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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                                    *
* 100-YR EV DECEMBER 2018 FKAZI                                          *
 ************************************************************************

  FILE NAME: 3A00EVRL.DAT
  TIME/DATE OF STUDY: 17:15 12/04/2018
============================================================================
  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;  5.876
   2)   10.00;  3.789
   3)   15.00;  2.933
   4)   20.00;  2.419
   5)   25.00;  2.096
   6)   30.00;  1.873
   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 0.0312 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
  * 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
```

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------------------------------------------------------------------------------
  >>>>>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
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  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
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  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) =  5.702
  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) =      23.63
    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) =  5.126
  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) =   17.76
  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) =      48.28
  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) =  4.627
 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) =   34.63
 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) =      62.48

 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) =      62.48
 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) =   68.24
 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) =     137.16

****************************************************************************
 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) =   35.50
 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) =     172.65

****************************************************************************
 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) =     192.84

****************************************************************************
  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) =     192.84
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =    9.59
  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.) =    9.59
  * 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) =     249.95

****************************************************************************
  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) =     249.95
  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) =     288.02

****************************************************************************
  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) =   10.89
  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) =     170.50   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) =  3.580
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        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) =    175.20   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) =     175.20
  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) =  4.815
  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) =      65.44

****************************************************************************
  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) =      65.44
  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) =     157.25

****************************************************************************
  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) =  4.162
  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) =     210.13

****************************************************************************
  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) =  4.162
  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) =     210.87

****************************************************************************
  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) =     210.87
  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) =   44.65
  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) =     261.84

****************************************************************************
  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) =     295.14

****************************************************************************
  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) =     295.14
  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) =     405.66

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

```
 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    3.580  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     1032.04   11.22    3.580  0.30( 0.11) 0.37     327.3     120.00
     2     1032.04   11.22    3.580  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) =    1032.04    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) =    1032.04
  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) =    1032.04
  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) =    1032.04
  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) =    1039.98

****************************************************************************
  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) =    1101.40

****************************************************************************
  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) =    1123.28

****************************************************************************
  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) =    1123.28
  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) =    1123.28
  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) =    1123.28
  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 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) =   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 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) =   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 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) =   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     1123.28   13.34    3.218  0.30( 0.11) 0.37     395.5     120.00
      2     1123.28   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     1221.21   13.34    3.218  0.30( 0.13) 0.42     425.5     120.00
      2     1221.20   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) =     1221.21  Tc(MIN.) =   13.336
  EFFECTIVE AREA(ACRES) =    425.48  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) =    434.38   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) =    1221.21
  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) =    436.78   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) =    1221.21
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      510.2  TC(MIN.) =     13.34
  EFFECTIVE AREA(ACRES) =    436.78  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.432
  PEAK FLOW RATE(CFS)   =    1221.21
```

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1221.21	13.34	3.218	0.30(0.13)	0.43	436.8	120.00
2	1221.20	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 A                                                   *
* RATIONAL METHOD - REGIONAL RAINFALL                                  *
* 2-YR EV DECEMBER 2018 FKAZI                                          *
 **********************************************************************

  FILE NAME: 3A02EVRL.DAT
  TIME/DATE OF STUDY: 17:16 12/04/2018
============================================================================
  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 0.0313 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
  *   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:
```

```
  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
```

```
  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(CS) =     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(CS) =     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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 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 SUBAREA A                                                    *
* RATIONAL METHOD - REGIONAL RAINFALL                                   *
* -YR EV DECEMBER 2018 FKAZI                                            *
 ************************************************************************

  FILE NAME: 3A05EVRL.DAT
  TIME/DATE OF STUDY: 17:18 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;  2.642
   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 0.0313 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
  *   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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             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                                    *
* 10-YR EV DECEMBER 2018 FKAZI                                           *
 ************************************************************************

  FILE NAME: 3A10EVRL.DAT
  TIME/DATE OF STUDY: 17:19 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;  3.775
   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 0.0313 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
  *  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) =      10.20

  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
```

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------------------------------------------------------------------------------
  >>>>>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
```

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  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/      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) =   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/      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
```



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  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/      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) =   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/      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
```

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  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) =  3.670
  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) =      14.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.60
    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) =  3.283
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        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) =   11.29
  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) =      30.39
  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) =  2.946
 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.) =  13.82
 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) =  2.733
 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) =  2.733
 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) =      85.75

****************************************************************************
 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) =  2.733
 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) =     107.79

****************************************************************************
 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) =  2.733
  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) =     120.05

****************************************************************************
  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) =     120.05
  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) =  3.302
  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) =     17.79
```

```
  TOTAL AREA(ACRES) =      6.20   PEAK FLOW RATE(CFS) =     17.79

****************************************************************************
  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
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.302
  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) =   24.50
  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) =      41.77

****************************************************************************
  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) =      41.77
  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) =  2.764
  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) =      99.70

****************************************************************************
  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) =  2.764
  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) =     125.16

****************************************************************************
  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) =     125.16
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    9.33
  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.) =    9.33
  *  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) =     132.89

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.33
  *  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) =     133.36

****************************************************************************
  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) =     133.36
  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) =     138.29

****************************************************************************
  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) =     187.75

****************************************************************************
  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) =     187.75
  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) =  2.423
```



```
  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) =     221.51

****************************************************************************
  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) =     221.51
  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) =   41.45
  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) =     255.73

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

```
 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) =     261.25

****************************************************************************
 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) =     298.54

****************************************************************************
 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) =     298.54
 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) =  2.293
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        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) =     298.54
 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 =     298.54

 ** 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   19.08    1.642  0.30( 0.09) 0.29     227.3     100.00
     2      298.54   11.72    2.293  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      651.79   11.72    2.293  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   19.08    1.642  0.30( 0.10) 0.34     379.4     100.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =     651.79    Tc(MIN.) =    11.72
  EFFECTIVE AREA(ACRES) =     324.93   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) =     651.79
  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) =    331.73   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) =     651.79
  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) =    336.43   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) =     651.79
  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) =    350.13   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) =     651.79
  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) =    370.73   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) =     673.47

****************************************************************************
  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) =    378.23   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) =     686.84

****************************************************************************
  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) =     686.84
  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) =    385.23   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) =     686.84
  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) =    393.13   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) =     686.84
  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      686.84   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      742.59   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) =      742.59  Tc(MIN.) =   14.107
  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) =   13.53
  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) =     742.59
  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) =     742.59
  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)   =     742.59
```

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	742.59	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:

                       Michael Baker International
                     5 Hutton Centre Drive, Suite 500
                          Santa Ana, CA 92707


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

  FILE NAME: 3A25EVRL.DAT
  TIME/DATE OF STUDY: 09:16 12/05/2018
============================================================================
  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;  4.829
   2)   10.00;  3.154
   3)   15.00;  2.415
   4)   20.00;  2.000
   5)   25.00;  1.745
   6)   30.00;  1.534
   7)   40.00;  1.333
   8)   50.00;  1.181
   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 0.0313 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
  *  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) =      68.31

******************************************************************************
  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) =  4.689
  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.) =    2.32
  STREET FLOW TRAVEL TIME(MIN.) =   1.44   Tc(MIN.) =    6.86
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.206
  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) =   14.53
  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) =      25.24

  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) =      39.34
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.52
  HALFSTREET FLOOD WIDTH(FEET) =   20.20
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.13
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.68
 STREET FLOW TRAVEL TIME(MIN.) =   1.26   Tc(MIN.) =    8.13
 *  25 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
 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) =   28.16
 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) =      50.77

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.56   HALFSTREET FLOOD WIDTH(FEET) =  22.30
 FLOW VELOCITY(FEET/SEC.) =  5.47   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) =      50.77
 PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =    8.92
 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.) =    8.92
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.517
 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) =    8.82
 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) =      55.91

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.92
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.517
 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) =   55.45
 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) =     111.36

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.92
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.517
 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) =   28.75
 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) =     140.11

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

```
 MAINLINE Tc(MIN.) =    8.92
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.517
 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) =   16.21
 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) =     156.32

****************************************************************************
 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.) =  19.39
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     156.32
 PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =    9.79
 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.) =    9.79
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.224
 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) =   59.39
 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) =     202.17

****************************************************************************
 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  32.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  25.13
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     202.17
 PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   10.53
 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.) =   10.53
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.076
 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) =   42.73
 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) =     235.28

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.53
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.076
 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) =     244.19

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

```
  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.) =   10.53
  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 =     244.19

  ** 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      244.19   10.53    3.076  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      457.31   10.53    3.076  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) =     457.31    Tc(MIN.) =    10.53
  EFFECTIVE AREA(ACRES) =     170.45   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) =     457.31
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =   11.50
  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.) =   11.50
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.932
  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) =    175.15   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) =     457.31
  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.) =   11.50
  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) =     175.15
  TOTAL STREAM AREA(ACRES) =     227.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     457.31

****************************************************************************
  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) =   31.49
  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) =      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) =   80.92
  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) =     128.22

****************************************************************************
  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) =     161.11

****************************************************************************
  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) =     161.11
  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) =     171.17

****************************************************************************
  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) =     171.77

****************************************************************************
  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  29.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.75
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     171.77
  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) =     177.49

****************************************************************************
  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) =     338.21

****************************************************************************
 FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.04
 *  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      457.31   11.50    2.932  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      842.54   11.44    2.941  0.30( 0.11) 0.37     326.3     120.00
     2      842.29   11.50    2.932  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) =     842.54    Tc(MIN.) =    11.44
  EFFECTIVE AREA(ACRES) =     326.35   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) =     842.54
  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) =    333.15   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) =     842.54
  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) =    337.85   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) =     842.54
  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) =    351.55   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) =     842.54
  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) =    372.15   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) =     890.11

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.62
  *  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) =    379.65   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) =     907.80

****************************************************************************
  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) =     907.80
  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) =    386.65   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) =     907.80
  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) =    394.55   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) =     907.80
  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      907.80   13.67    2.612  0.30( 0.11) 0.37     394.5     120.00
      2      906.98   13.73    2.603  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      985.27   13.67    2.612  0.30( 0.13) 0.42     424.3     120.00
      2      984.49   13.73    2.603  0.30( 0.13) 0.42     425.3     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) =      985.27  Tc(MIN.) =   13.670
  EFFECTIVE AREA(ACRES) =    424.31  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) =    433.21   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) =     985.27
  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.) =   13.67
  *  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) =    435.61   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) =     985.27
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      510.2  TC(MIN.) =     13.67
  EFFECTIVE AREA(ACRES) =    435.61  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.432
  PEAK FLOW RATE(CFS)   =     985.27
```

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	985.27	13.67	2.612	0.30(0.13)	0.43	435.6	120.00
2	984.49	13.73	2.603	0.30(0.13)	0.43	436.6	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:

                       Michael Baker International
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                          Santa Ana, CA 92707


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

  FILE NAME: 3A50EVRL.DAT
  TIME/DATE OF STUDY: 09:15 12/05/2018
============================================================================
  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;  5.329
   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;  1.455
   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 0.0313 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
  *  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.) =  14.65
  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) =  5.171
  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) =  4.631
  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) =      27.88

  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) =  4.164
 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) =      56.06

 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) =      56.06
 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) =   61.15
 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) =     122.85

****************************************************************************
 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) =     154.60

****************************************************************************
 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) =     172.58

****************************************************************************
  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) =     172.58
  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) =     223.28

****************************************************************************
  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.) =  26.07
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     223.28
  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) =     268.26

