  10)   90.00;  0.733
  11)  120.00;  0.650
  12)  180.00;  0.547
  13)  360.00;  0.406
  14) 1200.00;  0.179
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   322.00
  ELEVATION DATA: UPSTREAM(FEET) =    695.00  DOWNSTREAM(FEET) =    635.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.951
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.606
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        0.80      0.30     1.000    66    9.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.66
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      1.66

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    635.00  DOWNSTREAM(FEET) =    585.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   352.00   CHANNEL SLOPE =  0.1420
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.450
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        2.90      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.47
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.47
  AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   1.07
  Tc(MIN.) =   11.02
  SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =    5.61
  EFFECTIVE AREA(ACRES) =      3.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       7.16

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.62   FLOW VELOCITY(FEET/SEC.) =   6.19
```

```
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =     674.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    585.00  DOWNSTREAM(FEET) =    515.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   872.00   CHANNEL SLOPE =  0.0803
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.134
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               B       14.80      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.999
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.51
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.45
 AVERAGE FLOW DEPTH(FEET) =   1.00   TRAVEL TIME(MIN.) =   2.25
 Tc(MIN.) =   13.28
 SUBAREA AREA(ACRES) =    14.90       SUBAREA RUNOFF(CFS) =   24.60
 EFFECTIVE AREA(ACRES) =     18.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       18.6         PEAK FLOW RATE(CFS) =      30.71

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.19   FLOW VELOCITY(FEET/SEC.) =   7.19
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    603.00 =    1546.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    603.00 TO NODE    604.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    455.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   733.00   CHANNEL SLOPE =  0.0819
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.913
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"               B       11.70      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.991
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      40.10
```



```
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.73
 AVERAGE FLOW DEPTH(FEET) =   1.32   TRAVEL TIME(MIN.) =   1.58
 Tc(MIN.) =   14.86
 SUBAREA AREA(ACRES) =    12.90       SUBAREA RUNOFF(CFS) =   18.76
 EFFECTIVE AREA(ACRES) =     31.50     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       31.5         PEAK FLOW RATE(CFS) =      45.76

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.38   FLOW VELOCITY(FEET/SEC.) =   8.03
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    604.00 =    2279.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    604.00 TO NODE    605.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   325.00
 FLOW LENGTH(FEET) =  2571.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.48
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      45.76
 PIPE TRAVEL TIME(MIN.) =   2.45    Tc(MIN.) =   17.31
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    605.00 =    4850.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.31
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.767
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.30      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.40      0.30     0.900    56
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.60      0.30     1.000    65
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        1.00      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        8.30      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.988
 SUBAREA AREA(ACRES) =   11.70      SUBAREA RUNOFF(CFS) =   15.49
 EFFECTIVE AREA(ACRES) =     43.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.99
 TOTAL AREA(ACRES) =       43.2       PEAK FLOW RATE(CFS) =      57.12

****************************************************************************
 FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
```

```
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   17.31
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.767
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        5.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    5.20      SUBAREA RUNOFF(CFS) =    7.01
  EFFECTIVE AREA(ACRES) =     48.40   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =       48.4       PEAK FLOW RATE(CFS) =      64.13
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       48.4  TC(MIN.) =     17.31
  EFFECTIVE AREA(ACRES) =     48.40  AREA-AVERAGED Fm(INCH/HR)=  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.984
  PEAK FLOW RATE(CFS)   =      64.13
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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            Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:

                      Michael Baker International
                    5 Hutton Centre Drive, Suite 500
                            Santa Ana, CA
                                92707

 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA O                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 25-YR EV JUNE 2018 ROKAMOTO                                         *
 ************************************************************************