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

```
  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 =     268.26

  ** 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      268.26   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) =  4.616
  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) =     25.12
```

```
  TOTAL AREA(ACRES) =      6.20   PEAK FLOW RATE(CFS) =     25.12

****************************************************************************
  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) =  4.616
  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        0.20      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) =      25.90

****************************************************************************
  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.) =  10.57
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.90
  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) =  3.868
  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) =   89.40
  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) =     141.63

****************************************************************************
  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) =  3.868
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        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) =     178.01

****************************************************************************
  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) =     178.01
  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) =  3.760
  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) =     189.11

****************************************************************************
  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) =  3.760
  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) =     189.78

****************************************************************************
  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) =     189.78
  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) =     264.58

****************************************************************************
  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) =     264.58
  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) =  3.284
  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) =     364.00

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

```
 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) =  3.284
 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) =  3.284
 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      925.77   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) =     326.71   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) =    333.51   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) =    338.21   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) =    351.91   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) =     927.20

****************************************************************************
  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) =    372.51   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) =    380.01   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) =    1001.64

****************************************************************************
  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) =    1001.64
  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) =    387.01   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) =    1001.64
  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) =    394.91   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) =    1001.64
  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 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) =   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 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) =   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 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) =   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     1001.64   13.49    2.876  0.30( 0.11) 0.37     394.9     120.00
      2     1001.14   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     1086.75   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) =    424.76  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) =    433.66   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) =    436.06   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) =    436.06  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	1086.75	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)
         (c) Copyright 1983-2013 Advanced Engineering Software (aes)
             Ver. 20.0  Release Date: 06/01/2013  License ID 1237

                         Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED B                          *
* PHASED NO PA45 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL          *
* 100-YR EV FEB 2023 ROKAMOTO                                           *
 ***********************************************************************

  FILE NAME: 3B00EVRL.DAT
  TIME/DATE OF STUDY: 07:58 02/15/2023
============================================================================
  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;  6.007
   2)   10.00;  3.854
   3)   15.00;  2.975
   4)   20.00;  2.446
   5)   25.00;  2.115
   6)   30.00;  1.889
   7)   40.00;  1.633
   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 0.0313 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    203.00 TO NODE    204.00 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) =    410.00  DOWNSTREAM(FEET) =    402.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.206
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.488
  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    6.21
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30      0.200    56    6.61
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30      0.900    56    9.94
  COMMERCIAL                 B        0.30      0.30      0.100    56    6.21
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.60      0.30      0.200    56    6.61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.207
  SUBAREA RUNOFF(CFS) =      7.32
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      7.32

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 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) =   515.00   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) =      14.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.46
```

```
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.44
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.71
 STREET FLOW TRAVEL TIME(MIN.) =   1.93   Tc(MIN.) =    8.14
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.656
 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
 COMMERCIAL                 B        0.50      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.80      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    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 =  0.512
 SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =   13.37
 EFFECTIVE AREA(ACRES) =      4.80    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =        4.8        PEAK FLOW RATE(CFS) =      19.57

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.41
 FLOW VELOCITY(FEET/SEC.) =  4.78   DEPTH*VELOCITY(FT*FT/SEC.) =   2.01
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    205.00 =     820.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 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) =   386.00   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) =      24.46
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.46
   HALFSTREET FLOOD WIDTH(FEET) =   16.60
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.61
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.11
 STREET FLOW TRAVEL TIME(MIN.) =   1.40   Tc(MIN.) =    9.54
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.054
 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
```



```
 COMMERCIAL                 B        0.40      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    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 =  0.600
 SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    9.76
 EFFECTIVE AREA(ACRES) =      7.60    AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =        7.6        PEAK FLOW RATE(CFS) =      26.74

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.23
 FLOW VELOCITY(FEET/SEC.) =  4.70   DEPTH*VELOCITY(FT*FT/SEC.) =   2.21
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    206.00 =    1206.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.54
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.054
 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        2.50      0.30     0.100    56
 COMMERCIAL                 B        0.30      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
 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 =  0.115
 SUBAREA AREA(ACRES) =    4.10      SUBAREA RUNOFF(CFS) =   14.83
 EFFECTIVE AREA(ACRES) =     11.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
 TOTAL AREA(ACRES) =       11.7       PEAK FLOW RATE(CFS) =      41.57

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.54
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.054
 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        2.60      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        9.30      0.30     0.900    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 =  0.900
  SUBAREA AREA(ACRES) =   13.40      SUBAREA RUNOFF(CFS) =   45.64
  EFFECTIVE AREA(ACRES) =     25.10   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.65
  TOTAL AREA(ACRES) =       25.1       PEAK FLOW RATE(CFS) =      87.21

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 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) =   353.00
  FLOW LENGTH(FEET) =  1217.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.19
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      87.21
  PIPE TRAVEL TIME(MIN.) =   1.43    Tc(MIN.) =   10.96
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    207.00 =    2423.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.96
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.684
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.40      0.30     0.100    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    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 =  0.500
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =   18.45
  EFFECTIVE AREA(ACRES) =     30.90   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       30.9       PEAK FLOW RATE(CFS) =      97.30

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```



```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   353.00  DOWNSTREAM(FEET) =   343.00
  FLOW LENGTH(FEET) =  1021.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.55
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      97.30
  PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =   12.44
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    208.00 =    3444.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.44
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.426
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.40      0.30     0.100    56
  COMMERCIAL                 B        1.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.60      0.30     0.900    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 =  0.561
  SUBAREA AREA(ACRES) =    6.20      SUBAREA RUNOFF(CFS) =   18.17
  EFFECTIVE AREA(ACRES) =     37.10   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =     108.28

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   343.00  DOWNSTREAM(FEET) =   340.00
  FLOW LENGTH(FEET) =   916.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  41.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.85
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     108.28
  PIPE TRAVEL TIME(MIN.) =   1.94    Tc(MIN.) =   14.38
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    209.00 =    4360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    209.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.084
  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
COMMERCIAL                  B        0.60      0.30      0.100    56
COMMERCIAL                  B        0.70      0.30      0.100    56
RESIDENTIAL
".4 DWELLING/ACRE"          B        0.40      0.30      0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"          B        0.80      0.30      0.900    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 =  0.500
SUBAREA AREA(ACRES) =     3.20      SUBAREA RUNOFF(CFS) =     8.45
EFFECTIVE AREA(ACRES) =     40.30   AREA-AVERAGED Fm(INCH/HR) =  0.18
AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.60
TOTAL AREA(ACRES) =       40.3       PEAK FLOW RATE(CFS) =     108.28
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    209.00 TO NODE    209.10 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) =   331.00
 FLOW LENGTH(FEET) =   960.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  35.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.46
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     108.28
 PIPE TRAVEL TIME(MIN.) =   1.40    Tc(MIN.) =   15.78
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    209.10 =    5320.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    209.10 TO NODE    209.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.78
 * 100 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        1.00      0.30      0.100    56
RESIDENTIAL
"11+ DWELLINGS/ACRE"        B        0.40      0.30      0.200    56
COMMERCIAL                  B        0.40      0.30      0.100    56
COMMERCIAL                  B        2.20      0.30      0.100    56
RESIDENTIAL
"11+ DWELLINGS/ACRE"        B        0.70      0.30      0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"       B        1.10      0.30      0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.176
SUBAREA AREA(ACRES) =     5.80      SUBAREA RUNOFF(CFS) =    14.82
EFFECTIVE AREA(ACRES) =     46.10   AREA-AVERAGED Fm(INCH/HR) =  0.16
AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
```



```
 TOTAL AREA(ACRES) =       46.1       PEAK FLOW RATE(CFS) =     113.21

****************************************************************************
 FLOW PROCESS FROM NODE    209.10 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   331.00  DOWNSTREAM(FEET) =   330.00
 FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  54.0 INCH PIPE IS  38.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.23
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     113.21
 PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   16.15
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    230.00 =    5525.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =   16.15
 RAINFALL INTENSITY(INCH/HR) =   2.85
 AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.55
 EFFECTIVE STREAM AREA(ACRES) =      46.10
 TOTAL STREAM AREA(ACRES) =      46.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     113.21

****************************************************************************
 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) =   328.00
 ELEVATION DATA: UPSTREAM(FEET) =    426.00  DOWNSTREAM(FEET) =    423.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.407
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.540
 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
"11+ DWELLINGS/ACRE"        B        0.50      0.30      0.200    56    8.41
RESIDENTIAL
"11+ DWELLINGS/ACRE"        B        1.20      0.30      0.200    56    8.41
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
SUBAREA RUNOFF(CFS) =      6.85
TOTAL AREA(ACRES) =      1.70   PEAK FLOW RATE(CFS) =      6.85

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

```
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.00  DOWNSTREAM(FEET) =   421.00
  FLOW LENGTH(FEET) =   385.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.62
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.85
  PIPE TRAVEL TIME(MIN.) =   1.39    Tc(MIN.) =    9.79
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     713.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.79
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.942
  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        1.10      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.40      0.30     0.200    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 =  0.200
  SUBAREA AREA(ACRES) =    4.30      SUBAREA RUNOFF(CFS) =   15.03
  EFFECTIVE AREA(ACRES) =      6.00   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.0       PEAK FLOW RATE(CFS) =      20.97

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   421.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =   567.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.00
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.97
  PIPE TRAVEL TIME(MIN.) =   1.18    Tc(MIN.) =   10.98
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.98
```



```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.682
  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        1.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.70      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) =    7.60      SUBAREA RUNOFF(CFS) =   24.78
  EFFECTIVE AREA(ACRES) =     13.60   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       13.6       PEAK FLOW RATE(CFS) =      44.34

****************************************************************************
  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) =   415.00  DOWNSTREAM(FEET) =   409.00
  FLOW LENGTH(FEET) =   747.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.63
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.34
  PIPE TRAVEL TIME(MIN.) =   1.44    Tc(MIN.) =   12.42
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =    2027.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.42
  * 100 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
  COMMERCIAL                 B        0.60      0.30     0.100    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.90      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B       11.40      0.30     0.400    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 =  0.381
  SUBAREA AREA(ACRES) =   16.30      SUBAREA RUNOFF(CFS) =   48.62
  EFFECTIVE AREA(ACRES) =     29.90   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       29.9       PEAK FLOW RATE(CFS) =      89.86

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

```
 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) =   409.00  DOWNSTREAM(FEET) =   382.00
 FLOW LENGTH(FEET) =  1002.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.54
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      89.86
 PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =   13.43
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =    3029.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.43
 * 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
 "11+ DWELLINGS/ACRE"       B        2.40      0.30     0.200    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        7.10      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        3.60      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B       10.50      0.30     0.400    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        9.40      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.419
 SUBAREA AREA(ACRES) =   33.30      SUBAREA RUNOFF(CFS) =   93.68
 EFFECTIVE AREA(ACRES) =     63.20   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       63.2       PEAK FLOW RATE(CFS) =     178.75

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.43
 * 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
 "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) =    0.85
```



```
 EFFECTIVE AREA(ACRES) =     63.50   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       63.5       PEAK FLOW RATE(CFS) =     179.60

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    218.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   382.00  DOWNSTREAM(FEET) =   373.00
 FLOW LENGTH(FEET) =  1218.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  57.0 INCH PIPE IS  45.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.91
 ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     179.60
 PIPE TRAVEL TIME(MIN.) =   1.70    Tc(MIN.) =   15.13
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    218.00 =    4247.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    218.00 TO NODE    218.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.13
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.961
 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        7.70      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.40      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        1.70      0.30     0.200    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.212
 SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =   26.60
 EFFECTIVE AREA(ACRES) =     73.70   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.34
 TOTAL AREA(ACRES) =       73.7       PEAK FLOW RATE(CFS) =     189.61

****************************************************************************
 FLOW PROCESS FROM NODE    218.00 TO NODE    219.00 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) =   347.00
 FLOW LENGTH(FEET) =  2106.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.78
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     189.61
 PIPE TRAVEL TIME(MIN.) =   2.38    Tc(MIN.) =   17.51
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    219.00 =    6353.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.710
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.20      0.30     0.100    56
  COMMERCIAL                 B        2.40      0.30     0.100    56
  PUBLIC PARK                B        1.20      0.30     0.850    56
  PUBLIC PARK                B        1.70      0.30     0.850    56
  PUBLIC PARK                B        8.50      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.70      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.686
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =   33.12
  EFFECTIVE AREA(ACRES) =     88.40   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       88.4       PEAK FLOW RATE(CFS) =     206.06

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.710
  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        2.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       24.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.20      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 =  0.205
  SUBAREA AREA(ACRES) =   30.20      SUBAREA RUNOFF(CFS) =   71.97
  EFFECTIVE AREA(ACRES) =    118.60   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      118.6       PEAK FLOW RATE(CFS) =     278.03

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   17.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.710
  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        0.50      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.40      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        7.40      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) =    9.30      SUBAREA RUNOFF(CFS) =   21.68
  EFFECTIVE AREA(ACRES) =    127.90   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      127.9       PEAK FLOW RATE(CFS) =     299.71

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   347.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1244.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  47.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.22
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     299.71
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =   18.71
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    230.00 =    7597.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.71
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.582
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.20      0.30     0.100    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.124
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =   11.68
  EFFECTIVE AREA(ACRES) =    133.00   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =      133.0       PEAK FLOW RATE(CFS) =     299.71
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =   18.71
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.34
  EFFECTIVE STREAM AREA(ACRES) =     133.00
  TOTAL STREAM AREA(ACRES) =     133.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     299.71

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      113.21   16.15    2.853  0.30( 0.16) 0.55      46.1     203.00
      2      299.71   18.71    2.582  0.30( 0.10) 0.34     133.0     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      400.16   16.15    2.853  0.30( 0.12) 0.40     160.9     203.00
      2      401.50   18.71    2.582  0.30( 0.12) 0.40     179.1     210.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     401.50    Tc(MIN.) =    18.71
  EFFECTIVE AREA(ACRES) =     179.10   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      179.1
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    230.00 =    7597.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    231.00 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) =   293.00
  FLOW LENGTH(FEET) =   389.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  37.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  38.07
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     401.50
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   18.88
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    231.00 =    7986.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   18.88
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.564
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.00      0.30      0.100    56
  COMMERCIAL                 B        4.60      0.30      0.100    56
  COMMERCIAL                 B        5.60      0.30      0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.60      0.30      1.000    66
  AGRICULTURAL FAIR COVER
  "ORCHARDS"                 B        0.70      0.30      1.000    65
  AGRICULTURAL FAIR COVER
  "ORCHARDS"                 B        0.20      0.30      1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =   32.92
  EFFECTIVE AREA(ACRES) =    193.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =      193.8       PEAK FLOW RATE(CFS) =     427.08

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      429.58   16.32    2.835  0.30( 0.12) 0.39     175.6     203.00
      2      427.08   18.88    2.564  0.30( 0.12) 0.39     193.8     210.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     429.58  Tc(MIN.) =   16.32
  AREA-AVERAGED Fm(INCH/HR) =  0.12  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.39  EFFECTIVE AREA(ACRES) =     175.58

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.32
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.835
  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        7.30      0.30      0.850    56
  PUBLIC PARK                B        0.80      0.30      0.850    56
  PUBLIC PARK                B        0.20      0.30      0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.00      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 =  0.875
  SUBAREA AREA(ACRES) =   16.60      SUBAREA RUNOFF(CFS) =   38.44
  EFFECTIVE AREA(ACRES) =    192.18   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      210.4       PEAK FLOW RATE(CFS) =     468.02
```

```
*******************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
-------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
===============================================================================
  MAINLINE Tc(MIN.) =   16.32
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.835
  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        0.50      0.30     0.500    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.40      0.30     1.000    65
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.30      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.576
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    7.91
  EFFECTIVE AREA(ACRES) =    195.48   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      213.7       PEAK FLOW RATE(CFS) =     475.93
===============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      213.7  TC(MIN.) =     16.32
  EFFECTIVE AREA(ACRES) =    195.48  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.434
  PEAK FLOW RATE(CFS)   =     475.93

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      475.93   16.32    2.835  0.30( 0.13) 0.43     195.5     203.00
      2      468.57   18.88    2.564  0.30( 0.13) 0.43     213.7     210.00
===============================================================================
===============================================================================
  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 1237

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED B                        *
* PHASED NO PA45 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL        *
* 2-YR EV FEB 2023 ROKAMOTO                                            *
 ***********************************************************************

  FILE NAME: 3B02EVRL.DAT
  TIME/DATE OF STUDY: 07:57 02/15/2023
============================================================================
  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    203.00 TO NODE    204.00 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) =    410.00  DOWNSTREAM(FEET) =    402.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.206
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.704
  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    6.21
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        0.20      0.60      0.200    56    6.61
  RESIDENTIAL
  ".4 DWELLING/ACRE"         -        0.10      0.60      0.900    56    9.94
  COMMERCIAL                 -        0.30      0.60      0.100    56    6.21
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        0.60      0.60      0.200    56    6.61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.207
  SUBAREA RUNOFF(CFS) =      2.13
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      2.13

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 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) =   515.00   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) =       3.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    6.28
```

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  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.44
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
 STREET FLOW TRAVEL TIME(MIN.) =   2.49   Tc(MIN.) =    8.70
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.397
 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               -        0.50      0.60     0.100     -
 USER-DEFINED               -        0.80      0.60     0.200     -
 USER-DEFINED               -        0.40      0.60     0.900     -
 USER-DEFINED               -        1.20      0.60     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
 SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    3.24
 EFFECTIVE AREA(ACRES) =      4.80    AREA-AVERAGED Fm(INCH/HR) =  0.25
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =        4.8        PEAK FLOW RATE(CFS) =       4.95

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   7.47
 FLOW VELOCITY(FEET/SEC.) =  3.58   DEPTH*VELOCITY(FT*FT/SEC.) =   1.06
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    205.00 =     820.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 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) =   386.00   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) =       6.01
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    8.84
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.37
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.08
 STREET FLOW TRAVEL TIME(MIN.) =   1.91   Tc(MIN.) =   10.61
 *   2 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      0.60     0.100     -
 USER-DEFINED               -        0.40      0.60     0.100     -
 USER-DEFINED               -        0.10      0.60     0.200     -
 USER-DEFINED               -        0.30      0.60     0.200     -
```



```
 USER-DEFINED               -        0.20      0.60     0.900     -
 USER-DEFINED               -        1.50      0.60     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    2.12
 EFFECTIVE AREA(ACRES) =      7.60    AREA-AVERAGED Fm(INCH/HR) =  0.29
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =        7.6        PEAK FLOW RATE(CFS) =       6.22

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.03
 FLOW VELOCITY(FEET/SEC.) =  3.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    206.00 =    1206.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.61
 *   2 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               -        0.70      0.60     0.100     -
 USER-DEFINED               -        2.50      0.60     0.100     -
 USER-DEFINED               -        0.30      0.60     0.100     -
 USER-DEFINED               -        0.30      0.60     0.200     -
 USER-DEFINED               -        0.10      0.60     0.200     -
 USER-DEFINED               -        0.20      0.60     0.200     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.115
 SUBAREA AREA(ACRES) =    4.10      SUBAREA RUNOFF(CFS) =    4.18
 EFFECTIVE AREA(ACRES) =     11.70   AREA-AVERAGED Fm(INCH/HR) =  0.21
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.35
 TOTAL AREA(ACRES) =       11.7       PEAK FLOW RATE(CFS) =      10.40

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.61
 *   2 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               -        2.60      0.60     0.900     -
 USER-DEFINED               -        9.30      0.60     0.900     -
 USER-DEFINED               -        1.50      0.60     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =   13.40      SUBAREA RUNOFF(CFS) =    7.97
 EFFECTIVE AREA(ACRES) =     25.10   AREA-AVERAGED Fm(INCH/HR) =  0.39
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.65
 TOTAL AREA(ACRES) =       25.1       PEAK FLOW RATE(CFS) =      18.37

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

```
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 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) =   353.00
  FLOW LENGTH(FEET) =  1217.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.52
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.37
  PIPE TRAVEL TIME(MIN.) =   2.13    Tc(MIN.) =   12.74
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    207.00 =    2423.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.74
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.076
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.40      0.60     0.100     -
  USER-DEFINED               -        0.20      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.100     -
  USER-DEFINED               -        2.10      0.60     0.900     -
  USER-DEFINED               -        0.30      0.60     0.900     -
  USER-DEFINED               -        0.50      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =    4.05
  EFFECTIVE AREA(ACRES) =     30.90   AREA-AVERAGED Fm(INCH/HR) =  0.37
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       30.9       PEAK FLOW RATE(CFS) =      19.59

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   353.00  DOWNSTREAM(FEET) =   343.00
  FLOW LENGTH(FEET) =  1021.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.67
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.59
  PIPE TRAVEL TIME(MIN.) =   2.22    Tc(MIN.) =   14.96
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    208.00 =    3444.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.96
```



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  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.946
  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     0.100     -
  USER-DEFINED               -        1.10      0.60     0.100     -
  USER-DEFINED               -        1.90      0.60     0.900     -
  USER-DEFINED               -        1.60      0.60     0.900     -
  USER-DEFINED               -        0.20      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.561
  SUBAREA AREA(ACRES) =    6.20      SUBAREA RUNOFF(CFS) =    3.40
  EFFECTIVE AREA(ACRES) =     37.10   AREA-AVERAGED Fm(INCH/HR) =  0.37
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =      19.59
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   343.00  DOWNSTREAM(FEET) =   340.00
  FLOW LENGTH(FEET) =   916.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.12
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.59
  PIPE TRAVEL TIME(MIN.) =   2.98    Tc(MIN.) =   17.94
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    209.00 =    4360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    209.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.94
  *   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               -        0.30      0.60     0.100     -
  USER-DEFINED               -        0.60      0.60     0.100     -
  USER-DEFINED               -        0.70      0.60     0.100     -
  USER-DEFINED               -        0.40      0.60     0.900     -
  USER-DEFINED               -        0.80      0.60     0.900     -
  USER-DEFINED               -        0.40      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    1.56
  EFFECTIVE AREA(ACRES) =     40.30   AREA-AVERAGED Fm(INCH/HR) =  0.36
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       40.3       PEAK FLOW RATE(CFS) =      19.59
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    209.10 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) =   331.00
  FLOW LENGTH(FEET) =   960.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.52
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.59
  PIPE TRAVEL TIME(MIN.) =   2.13    Tc(MIN.) =   20.07
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    209.10 =    5320.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    209.10 TO NODE    209.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.07
  *   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               -        1.00      0.60     0.100     -
  USER-DEFINED               -        0.40      0.60     0.200     -
  USER-DEFINED               -        0.40      0.60     0.100     -
  USER-DEFINED               -        2.20      0.60     0.100     -
  USER-DEFINED               -        0.70      0.60     0.200     -
  USER-DEFINED               -        1.10      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.176
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =    3.48
  EFFECTIVE AREA(ACRES) =     46.10   AREA-AVERAGED Fm(INCH/HR) =  0.33
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       46.1       PEAK FLOW RATE(CFS) =      19.59
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    209.10 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   331.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.88
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.59
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   20.65
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    230.00 =    5525.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =   20.65
  RAINFALL INTENSITY(INCH/HR) =   0.76
  AREA-AVERAGED Fm(INCH/HR) =  0.33
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =      46.10
  TOTAL STREAM AREA(ACRES) =      46.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.59