  FILE NAME: 3O25EVRL.DAT
  TIME/DATE OF STUDY: 10:17 06/26/2018
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  4.986
   2)   10.00;  3.244
   3)   15.00;  2.468
   4)   20.00;  2.035
   5)   25.00;  1.773
   6)   30.00;  1.553
   7)   40.00;  1.354
   8)   50.00;  1.201
   9)   60.00;  1.077
  10)   90.00;  0.909
  11)  120.00;  0.800
  12)  180.00;  0.670
  13)  360.00;  0.498
  14) 1200.00;  0.220
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   322.00
  ELEVATION DATA: UPSTREAM(FEET) =    695.00  DOWNSTREAM(FEET) =    635.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.951
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.261
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.80      0.30     1.000    66    9.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.13
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      2.13

************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    635.00  DOWNSTREAM(FEET) =    585.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   352.00   CHANNEL SLOPE =  0.1420
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.095
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        2.90      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.78
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.83
  AVERAGE FLOW DEPTH(FEET) =   0.58   TRAVEL TIME(MIN.) =   1.01
  Tc(MIN.) =   10.96
  SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =    7.30
  EFFECTIVE AREA(ACRES) =      3.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =       9.31

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   6.64
```

```
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =     674.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    585.00  DOWNSTREAM(FEET) =    515.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   872.00   CHANNEL SLOPE =  0.0803
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.768
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               B       14.80      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.999
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.89
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.90
 AVERAGE FLOW DEPTH(FEET) =   1.12   TRAVEL TIME(MIN.) =   2.11
 Tc(MIN.) =   13.07
 SUBAREA AREA(ACRES) =    14.90       SUBAREA RUNOFF(CFS) =   33.10
 EFFECTIVE AREA(ACRES) =     18.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       18.6         PEAK FLOW RATE(CFS) =      41.32

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.33   FLOW VELOCITY(FEET/SEC.) =   7.76
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    603.00 =    1546.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    603.00 TO NODE    604.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    455.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   733.00   CHANNEL SLOPE =  0.0819
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.542
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"               B       11.70      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.991
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      54.36
```



```
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.39
 AVERAGE FLOW DEPTH(FEET) =   1.47   TRAVEL TIME(MIN.) =   1.46
 Tc(MIN.) =   14.52
 SUBAREA AREA(ACRES) =    12.90       SUBAREA RUNOFF(CFS) =   26.06
 EFFECTIVE AREA(ACRES) =     31.50     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       31.5         PEAK FLOW RATE(CFS) =      63.60

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.56   FLOW VELOCITY(FEET/SEC.) =   8.70
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    604.00 =    2279.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    604.00 TO NODE    605.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   325.00
 FLOW LENGTH(FEET) =  2571.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.93
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      63.60
 PIPE TRAVEL TIME(MIN.) =   2.26    Tc(MIN.) =   16.79
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    605.00 =    4850.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.79
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.313
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.30      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.40      0.30     0.900    56
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.60      0.30     1.000    65
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        1.00      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        8.30      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.988
 SUBAREA AREA(ACRES) =   11.70      SUBAREA RUNOFF(CFS) =   21.24
 EFFECTIVE AREA(ACRES) =     43.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.99
 TOTAL AREA(ACRES) =       43.2       PEAK FLOW RATE(CFS) =      78.35

****************************************************************************
 FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
```

```
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   16.79
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.313
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        5.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    5.20      SUBAREA RUNOFF(CFS) =    9.56
  EFFECTIVE AREA(ACRES) =     48.40   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =       48.4       PEAK FLOW RATE(CFS) =      87.91
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       48.4  TC(MIN.) =     16.79
  EFFECTIVE AREA(ACRES) =     48.40  AREA-AVERAGED Fm(INCH/HR)=  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.984
  PEAK FLOW RATE(CFS)   =      87.91
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                        Analysis prepared by:

                      Michael Baker International
                    5 Hutton Centre Drive, Suite 500
                            Santa Ana, CA
                                92707

 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA O                                                    *
* RATIONAL METHOD - REGIONAL RAINFALL                                   *
* 50-YR EV JUNE 2018 ROKAMOTO                                          *
 ************************************************************************