****************************************************************************
  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) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =    426.00  DOWNSTREAM(FEET) =    423.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.407
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.433
  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
  "11+ DWELLINGS/ACRE"       -        0.50      0.60     0.200    56    8.41
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        1.20      0.60     0.200    56    8.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.01
  TOTAL AREA(ACRES) =      1.70   PEAK FLOW RATE(CFS) =      2.01

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.00  DOWNSTREAM(FEET) =   421.00
  FLOW LENGTH(FEET) =   385.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.48
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.01
  PIPE TRAVEL TIME(MIN.) =   1.84    Tc(MIN.) =   10.25
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     713.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.25
  *   2 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                -        1.10      0.60      0.200     -
  USER-DEFINED                -        1.40      0.60      0.200     -
  USER-DEFINED                -        1.80      0.60      0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.30      SUBAREA RUNOFF(CFS) =    4.26
  EFFECTIVE AREA(ACRES) =      6.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.0       PEAK FLOW RATE(CFS) =       5.95

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   421.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =   567.00   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.) =   6.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.95
  PIPE TRAVEL TIME(MIN.) =   1.57    Tc(MIN.) =   11.82
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.82
  *   2 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                -        1.90      0.60      0.200     -
  USER-DEFINED                -        5.70      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) =    7.60      SUBAREA RUNOFF(CFS) =    6.90
  EFFECTIVE AREA(ACRES) =     13.60   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       13.6       PEAK FLOW RATE(CFS) =      12.35

****************************************************************************
  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) =   415.00  DOWNSTREAM(FEET) =   409.00
  FLOW LENGTH(FEET) =   747.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.35
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
```



```
  PIPE-FLOW(CFS) =      12.35
  PIPE TRAVEL TIME(MIN.) =   1.96    Tc(MIN.) =   13.78
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =    2027.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.78
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.014
  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      0.100     -
  USER-DEFINED                -        0.20      0.60      0.200     -
  USER-DEFINED                -        2.90      0.60      0.400     -
  USER-DEFINED                -       11.40      0.60      0.400     -
  USER-DEFINED                -        0.90      0.60      0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.381
  SUBAREA AREA(ACRES) =   16.30      SUBAREA RUNOFF(CFS) =   11.53
  EFFECTIVE AREA(ACRES) =     29.90   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       29.9       PEAK FLOW RATE(CFS) =      22.48

****************************************************************************
  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) =   409.00  DOWNSTREAM(FEET) =   382.00
  FLOW LENGTH(FEET) =  1002.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.62
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.48
  PIPE TRAVEL TIME(MIN.) =   1.44    Tc(MIN.) =   15.22
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =    3029.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.22
  *   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                -        2.40      0.60      0.200     -
  USER-DEFINED                -        7.10      0.60      0.500     -
  USER-DEFINED                -        3.60      0.60      0.500     -
  USER-DEFINED                -        0.30      0.60      0.500     -
  USER-DEFINED                -       10.50      0.60      0.400     -
  USER-DEFINED                -        9.40      0.60      0.400     -
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.419
  SUBAREA AREA(ACRES) =   33.30      SUBAREA RUNOFF(CFS) =   20.51
  EFFECTIVE AREA(ACRES) =     63.20   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       63.2       PEAK FLOW RATE(CFS) =      40.87

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.22
  *   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               -        0.30      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) =    0.19
  EFFECTIVE AREA(ACRES) =     63.50   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       63.5       PEAK FLOW RATE(CFS) =      41.06

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    218.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   382.00  DOWNSTREAM(FEET) =   373.00
  FLOW LENGTH(FEET) =  1218.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.26
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.06
  PIPE TRAVEL TIME(MIN.) =   2.46    Tc(MIN.) =   17.68
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    218.00 =    4247.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    218.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.68
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.852
  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     0.200     -
  USER-DEFINED               -        0.40      0.60     0.200     -
  USER-DEFINED               -        1.70      0.60     0.200     -
  USER-DEFINED               -        0.40      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.212
  SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =    6.66
  EFFECTIVE AREA(ACRES) =     73.70   AREA-AVERAGED Fm(INCH/HR) =  0.20
```



```
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =       73.7       PEAK FLOW RATE(CFS) =      42.94

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    219.00 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) =   347.00
  FLOW LENGTH(FEET) =  2106.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.04
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.94
  PIPE TRAVEL TIME(MIN.) =   3.50    Tc(MIN.) =   21.17
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    219.00 =    6353.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.17
  *   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               -        0.20      0.60     0.100     -
  USER-DEFINED               -        2.40      0.60     0.100     -
  USER-DEFINED               -        1.20      0.60     0.850     -
  USER-DEFINED               -        1.70      0.60     0.850     -
  USER-DEFINED               -        8.50      0.60     0.850     -
  USER-DEFINED               -        0.70      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.686
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =    4.45
  EFFECTIVE AREA(ACRES) =     88.40   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       88.4       PEAK FLOW RATE(CFS) =      42.94
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.17
  *   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               -        2.90      0.60     0.200     -
  USER-DEFINED               -        2.90      0.60     0.200     -
  USER-DEFINED               -       24.00      0.60     0.200     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  USER-DEFINED               -        0.20      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 =  0.205
  SUBAREA AREA(ACRES) =   30.20      SUBAREA RUNOFF(CFS) =   16.98
  EFFECTIVE AREA(ACRES) =    118.60   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      118.6       PEAK FLOW RATE(CFS) =      57.46

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.17
  *   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                -        0.50      0.60     0.400     -
  USER-DEFINED                -        1.40      0.60     0.400     -
  USER-DEFINED                -        7.40      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) =    9.30      SUBAREA RUNOFF(CFS) =    4.25
  EFFECTIVE AREA(ACRES) =    127.90   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      127.9       PEAK FLOW RATE(CFS) =      61.72

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   347.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1244.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.71
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.72
  PIPE TRAVEL TIME(MIN.) =   1.77    Tc(MIN.) =   22.94
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    230.00 =    7597.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.94
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.710
  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     0.100     -
  USER-DEFINED                -        0.70      0.60     0.100     -
  USER-DEFINED                -        0.90      0.60     0.200     -
  USER-DEFINED                -        0.30      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.124
```



```
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =    2.92
  EFFECTIVE AREA(ACRES) =    133.00   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =      133.0       PEAK FLOW RATE(CFS) =      61.72
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =   22.94
  RAINFALL INTENSITY(INCH/HR) =   0.71
  AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.34
  EFFECTIVE STREAM AREA(ACRES) =     133.00
  TOTAL STREAM AREA(ACRES) =     133.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      61.72

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.59   20.65    0.759  0.60( 0.33) 0.55      46.1     203.00
      2       61.72   22.94    0.710  0.60( 0.21) 0.34     133.0     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       80.55   20.65    0.759  0.60( 0.24) 0.40     165.8     203.00
      2       79.08   22.94    0.710  0.60( 0.24) 0.40     179.1     210.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      80.55    Tc(MIN.) =    20.65
  EFFECTIVE AREA(ACRES) =     165.80   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      179.1
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    230.00 =    7597.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    231.00 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) =   293.00
  FLOW LENGTH(FEET) =   389.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.75
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      80.55
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   20.90
```

```
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    231.00 =    7986.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   20.90
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.754
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        2.00      0.60     0.100     -
 USER-DEFINED               -        4.60      0.60     0.100     -
 USER-DEFINED               -        5.60      0.60     0.100     -
 USER-DEFINED               -        1.60      0.60     1.000     -
 USER-DEFINED               -        0.70      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 =  0.253
 SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =    7.96
 EFFECTIVE AREA(ACRES) =    180.50   AREA-AVERAGED Fm(INCH/HR) =  0.23
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.39
 TOTAL AREA(ACRES) =      193.8       PEAK FLOW RATE(CFS) =      84.58

****************************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   20.90
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.754
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        7.30      0.60     0.850     -
 USER-DEFINED               -        0.80      0.60     0.850     -
 USER-DEFINED               -        0.20      0.60     0.850     -
 USER-DEFINED               -        0.10      0.60     0.900     -
 USER-DEFINED               -        4.00      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 =  0.875
 SUBAREA AREA(ACRES) =   16.60      SUBAREA RUNOFF(CFS) =    3.42
 EFFECTIVE AREA(ACRES) =    197.10   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =      210.4       PEAK FLOW RATE(CFS) =      88.00

****************************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   20.90
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.754
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```



```
 USER-DEFINED               -        0.50      0.60     0.500     -
 USER-DEFINED               -        0.10      0.60     1.000     -
 USER-DEFINED               -        0.40      0.60     1.000     -
 USER-DEFINED               -        2.30      0.60     0.500     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.576
 SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    1.21
 EFFECTIVE AREA(ACRES) =    200.40   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =      213.7       PEAK FLOW RATE(CFS) =      89.21
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =      213.7  TC(MIN.) =     20.90
 EFFECTIVE AREA(ACRES) =    200.40  AREA-AVERAGED Fm(INCH/HR)=  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap = 0.432
 PEAK FLOW RATE(CFS)   =      89.21

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       89.21   20.90    0.754  0.60( 0.26) 0.43     200.4     203.00
     2       86.32   23.19    0.705  0.60( 0.26) 0.43     213.7     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 1237

                        Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED B                         *
* PHASED NO PA45 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL         *
* 5-YR EV DEC 2022 ROKAMOTO                                             *
 ************************************************************************

  FILE NAME: 3B05EVRL.DAT
  TIME/DATE OF STUDY: 12:45 12/02/2022
========================================================================
  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;  1.317
   4)   20.00;  1.127
   5)   25.00;  0.982
   6)   30.00;  0.881
   7)   40.00;  0.754
   8)   50.00;  0.672
   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    203.00 TO NODE    204.00 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) =    410.00  DOWNSTREAM(FEET) =    402.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.206
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.480
  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    6.21
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        0.20      0.50      0.200    56    6.61
  RESIDENTIAL
  ".4 DWELLING/ACRE"         -        0.10      0.50      0.900    56    9.94
  COMMERCIAL                 -        0.30      0.50      0.100    56    6.21
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        0.60      0.50      0.200    56    6.61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.207
  SUBAREA RUNOFF(CFS) =      3.21
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      3.21

************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 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) =   515.00   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) =       5.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.22
```

```
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.70
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.14
 STREET FLOW TRAVEL TIME(MIN.) =   2.32   Tc(MIN.) =    8.53
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.060
 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               -        0.50      0.50     0.100     -
 USER-DEFINED               -        0.80      0.50     0.200     -
 USER-DEFINED               -        0.40      0.50     0.900     -
 USER-DEFINED               -        1.20      0.50     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
 SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    5.36
 EFFECTIVE AREA(ACRES) =      4.80    AREA-AVERAGED Fm(INCH/HR) =  0.21
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =        4.8        PEAK FLOW RATE(CFS) =       8.00

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.59
 FLOW VELOCITY(FEET/SEC.) =  3.94   DEPTH*VELOCITY(FT*FT/SEC.) =   1.31
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    205.00 =     820.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 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) =   386.00   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) =       9.85
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.21
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.74
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.36
 STREET FLOW TRAVEL TIME(MIN.) =   1.72   Tc(MIN.) =   10.24
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.770
 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               -        0.40      0.50     0.100     -
 USER-DEFINED               -        0.10      0.50     0.200     -
 USER-DEFINED               -        0.30      0.50     0.200     -
```



```
 USER-DEFINED               -        0.20      0.50     0.900     -
 USER-DEFINED               -        1.50      0.50     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    3.70
 EFFECTIVE AREA(ACRES) =      7.60    AREA-AVERAGED Fm(INCH/HR) =  0.24
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =        7.6        PEAK FLOW RATE(CFS) =      10.45

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.52
 FLOW VELOCITY(FEET/SEC.) =  3.79   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    206.00 =    1206.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.24
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.770
 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               -        2.50      0.50     0.100     -
 USER-DEFINED               -        0.30      0.50     0.100     -
 USER-DEFINED               -        0.30      0.50     0.200     -
 USER-DEFINED               -        0.10      0.50     0.200     -
 USER-DEFINED               -        0.20      0.50     0.200     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.115
 SUBAREA AREA(ACRES) =    4.10      SUBAREA RUNOFF(CFS) =    6.32
 EFFECTIVE AREA(ACRES) =     11.70   AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.35
 TOTAL AREA(ACRES) =       11.7       PEAK FLOW RATE(CFS) =      16.77

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.24
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.770
 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     0.900     -
 USER-DEFINED               -        9.30      0.50     0.900     -
 USER-DEFINED               -        1.50      0.50     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =   13.40      SUBAREA RUNOFF(CFS) =   15.91
 EFFECTIVE AREA(ACRES) =     25.10   AREA-AVERAGED Fm(INCH/HR) =  0.32
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.65
 TOTAL AREA(ACRES) =       25.1       PEAK FLOW RATE(CFS) =      32.68

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

```
 FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 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) =   353.00
 FLOW LENGTH(FEET) =  1217.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.10
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      32.68
 PIPE TRAVEL TIME(MIN.) =   1.83    Tc(MIN.) =   12.07
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    207.00 =    2423.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.07
 *   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               -        2.40      0.50     0.100     -
 USER-DEFINED               -        0.20      0.50     0.100     -
 USER-DEFINED               -        0.30      0.50     0.100     -
 USER-DEFINED               -        2.10      0.50     0.900     -
 USER-DEFINED               -        0.30      0.50     0.900     -
 USER-DEFINED               -        0.50      0.50     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =    7.02
 EFFECTIVE AREA(ACRES) =     30.90   AREA-AVERAGED Fm(INCH/HR) =  0.31
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.62
 TOTAL AREA(ACRES) =       30.9       PEAK FLOW RATE(CFS) =      35.78

****************************************************************************
 FLOW PROCESS FROM NODE    207.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   353.00  DOWNSTREAM(FEET) =   343.00
 FLOW LENGTH(FEET) =  1021.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.91
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      35.78
 PIPE TRAVEL TIME(MIN.) =   1.91    Tc(MIN.) =   13.98
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    208.00 =    3444.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.98
```



```
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.414
 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     0.100     -
 USER-DEFINED               -        1.10      0.50     0.100     -
 USER-DEFINED               -        1.90      0.50     0.900     -
 USER-DEFINED               -        1.60      0.50     0.900     -
 USER-DEFINED               -        0.20      0.50     0.400     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.561
 SUBAREA AREA(ACRES) =    6.20      SUBAREA RUNOFF(CFS) =    6.32
 EFFECTIVE AREA(ACRES) =     37.10   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.61
 TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =      37.04

****************************************************************************
 FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   343.00  DOWNSTREAM(FEET) =   340.00
 FLOW LENGTH(FEET) =   916.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.04
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      37.04
 PIPE TRAVEL TIME(MIN.) =   2.53    Tc(MIN.) =   16.51
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    209.00 =    4360.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    209.00 TO NODE    209.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.51
 *   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               -        0.30      0.50     0.100     -
 USER-DEFINED               -        0.60      0.50     0.100     -
 USER-DEFINED               -        0.70      0.50     0.100     -
 USER-DEFINED               -        0.40      0.50     0.900     -
 USER-DEFINED               -        0.80      0.50     0.900     -
 USER-DEFINED               -        0.40      0.50     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    2.91
 EFFECTIVE AREA(ACRES) =     40.30   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =       40.3       PEAK FLOW RATE(CFS) =      37.04
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    209.00 TO NODE    209.10 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) =   331.00
  FLOW LENGTH(FEET) =   960.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.75
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.04
  PIPE TRAVEL TIME(MIN.) =   1.83    Tc(MIN.) =   18.34
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    209.10 =    5320.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    209.10 TO NODE    209.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.34
  *   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               -        1.00      0.50     0.100     -
  USER-DEFINED               -        0.40      0.50     0.200     -
  USER-DEFINED               -        0.40      0.50     0.100     -
  USER-DEFINED               -        2.20      0.50     0.100     -
  USER-DEFINED               -        0.70      0.50     0.200     -
  USER-DEFINED               -        1.10      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.176
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =    5.75
  EFFECTIVE AREA(ACRES) =     46.10   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       46.1       PEAK FLOW RATE(CFS) =      38.03

****************************************************************************
  FLOW PROCESS FROM NODE    209.10 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   331.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.03
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.03
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   18.82
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    230.00 =    5525.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =   18.82
```



```
  RAINFALL INTENSITY(INCH/HR) =   1.17
  AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =      46.10
  TOTAL STREAM AREA(ACRES) =      46.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      38.03

****************************************************************************
  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) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =    426.00  DOWNSTREAM(FEET) =    423.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.407
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.081
  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
  "11+ DWELLINGS/ACRE"       -        0.50      0.50     0.200    56    8.41
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        1.20      0.50     0.200    56    8.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.03
  TOTAL AREA(ACRES) =      1.70   PEAK FLOW RATE(CFS) =      3.03

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.00  DOWNSTREAM(FEET) =   421.00
  FLOW LENGTH(FEET) =   385.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.89
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.03
  PIPE TRAVEL TIME(MIN.) =   1.65    Tc(MIN.) =   10.06
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     713.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.06
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.788
  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     0.200     -
  USER-DEFINED               -        1.40      0.50     0.200     -
  USER-DEFINED               -        1.80      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.30      SUBAREA RUNOFF(CFS) =    6.53
  EFFECTIVE AREA(ACRES) =      6.00   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.0       PEAK FLOW RATE(CFS) =       9.11

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   421.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =   567.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.11
  PIPE TRAVEL TIME(MIN.) =   1.44    Tc(MIN.) =   11.50
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.50
  *   5 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
  USER-DEFINED               -        1.90      0.50     0.200     -
  USER-DEFINED               -        5.70      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) =    7.60      SUBAREA RUNOFF(CFS) =   10.60
  EFFECTIVE AREA(ACRES) =     13.60   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       13.6       PEAK FLOW RATE(CFS) =      18.98

****************************************************************************
  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) =   415.00  DOWNSTREAM(FEET) =   409.00
  FLOW LENGTH(FEET) =   747.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.98
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.98
  PIPE TRAVEL TIME(MIN.) =   1.78    Tc(MIN.) =   13.28
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =    2027.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.28
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.481
  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     0.100     -
  USER-DEFINED               -        0.20      0.50     0.200     -
  USER-DEFINED               -        2.90      0.50     0.400     -
  USER-DEFINED               -       11.40      0.50     0.400     -
  USER-DEFINED               -        0.90      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.381
  SUBAREA AREA(ACRES) =   16.30      SUBAREA RUNOFF(CFS) =   18.93
  EFFECTIVE AREA(ACRES) =     29.90   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       29.9       PEAK FLOW RATE(CFS) =      35.82