  FILE NAME: 3O50EVRL.DAT
  TIME/DATE OF STUDY: 11:23 06/26/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  5.516
   2)   10.00;  3.520
   3)   15.00;  2.687
   4)   20.00;  2.242
   5)   25.00;  1.935
   6)   30.00;  1.742
   7)   40.00;  1.473
   8)   50.00;  1.311
   9)   60.00;  1.211
  10)   90.00;  1.008
  11)  120.00;  0.877
  12)  180.00;  0.757
  13)  360.00;  0.563
  14) 1200.00;  0.248
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   322.00
  ELEVATION DATA: UPSTREAM(FEET) =    695.00  DOWNSTREAM(FEET) =    635.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.951
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.539
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        0.80      0.30     1.000    66    9.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.33
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      2.33

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    635.00  DOWNSTREAM(FEET) =    585.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   352.00   CHANNEL SLOPE =  0.1420
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.366
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        2.90      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.02
  AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   0.97
  Tc(MIN.) =   10.93
  SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =    8.00
  EFFECTIVE AREA(ACRES) =      3.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =      10.21

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.71   FLOW VELOCITY(FEET/SEC.) =   6.81
```

```
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =     674.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    585.00  DOWNSTREAM(FEET) =    515.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   872.00   CHANNEL SLOPE =  0.0803
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.021
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               B       14.80      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.999
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      28.51
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.03
 AVERAGE FLOW DEPTH(FEET) =   1.16   TRAVEL TIME(MIN.) =   2.07
 Tc(MIN.) =   12.99
 SUBAREA AREA(ACRES) =    14.90       SUBAREA RUNOFF(CFS) =   36.50
 EFFECTIVE AREA(ACRES) =     18.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       18.6         PEAK FLOW RATE(CFS) =      45.56

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.38   FLOW VELOCITY(FEET/SEC.) =   7.93
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    603.00 =    1546.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    603.00 TO NODE    604.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    455.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   733.00   CHANNEL SLOPE =  0.0819
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.784
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"               B       11.70      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.991
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      60.01
```



```
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.56
 AVERAGE FLOW DEPTH(FEET) =   1.53   TRAVEL TIME(MIN.) =   1.43
 Tc(MIN.) =   14.42
 SUBAREA AREA(ACRES) =    12.90       SUBAREA RUNOFF(CFS) =   28.86
 EFFECTIVE AREA(ACRES) =     31.50     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       31.5         PEAK FLOW RATE(CFS) =      70.44

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.62   FLOW VELOCITY(FEET/SEC.) =   8.92
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    604.00 =    2279.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    604.00 TO NODE    605.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   325.00
 FLOW LENGTH(FEET) =  2571.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.83
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      70.44
 PIPE TRAVEL TIME(MIN.) =   2.16    Tc(MIN.) =   16.58
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    605.00 =    4850.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.58
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.546
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.30      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.40      0.30     0.900    56
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.60      0.30     1.000    65
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        1.00      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        8.30      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.988
 SUBAREA AREA(ACRES) =   11.70      SUBAREA RUNOFF(CFS) =   23.69
 EFFECTIVE AREA(ACRES) =     43.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.99
 TOTAL AREA(ACRES) =       43.2       PEAK FLOW RATE(CFS) =      87.41

****************************************************************************
 FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
```

```
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   16.58
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.546
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        5.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    5.20      SUBAREA RUNOFF(CFS) =   10.65
  EFFECTIVE AREA(ACRES) =     48.40   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =       48.4       PEAK FLOW RATE(CFS) =      98.06
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       48.4  TC(MIN.) =     16.58
  EFFECTIVE AREA(ACRES) =     48.40  AREA-AVERAGED Fm(INCH/HR)=  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.984
  PEAK FLOW RATE(CFS)   =      98.06
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
        (c) Copyright 1983-2013 Advanced Engineering Software (aes)
            Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:

                      Michael Baker International
                    5 Hutton Centre Drive, Suite 500
                            Santa Ana, CA
                                92707

 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA O                                                    *
* RATIONAL METHOD - REGIONAL RAINFALL                                   *
* 100-YR EV JUNE 2018 ROKAMOTO                                         *
 ************************************************************************