****************************************************************************
  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) =   409.00  DOWNSTREAM(FEET) =   382.00
  FLOW LENGTH(FEET) =  1002.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.29
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.82
  PIPE TRAVEL TIME(MIN.) =   1.26    Tc(MIN.) =   14.54
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =    3029.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.54
  *   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               -        2.40      0.50     0.200     -
  USER-DEFINED               -        7.10      0.50     0.500     -
  USER-DEFINED               -        3.60      0.50     0.500     -
  USER-DEFINED               -        0.30      0.50     0.500     -
  USER-DEFINED               -       10.50      0.50     0.400     -
  USER-DEFINED               -        9.40      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.419
  SUBAREA AREA(ACRES) =   33.30      SUBAREA RUNOFF(CFS) =   34.51
```

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  EFFECTIVE AREA(ACRES) =     63.20   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       63.2       PEAK FLOW RATE(CFS) =      67.12

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.54
  *   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               -        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) =    0.31
  EFFECTIVE AREA(ACRES) =     63.50   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       63.5       PEAK FLOW RATE(CFS) =      67.43

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    218.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   382.00  DOWNSTREAM(FEET) =   373.00
  FLOW LENGTH(FEET) =  1218.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.52
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      67.43
  PIPE TRAVEL TIME(MIN.) =   2.13    Tc(MIN.) =   16.67
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    218.00 =    4247.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    218.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.67
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.254
  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     0.200     -
  USER-DEFINED               -        0.40      0.50     0.200     -
  USER-DEFINED               -        1.70      0.50     0.200     -
  USER-DEFINED               -        0.40      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.212
  SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =   10.54
  EFFECTIVE AREA(ACRES) =     73.70   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =       73.7       PEAK FLOW RATE(CFS) =      71.83
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    219.00 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) =   347.00
  FLOW LENGTH(FEET) =  2106.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.72
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      71.83
  PIPE TRAVEL TIME(MIN.) =   3.00    Tc(MIN.) =   19.67
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    219.00 =    6353.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.67
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.140
  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     0.100     -
  USER-DEFINED               -        2.40      0.50     0.100     -
  USER-DEFINED               -        1.20      0.50     0.850     -
  USER-DEFINED               -        1.70      0.50     0.850     -
  USER-DEFINED               -        8.50      0.50     0.850     -
  USER-DEFINED               -        0.70      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.686
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =   10.54
  EFFECTIVE AREA(ACRES) =     88.40   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       88.4       PEAK FLOW RATE(CFS) =      74.81

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.67
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.140
  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     0.200     -
  USER-DEFINED               -        2.90      0.50     0.200     -
  USER-DEFINED               -       24.00      0.50     0.200     -
  USER-DEFINED               -        0.10      0.50     0.900     -
  USER-DEFINED               -        0.20      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 =  0.205
  SUBAREA AREA(ACRES) =   30.20      SUBAREA RUNOFF(CFS) =   28.19
  EFFECTIVE AREA(ACRES) =    118.60   AREA-AVERAGED Fm(INCH/HR) =  0.17
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      118.6       PEAK FLOW RATE(CFS) =     103.00

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.67
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.140
  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     0.400     -
  USER-DEFINED              -        1.40      0.50     0.400     -
  USER-DEFINED              -        7.40      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) =    9.30      SUBAREA RUNOFF(CFS) =    7.86
  EFFECTIVE AREA(ACRES) =    127.90   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      127.9       PEAK FLOW RATE(CFS) =     110.86

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   347.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1244.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  34.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.22
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     110.86
  PIPE TRAVEL TIME(MIN.) =   1.57    Tc(MIN.) =   21.23
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    230.00 =    7597.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.23
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.091
  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     0.100     -
  USER-DEFINED              -        0.70      0.50     0.100     -
  USER-DEFINED              -        0.90      0.50     0.200     -
  USER-DEFINED              -        0.30      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.124
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =    4.73
  EFFECTIVE AREA(ACRES) =    133.00   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =      133.0       PEAK FLOW RATE(CFS) =     110.86
```



```
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =   21.23
  RAINFALL INTENSITY(INCH/HR) =   1.09
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.34
  EFFECTIVE STREAM AREA(ACRES) =     133.00
  TOTAL STREAM AREA(ACRES) =     133.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     110.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       38.03   18.82    1.172  0.50( 0.27) 0.55      46.1     203.00
      2      110.86   21.23    1.091  0.50( 0.17) 0.34     133.0     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      144.92   18.82    1.172  0.50( 0.20) 0.40     164.0     203.00
      2      145.49   21.23    1.091  0.50( 0.20) 0.40     179.1     210.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     145.49    Tc(MIN.) =    21.23
  EFFECTIVE AREA(ACRES) =     179.10   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      179.1
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    230.00 =    7597.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    231.00 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) =   293.00
  FLOW LENGTH(FEET) =   389.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.62
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     145.49
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   21.45
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    231.00 =    7986.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
```

```
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   21.45
  *   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               -        2.00      0.50     0.100     -
  USER-DEFINED               -        4.60      0.50     0.100     -
  USER-DEFINED               -        5.60      0.50     0.100     -
  USER-DEFINED               -        1.60      0.50     1.000     -
  USER-DEFINED               -        0.70      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 =  0.253
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =   12.68
  EFFECTIVE AREA(ACRES) =    193.80   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =      193.8       PEAK FLOW RATE(CFS) =     155.59

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      155.81   19.04    1.163  0.50( 0.19) 0.39     178.7     203.00
      2      155.59   21.45    1.085  0.50( 0.19) 0.39     193.8     210.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     155.81  Tc(MIN.) =   19.04
  AREA-AVERAGED Fm(INCH/HR) =  0.19  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.39  EFFECTIVE AREA(ACRES) =     178.71

********************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   19.04
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.163
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        7.30      0.50     0.850     -
  USER-DEFINED               -        0.80      0.50     0.850     -
  USER-DEFINED               -        0.20      0.50     0.850     -
  USER-DEFINED               -        0.10      0.50     0.900     -
  USER-DEFINED               -        4.00      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 =  0.875
  SUBAREA AREA(ACRES) =   16.60      SUBAREA RUNOFF(CFS) =   10.84
  EFFECTIVE AREA(ACRES) =    195.31   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      210.4       PEAK FLOW RATE(CFS) =     166.66

********************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
================================================================================
  MAINLINE Tc(MIN.) =   19.04
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.163
  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     0.500     -
  USER-DEFINED               -        0.10      0.50     1.000     -
  USER-DEFINED               -        0.40      0.50     1.000     -
  USER-DEFINED               -        2.30      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.576
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    2.60
  EFFECTIVE AREA(ACRES) =    198.61   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      213.7       PEAK FLOW RATE(CFS) =     169.26
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      213.7  TC(MIN.) =     19.04
  EFFECTIVE AREA(ACRES) =    198.61  AREA-AVERAGED Fm(INCH/HR)=  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap = 0.433
  PEAK FLOW RATE(CFS)   =     169.26

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      169.26   19.04    1.163  0.50( 0.22) 0.43     198.6     203.00
      2      167.62   21.45    1.085  0.50( 0.21) 0.43     213.7     210.00
================================================================================
================================================================================
  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 1237

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED B                            *
* PHASED NO PA45 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL            *
* 10-YR EV FEB 2023 ROKAMOTO                                               *
 ****************************************************************************

  FILE NAME: 3B10EVRL.DAT
  TIME/DATE OF STUDY: 07:58 02/15/2023
============================================================================
  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;  3.855
   2)   10.00;  2.561
   3)   15.00;  1.881
   4)   20.00;  1.610
   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    203.00 TO NODE    204.00 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) =    410.00  DOWNSTREAM(FEET) =    402.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.206
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.543
  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    6.21
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30      0.200    56    6.61
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30      0.900    56    9.94
  COMMERCIAL                 B        0.30      0.30      0.100    56    6.21
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.60      0.30      0.200    56    6.61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.207
  SUBAREA RUNOFF(CFS) =      4.70
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      4.70

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 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) =   515.00   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) =       8.93
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.12
```

```
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.03
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.38
 STREET FLOW TRAVEL TIME(MIN.) =   2.13   Tc(MIN.) =    8.34
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.992
 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
 COMMERCIAL                 B        0.50      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.80      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    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 =  0.512
 SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    8.43
 EFFECTIVE AREA(ACRES) =      4.80    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =        4.8        PEAK FLOW RATE(CFS) =      12.38

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.76
 FLOW VELOCITY(FEET/SEC.) =  4.34   DEPTH*VELOCITY(FT*FT/SEC.) =   1.62
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    205.00 =     820.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 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) =   386.00   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) =      15.43
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.41
   HALFSTREET FLOOD WIDTH(FEET) =   13.71
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.12
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.68
 STREET FLOW TRAVEL TIME(MIN.) =   1.56   Tc(MIN.) =    9.90
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.588
 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
```



```
 COMMERCIAL                 B        0.40      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    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 =  0.600
 SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    6.07
 EFFECTIVE AREA(ACRES) =      7.60    AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =        7.6        PEAK FLOW RATE(CFS) =      16.71

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.18
 FLOW VELOCITY(FEET/SEC.) =  4.20   DEPTH*VELOCITY(FT*FT/SEC.) =   1.75
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    206.00 =    1206.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.90
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.588
 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        2.50      0.30     0.100    56
 COMMERCIAL                 B        0.30      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
 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 =  0.115
 SUBAREA AREA(ACRES) =    4.10      SUBAREA RUNOFF(CFS) =    9.42
 EFFECTIVE AREA(ACRES) =     11.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
 TOTAL AREA(ACRES) =       11.7       PEAK FLOW RATE(CFS) =      26.13

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.90
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.588
 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        2.60      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        9.30      0.30     0.900    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 =  0.900
  SUBAREA AREA(ACRES) =   13.40      SUBAREA RUNOFF(CFS) =   27.95
  EFFECTIVE AREA(ACRES) =     25.10   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.65
  TOTAL AREA(ACRES) =       25.1       PEAK FLOW RATE(CFS) =      54.08

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 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) =   353.00
  FLOW LENGTH(FEET) =  1217.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.62
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      54.08
  PIPE TRAVEL TIME(MIN.) =   1.61    Tc(MIN.) =   11.50
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    207.00 =    2423.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.356
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.40      0.30     0.100    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    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 =  0.500
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =   11.52
  EFFECTIVE AREA(ACRES) =     30.90   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       30.9       PEAK FLOW RATE(CFS) =      60.37

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```



```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   353.00  DOWNSTREAM(FEET) =   343.00
  FLOW LENGTH(FEET) =  1021.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.09
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.37
  PIPE TRAVEL TIME(MIN.) =   1.69    Tc(MIN.) =   13.19
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    208.00 =    3444.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.19
  *  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        1.40      0.30     0.100    56
  COMMERCIAL                 B        1.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.60      0.30     0.900    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 =  0.561
  SUBAREA AREA(ACRES) =    6.20      SUBAREA RUNOFF(CFS) =   10.93
  EFFECTIVE AREA(ACRES) =     37.10   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =      64.92

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   343.00  DOWNSTREAM(FEET) =   340.00
  FLOW LENGTH(FEET) =   916.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.78
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.92
  PIPE TRAVEL TIME(MIN.) =   2.25    Tc(MIN.) =   15.44
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    209.00 =    4360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    209.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.44
  *  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        0.30      0.30      0.100    56
COMMERCIAL                  B        0.60      0.30      0.100    56
COMMERCIAL                  B        0.70      0.30      0.100    56
RESIDENTIAL
".4 DWELLING/ACRE"          B        0.40      0.30      0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"          B        0.80      0.30      0.900    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 =  0.500
SUBAREA AREA(ACRES) =     3.20      SUBAREA RUNOFF(CFS) =     4.92
EFFECTIVE AREA(ACRES) =     40.30   AREA-AVERAGED Fm(INCH/HR) =  0.18
AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.60
TOTAL AREA(ACRES) =       40.3       PEAK FLOW RATE(CFS) =      64.92
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    209.00 TO NODE    209.10 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) =   331.00
 FLOW LENGTH(FEET) =   960.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.27
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      64.92
 PIPE TRAVEL TIME(MIN.) =   1.56    Tc(MIN.) =   17.00
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    209.10 =    5320.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    209.10 TO NODE    209.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.773
 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
 "11+ DWELLINGS/ACRE"        B        0.40      0.30      0.200    56
 COMMERCIAL                  B        0.40      0.30      0.100    56
 COMMERCIAL                  B        2.20      0.30      0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        B        0.70      0.30      0.200    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"       B        1.10      0.30      0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.176
 SUBAREA AREA(ACRES) =     5.80      SUBAREA RUNOFF(CFS) =     8.98
 EFFECTIVE AREA(ACRES) =     46.10   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
```



```
 TOTAL AREA(ACRES) =       46.1       PEAK FLOW RATE(CFS) =      66.74

****************************************************************************
 FLOW PROCESS FROM NODE    209.10 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   331.00  DOWNSTREAM(FEET) =   330.00
 FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.12
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      66.74
 PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   17.42
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    230.00 =    5525.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =   17.42
 RAINFALL INTENSITY(INCH/HR) =   1.75
 AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.55
 EFFECTIVE STREAM AREA(ACRES) =      46.10
 TOTAL STREAM AREA(ACRES) =      46.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      66.74

****************************************************************************
 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) =   328.00
 ELEVATION DATA: UPSTREAM(FEET) =    426.00  DOWNSTREAM(FEET) =    423.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.407
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.973
 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.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        B        0.50      0.30      0.200    56    8.41
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        B        1.20      0.30      0.200    56    8.41
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      4.46
 TOTAL AREA(ACRES) =      1.70   PEAK FLOW RATE(CFS) =      4.46

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

```
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.00  DOWNSTREAM(FEET) =   421.00
  FLOW LENGTH(FEET) =   385.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.46
  PIPE TRAVEL TIME(MIN.) =   1.50    Tc(MIN.) =    9.91
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     713.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    9.91
  *  10 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        1.10      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.40      0.30     0.200    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 =  0.200
  SUBAREA AREA(ACRES) =    4.30      SUBAREA RUNOFF(CFS) =    9.77
  EFFECTIVE AREA(ACRES) =      6.00   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.0       PEAK FLOW RATE(CFS) =      13.64

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   421.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =   567.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.25
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.64
  PIPE TRAVEL TIME(MIN.) =   1.30    Tc(MIN.) =   11.21
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   11.21
```



```
  *  10 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
  "11+ DWELLINGS/ACRE"       B        1.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.70      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) =    7.60      SUBAREA RUNOFF(CFS) =   15.98
  EFFECTIVE AREA(ACRES) =     13.60   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       13.6       PEAK FLOW RATE(CFS) =      28.60

****************************************************************************
  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) =   415.00  DOWNSTREAM(FEET) =   409.00
  FLOW LENGTH(FEET) =   747.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.93
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.60
  PIPE TRAVEL TIME(MIN.) =   1.57    Tc(MIN.) =   12.78
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =    2027.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   12.78
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.183
  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        0.30      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.90      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B       11.40      0.30     0.400    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 =  0.381
  SUBAREA AREA(ACRES) =   16.30      SUBAREA RUNOFF(CFS) =   30.35
  EFFECTIVE AREA(ACRES) =     29.90   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       29.9       PEAK FLOW RATE(CFS) =      56.34

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

```
 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) =   409.00  DOWNSTREAM(FEET) =   382.00
 FLOW LENGTH(FEET) =  1002.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.69
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      56.34
 PIPE TRAVEL TIME(MIN.) =   1.14    Tc(MIN.) =   13.92
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =    3029.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.92
 *  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
 "11+ DWELLINGS/ACRE"       B        2.40      0.30     0.200    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        7.10      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        3.60      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B       10.50      0.30     0.400    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        9.40      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.419
 SUBAREA AREA(ACRES) =   33.30      SUBAREA RUNOFF(CFS) =   57.03
 EFFECTIVE AREA(ACRES) =     63.20   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       63.2       PEAK FLOW RATE(CFS) =     109.20

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.92
 *  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
 "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) =    0.52
```



```
 EFFECTIVE AREA(ACRES) =     63.50   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       63.5       PEAK FLOW RATE(CFS) =     109.72

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    218.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   382.00  DOWNSTREAM(FEET) =   373.00
 FLOW LENGTH(FEET) =  1218.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  36.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.59
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     109.72
 PIPE TRAVEL TIME(MIN.) =   1.92    Tc(MIN.) =   15.83
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    218.00 =    4247.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    218.00 TO NODE    218.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.83
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.836
 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        7.70      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.40      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        1.70      0.30     0.200    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.212
 SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =   16.27
 EFFECTIVE AREA(ACRES) =     73.70   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.34
 TOTAL AREA(ACRES) =       73.7       PEAK FLOW RATE(CFS) =     114.99

****************************************************************************
 FLOW PROCESS FROM NODE    218.00 TO NODE    219.00 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) =   347.00
 FLOW LENGTH(FEET) =  2106.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.06
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     114.99
 PIPE TRAVEL TIME(MIN.) =   2.69    Tc(MIN.) =   18.52
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    219.00 =    6353.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.52
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.690
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.20      0.30     0.100    56
  COMMERCIAL                 B        2.40      0.30     0.100    56
  PUBLIC PARK                B        1.20      0.30     0.850    56
  PUBLIC PARK                B        1.70      0.30     0.850    56
  PUBLIC PARK                B        8.50      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.70      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.686
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =   19.64
  EFFECTIVE AREA(ACRES) =     88.40   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       88.4       PEAK FLOW RATE(CFS) =     124.97

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.52
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.690
  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        2.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       24.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.20      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 =  0.205
  SUBAREA AREA(ACRES) =   30.20      SUBAREA RUNOFF(CFS) =   44.27
  EFFECTIVE AREA(ACRES) =    118.60   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      118.6       PEAK FLOW RATE(CFS) =     169.23

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   18.52
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.690
  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        0.50      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.40      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        7.40      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) =    9.30      SUBAREA RUNOFF(CFS) =   13.14
  EFFECTIVE AREA(ACRES) =    127.90   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      127.9       PEAK FLOW RATE(CFS) =     182.38

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   347.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1244.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  40.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.04
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     182.38
  PIPE TRAVEL TIME(MIN.) =   1.38    Tc(MIN.) =   19.90
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    230.00 =    7597.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.90
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.616
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.20      0.30     0.100    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.124
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =    7.25
  EFFECTIVE AREA(ACRES) =    133.00   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =      133.0       PEAK FLOW RATE(CFS) =     182.38
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =   19.90
  RAINFALL INTENSITY(INCH/HR) =   1.62
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.34
  EFFECTIVE STREAM AREA(ACRES) =     133.00
  TOTAL STREAM AREA(ACRES) =     133.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     182.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       66.74   17.42    1.750  0.30( 0.16) 0.55      46.1     203.00
      2      182.38   19.90    1.616  0.30( 0.10) 0.34     133.0     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      240.59   17.42    1.750  0.30( 0.12) 0.40     162.6     203.00
      2      243.47   19.90    1.616  0.30( 0.12) 0.40     179.1     210.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     243.47    Tc(MIN.) =    19.90
  EFFECTIVE AREA(ACRES) =     179.10   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      179.1
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    230.00 =    7597.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    231.00 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) =   293.00
  FLOW LENGTH(FEET) =   389.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  34.19
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     243.47
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   20.09
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    231.00 =    7986.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   20.09
  *  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        2.00      0.30      0.100    56
  COMMERCIAL                 B        4.60      0.30      0.100    56
  COMMERCIAL                 B        5.60      0.30      0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.60      0.30      1.000    66
  AGRICULTURAL FAIR COVER
  "ORCHARDS"                 B        0.70      0.30      1.000    65
  AGRICULTURAL FAIR COVER
  "ORCHARDS"                 B        0.20      0.30      1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =   20.25
  EFFECTIVE AREA(ACRES) =    193.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =      193.8       PEAK FLOW RATE(CFS) =     260.02

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.09
  *  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
  PUBLIC PARK                B        7.30      0.30      0.850    56
  PUBLIC PARK                B        0.80      0.30      0.850    56
  PUBLIC PARK                B        0.20      0.30      0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.00      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 =  0.875
  SUBAREA AREA(ACRES) =   16.60      SUBAREA RUNOFF(CFS) =   20.08
  EFFECTIVE AREA(ACRES) =    210.40   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      210.4       PEAK FLOW RATE(CFS) =     280.10

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      280.87   17.62    1.739  0.30( 0.13) 0.43     193.9     203.00
      2      280.10   20.09    1.606  0.30( 0.13) 0.42     210.4     210.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     280.87  Tc(MIN.) =   17.62
  AREA-AVERAGED Fm(INCH/HR) =  0.13  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.43  EFFECTIVE AREA(ACRES) =     193.85
```

```
**************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN.) =   17.62
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.739
  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        0.50      0.30     0.500    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.40      0.30     1.000    65
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.30      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.576
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    4.65
  EFFECTIVE AREA(ACRES) =    197.15   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      213.7       PEAK FLOW RATE(CFS) =     285.52
==========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      213.7  TC(MIN.) =     17.62
  EFFECTIVE AREA(ACRES) =    197.15  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.433
  PEAK FLOW RATE(CFS)   =     285.52

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      285.52   17.62    1.739  0.30( 0.13) 0.43     197.2     203.00
      2      284.35   20.09    1.606  0.30( 0.13) 0.43     213.7     210.00
==========================================================================
==========================================================================
  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 1237

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED B                            *
* PHASED NO PA45 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL            *
* 25-YR EV FEB 2023 ROKAMOTO                                               *
 ****************************************************************************

  FILE NAME: 3B25EVRL.DAT
  TIME/DATE OF STUDY: 07:58 02/15/2023
============================================================================
  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;  4.920
   2)   10.00;  3.206
   3)   15.00;  2.446
   4)   20.00;  2.021
   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;  0.900
  11)  120.00;  0.790
  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:
```



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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    203.00 TO NODE    204.00 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) =    410.00  DOWNSTREAM(FEET) =    402.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.206
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.506
  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    6.21
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30      0.200    56    6.61
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30      0.900    56    9.94
  COMMERCIAL                 B        0.30      0.30      0.100    56    6.21
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.60      0.30      0.200    56    6.61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.207
  SUBAREA RUNOFF(CFS) =      6.00
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      6.00

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 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) =   515.00   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) =      11.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.37
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  AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.25
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.55
 STREET FLOW TRAVEL TIME(MIN.) =   2.02   Tc(MIN.) =    8.23
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.814
 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
 COMMERCIAL                 B        0.50      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.80      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    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 =  0.512
 SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =   10.87
 EFFECTIVE AREA(ACRES) =      4.80    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =        4.8        PEAK FLOW RATE(CFS) =      15.94

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.16
 FLOW VELOCITY(FEET/SEC.) =  4.58   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    205.00 =     820.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 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) =   386.00   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) =      19.89
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.44
   HALFSTREET FLOOD WIDTH(FEET) =   15.27
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.37
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.90
 STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    9.70
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.309
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.30      0.30     0.100    56
```



```
 COMMERCIAL                 B        0.40      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    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 =  0.600
 SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    7.88
 EFFECTIVE AREA(ACRES) =      7.60    AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =        7.6        PEAK FLOW RATE(CFS) =      21.64

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  15.82
 FLOW VELOCITY(FEET/SEC.) =  4.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.98
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    206.00 =    1206.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.70
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.309
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.70      0.30     0.100    56
 COMMERCIAL                 B        2.50      0.30     0.100    56
 COMMERCIAL                 B        0.30      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
 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 =  0.115
 SUBAREA AREA(ACRES) =    4.10      SUBAREA RUNOFF(CFS) =   12.08
 EFFECTIVE AREA(ACRES) =     11.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
 TOTAL AREA(ACRES) =       11.7       PEAK FLOW RATE(CFS) =      33.72

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.70
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.309
 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        2.60      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        9.30      0.30     0.900    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 =  0.900
  SUBAREA AREA(ACRES) =   13.40      SUBAREA RUNOFF(CFS) =   36.65
  EFFECTIVE AREA(ACRES) =     25.10   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.65
  TOTAL AREA(ACRES) =       25.1       PEAK FLOW RATE(CFS) =      70.37

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 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) =   353.00
  FLOW LENGTH(FEET) =  1217.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.45
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      70.37
  PIPE TRAVEL TIME(MIN.) =   1.51    Tc(MIN.) =   11.21
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    207.00 =    2423.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.21
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.022
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.40      0.30     0.100    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    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 =  0.500
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =   14.99
  EFFECTIVE AREA(ACRES) =     30.90   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       30.9       PEAK FLOW RATE(CFS) =      78.89

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```



```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   353.00  DOWNSTREAM(FEET) =   343.00
  FLOW LENGTH(FEET) =  1021.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.99
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      78.89
  PIPE TRAVEL TIME(MIN.) =   1.55    Tc(MIN.) =   12.76
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    208.00 =    3444.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.787
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.40      0.30     0.100    56
  COMMERCIAL                 B        1.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.60      0.30     0.900    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 =  0.561
  SUBAREA AREA(ACRES) =    6.20      SUBAREA RUNOFF(CFS) =   14.61
  EFFECTIVE AREA(ACRES) =     37.10   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =      86.96

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   343.00  DOWNSTREAM(FEET) =   340.00
  FLOW LENGTH(FEET) =   916.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  39.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.35
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      86.96
  PIPE TRAVEL TIME(MIN.) =   2.08    Tc(MIN.) =   14.83
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    209.00 =    4360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    209.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.83
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.471
  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
COMMERCIAL                  B        0.60      0.30     0.100    56
COMMERCIAL                  B        0.70      0.30     0.100    56
RESIDENTIAL
".4 DWELLING/ACRE"          B        0.40      0.30     0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"          B        0.80      0.30     0.900    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 =  0.500
SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    6.69
EFFECTIVE AREA(ACRES) =     40.30   AREA-AVERAGED Fm(INCH/HR) =  0.18
AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.60
TOTAL AREA(ACRES) =       40.3       PEAK FLOW RATE(CFS) =      86.96
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    209.00 TO NODE    209.10 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) =   331.00
 FLOW LENGTH(FEET) =   960.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.92
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      86.96
 PIPE TRAVEL TIME(MIN.) =   1.46    Tc(MIN.) =   16.30
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    209.10 =    5320.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    209.10 TO NODE    209.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.30
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.336
 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
 "11+ DWELLINGS/ACRE"        B        0.40      0.30     0.200    56
 COMMERCIAL                  B        0.40      0.30     0.100    56
 COMMERCIAL                  B        2.20      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        B        0.70      0.30     0.200    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"       B        1.10      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.176
 SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =   11.92
 EFFECTIVE AREA(ACRES) =     46.10   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
```