  FILE NAME: 3O00EVRL.DAT
  TIME/DATE OF STUDY: 10:05 06/26/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED TABLED RAINFALL USED*
  NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
   1)    5.00;  6.102
   2)   10.00;  3.901
   3)   15.00;  3.005
   4)   20.00;  2.465
   5)   25.00;  2.129
   6)   30.00;  1.900
   7)   40.00;  1.644
   8)   50.00;  1.419
   9)   60.00;  1.320
  10)   90.00;  1.119
  11)  120.00;  0.983
  12)  180.00;  0.826
  13)  360.00;  0.617
  14) 1200.00;  0.271
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   32.0     27.0    0.020/0.020/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.020/0.020/ ---    0.33    1.00 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```



```
    1. Relative Flow-Depth =  1.00 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   322.00
  ELEVATION DATA: UPSTREAM(FEET) =    695.00  DOWNSTREAM(FEET) =    635.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.951
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.922
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        0.80      0.30     1.000    66    9.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.61
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      2.61

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    635.00  DOWNSTREAM(FEET) =    585.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   352.00   CHANNEL SLOPE =  0.1420
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.738
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        2.90      0.30     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.10
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.14
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   0.96
  Tc(MIN.) =   10.91
  SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =    8.97
  EFFECTIVE AREA(ACRES) =      3.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        3.7         PEAK FLOW RATE(CFS) =      11.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   6.92
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 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =     674.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    585.00  DOWNSTREAM(FEET) =    515.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   872.00   CHANNEL SLOPE =  0.0803
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.379
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"               B       14.80      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.999
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      32.15
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.25
 AVERAGE FLOW DEPTH(FEET) =   1.22   TRAVEL TIME(MIN.) =   2.01
 Tc(MIN.) =   12.91
 SUBAREA AREA(ACRES) =    14.90       SUBAREA RUNOFF(CFS) =   41.29
 EFFECTIVE AREA(ACRES) =     18.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       18.6         PEAK FLOW RATE(CFS) =      51.55

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.45   FLOW VELOCITY(FEET/SEC.) =   8.21
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    603.00 =    1546.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    603.00 TO NODE    604.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    455.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   733.00   CHANNEL SLOPE =  0.0819
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) =  30.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.132
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        0.10      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"               B       11.70      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.991
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      68.01
```



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 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.86
 AVERAGE FLOW DEPTH(FEET) =   1.60   TRAVEL TIME(MIN.) =   1.38
 Tc(MIN.) =   14.29
 SUBAREA AREA(ACRES) =    12.90       SUBAREA RUNOFF(CFS) =   32.91
 EFFECTIVE AREA(ACRES) =     31.50     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       31.5         PEAK FLOW RATE(CFS) =      80.32

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.70   FLOW VELOCITY(FEET/SEC.) =   9.22
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    604.00 =    2279.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    604.00 TO NODE    605.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   325.00
 FLOW LENGTH(FEET) =  2571.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.22
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      80.32
 PIPE TRAVEL TIME(MIN.) =   2.12    Tc(MIN.) =   16.41
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    605.00 =    4850.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.41
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.853
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.30      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.40      0.30     0.900    56
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.60      0.30     1.000    65
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF"      B        1.00      0.30     1.000    63
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        8.30      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.988
 SUBAREA AREA(ACRES) =   11.70      SUBAREA RUNOFF(CFS) =   26.92
 EFFECTIVE AREA(ACRES) =     43.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.99
 TOTAL AREA(ACRES) =       43.2       PEAK FLOW RATE(CFS) =      99.32

****************************************************************************
 FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
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--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   16.41
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.853
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        5.20      0.30     0.900    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    5.20      SUBAREA RUNOFF(CFS) =   12.09
  EFFECTIVE AREA(ACRES) =     48.40   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =       48.4       PEAK FLOW RATE(CFS) =     111.41
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       48.4  TC(MIN.) =     16.41
  EFFECTIVE AREA(ACRES) =     48.40  AREA-AVERAGED Fm(INCH/HR)=  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.984
  PEAK FLOW RATE(CFS)   =     111.41
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
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