```
 TOTAL AREA(ACRES) =       46.1       PEAK FLOW RATE(CFS) =      90.10

****************************************************************************
 FLOW PROCESS FROM NODE    209.10 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   331.00  DOWNSTREAM(FEET) =   330.00
 FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  37.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.62
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      90.10
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   16.69
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    230.00 =    5525.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =   16.69
 RAINFALL INTENSITY(INCH/HR) =   2.30
 AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.55
 EFFECTIVE STREAM AREA(ACRES) =      46.10
 TOTAL STREAM AREA(ACRES) =      46.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      90.10

****************************************************************************
 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) =   328.00
 ELEVATION DATA: UPSTREAM(FEET) =    426.00  DOWNSTREAM(FEET) =    423.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.407
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.752
 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
 "11+ DWELLINGS/ACRE"        B        0.50      0.30     0.200    56    8.41
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        B        1.20      0.30     0.200    56    8.41
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      5.65
 TOTAL AREA(ACRES) =      1.70   PEAK FLOW RATE(CFS) =      5.65

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

```
 FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   423.00  DOWNSTREAM(FEET) =   421.00
 FLOW LENGTH(FEET) =   385.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.50
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.65
 PIPE TRAVEL TIME(MIN.) =   1.43    Tc(MIN.) =    9.83
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     713.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.83
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.263
 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        1.10      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        1.40      0.30     0.200    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 =  0.200
 SUBAREA AREA(ACRES) =    4.30      SUBAREA RUNOFF(CFS) =   12.40
 EFFECTIVE AREA(ACRES) =      6.00   AREA-AVERAGED Fm(INCH/HR) =  0.06
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        6.0       PEAK FLOW RATE(CFS) =      17.30

****************************************************************************
 FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   421.00  DOWNSTREAM(FEET) =   415.00
 FLOW LENGTH(FEET) =   567.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.78
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      17.30
 PIPE TRAVEL TIME(MIN.) =   1.21    Tc(MIN.) =   11.05
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =    1280.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.05
```



```
 *  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        1.90      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        5.70      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) =    7.60      SUBAREA RUNOFF(CFS) =   20.43
 EFFECTIVE AREA(ACRES) =     13.60   AREA-AVERAGED Fm(INCH/HR) =  0.06
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       13.6       PEAK FLOW RATE(CFS) =      36.56

****************************************************************************
 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) =   415.00  DOWNSTREAM(FEET) =   409.00
 FLOW LENGTH(FEET) =   747.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.43
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      36.56
 PIPE TRAVEL TIME(MIN.) =   1.48    Tc(MIN.) =   12.52
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =    2027.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.52
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.822
 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        0.30      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.90      0.30     0.400    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B       11.40      0.30     0.400    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 =  0.381
 SUBAREA AREA(ACRES) =   16.30      SUBAREA RUNOFF(CFS) =   39.73
 EFFECTIVE AREA(ACRES) =     29.90   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.30
 TOTAL AREA(ACRES) =       29.9       PEAK FLOW RATE(CFS) =      73.54

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

```
 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) =   409.00  DOWNSTREAM(FEET) =   382.00
 FLOW LENGTH(FEET) =  1002.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.68
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      73.54
 PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =   13.59
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =    3029.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.59
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.661
 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        2.40      0.30     0.200    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        7.10      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        3.60      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B       10.50      0.30     0.400    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        9.40      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.419
 SUBAREA AREA(ACRES) =   33.30      SUBAREA RUNOFF(CFS) =   75.97
 EFFECTIVE AREA(ACRES) =     63.20   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       63.2       PEAK FLOW RATE(CFS) =     145.16

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.59
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.661
 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) =    0.69
```



```
 EFFECTIVE AREA(ACRES) =     63.50   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       63.5       PEAK FLOW RATE(CFS) =     145.84

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    218.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   382.00  DOWNSTREAM(FEET) =   373.00
 FLOW LENGTH(FEET) =  1218.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.42
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     145.84
 PIPE TRAVEL TIME(MIN.) =   1.78    Tc(MIN.) =   15.37
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    218.00 =    4247.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    218.00 TO NODE    218.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.37
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.415
 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        7.70      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.40      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        1.70      0.30     0.200    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.212
 SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =   21.59
 EFFECTIVE AREA(ACRES) =     73.70   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.34
 TOTAL AREA(ACRES) =       73.7       PEAK FLOW RATE(CFS) =     153.39

****************************************************************************
 FLOW PROCESS FROM NODE    218.00 TO NODE    219.00 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) =   347.00
 FLOW LENGTH(FEET) =  2106.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  51.0 INCH PIPE IS  36.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.11
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     153.39
 PIPE TRAVEL TIME(MIN.) =   2.49    Tc(MIN.) =   17.85
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    219.00 =    6353.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.85
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.204
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.20      0.30     0.100    56
  COMMERCIAL                 B        2.40      0.30     0.100    56
  PUBLIC PARK                B        1.20      0.30     0.850    56
  PUBLIC PARK                B        1.70      0.30     0.850    56
  PUBLIC PARK                B        8.50      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.70      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.686
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =   26.43
  EFFECTIVE AREA(ACRES) =     88.40   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       88.4       PEAK FLOW RATE(CFS) =     165.80

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.85
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.204
  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        2.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       24.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.20      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 =  0.205
  SUBAREA AREA(ACRES) =   30.20      SUBAREA RUNOFF(CFS) =   58.22
  EFFECTIVE AREA(ACRES) =    118.60   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      118.6       PEAK FLOW RATE(CFS) =     224.02

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   17.85
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.204
  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        0.50      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.40      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        7.40      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) =    9.30      SUBAREA RUNOFF(CFS) =   17.44
  EFFECTIVE AREA(ACRES) =    127.90   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      127.9       PEAK FLOW RATE(CFS) =     241.46

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   347.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1244.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  44.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.19
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     241.46
  PIPE TRAVEL TIME(MIN.) =   1.28    Tc(MIN.) =   19.13
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    230.00 =    7597.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.13
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.095
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.20      0.30     0.100    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.124
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =    9.44
  EFFECTIVE AREA(ACRES) =    133.00   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =      133.0       PEAK FLOW RATE(CFS) =     241.46
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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) =   2.09
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.34
  EFFECTIVE STREAM AREA(ACRES) =     133.00
  TOTAL STREAM AREA(ACRES) =     133.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     241.46

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       90.10   16.69    2.302  0.30( 0.16) 0.55      46.1     203.00
      2      241.46   19.13    2.095  0.30( 0.10) 0.34     133.0     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      322.71   16.69    2.302  0.30( 0.12) 0.40     162.1     203.00
      2      322.82   19.13    2.095  0.30( 0.12) 0.40     179.1     210.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     322.82    Tc(MIN.) =    19.13
  EFFECTIVE AREA(ACRES) =     179.10   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      179.1
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    230.00 =    7597.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    231.00 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) =   293.00
  FLOW LENGTH(FEET) =   389.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  36.31
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     322.82
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   19.31
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    231.00 =    7986.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   19.31
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.079
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        2.00      0.30      0.100    56
  COMMERCIAL                  B        4.60      0.30      0.100    56
  COMMERCIAL                  B        5.60      0.30      0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"                B        1.60      0.30      1.000    66
  AGRICULTURAL FAIR COVER
  "ORCHARDS"                  B        0.70      0.30      1.000    65
  AGRICULTURAL FAIR COVER
  "ORCHARDS"                  B        0.20      0.30      1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =   26.51
  EFFECTIVE AREA(ACRES) =    193.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =      193.8       PEAK FLOW RATE(CFS) =     342.53

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      345.37   16.87    2.287  0.30( 0.12) 0.39     176.8     203.00
      2      342.53   19.31    2.079  0.30( 0.12) 0.39     193.8     210.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     345.37  Tc(MIN.) =   16.87
  AREA-AVERAGED Fm(INCH/HR) =  0.12  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.39  EFFECTIVE AREA(ACRES) =     176.84

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.87
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.287
  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        7.30      0.30      0.850    56
  PUBLIC PARK                 B        0.80      0.30      0.850    56
  PUBLIC PARK                 B        0.20      0.30      0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.10      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        4.00      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 =  0.875
  SUBAREA AREA(ACRES) =   16.60      SUBAREA RUNOFF(CFS) =   30.24
  EFFECTIVE AREA(ACRES) =    193.44   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      210.4       PEAK FLOW RATE(CFS) =     375.61
```

```
*******************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
-------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
===============================================================================
  MAINLINE Tc(MIN.) =   16.87
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.287
  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        0.50      0.30     0.500    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.40      0.30     1.000    65
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.30      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.576
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    6.28
  EFFECTIVE AREA(ACRES) =    196.74   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      213.7       PEAK FLOW RATE(CFS) =     381.89
===============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      213.7  TC(MIN.) =     16.87
  EFFECTIVE AREA(ACRES) =    196.74  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.434
  PEAK FLOW RATE(CFS)   =     381.89

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      381.89   16.87    2.287  0.30( 0.13) 0.43     196.7     203.00
      2      375.34   19.31    2.079  0.30( 0.13) 0.43     213.7     210.00
===============================================================================
===============================================================================
  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 1237

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED B                            *
* PHASED NO PA45 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL            *
* 50-YR EV DEC 2022 ROKAMOTO                                               *
 ****************************************************************************

  FILE NAME: 3B50EVRL.DAT
  TIME/DATE OF STUDY: 12:41 12/02/2022
============================================================================
  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;  3.483
   3)   15.00;  2.666
   4)   20.00;  2.227
   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    203.00 TO NODE    204.00 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) =    410.00  DOWNSTREAM(FEET) =    402.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.206
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.966
  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    6.21
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30      0.200    56    6.61
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30      0.900    56    9.94
  COMMERCIAL                 B        0.30      0.30      0.100    56    6.21
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.60      0.30      0.200    56    6.61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.207
  SUBAREA RUNOFF(CFS) =      6.62
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      6.62

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 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) =   515.00   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) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   11.91
```

```
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.33
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.62
 STREET FLOW TRAVEL TIME(MIN.) =   1.98   Tc(MIN.) =    8.19
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.190
 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
 COMMERCIAL                 B        0.50      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.80      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.40      0.30     0.900    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 =  0.512
 SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =   11.99
 EFFECTIVE AREA(ACRES) =      4.80    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =        4.8        PEAK FLOW RATE(CFS) =      17.56

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.71
 FLOW VELOCITY(FEET/SEC.) =  4.69   DEPTH*VELOCITY(FT*FT/SEC.) =   1.91
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    205.00 =     820.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 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) =   386.00   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) =      21.91
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.45
   HALFSTREET FLOOD WIDTH(FEET) =   15.90
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.47
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.00
 STREET FLOW TRAVEL TIME(MIN.) =   1.44   Tc(MIN.) =    9.63
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.628
 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
```



```
 COMMERCIAL                 B        0.40      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    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 =  0.600
 SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    8.69
 EFFECTIVE AREA(ACRES) =      7.60    AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =        7.6        PEAK FLOW RATE(CFS) =      23.82

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.45
 FLOW VELOCITY(FEET/SEC.) =  4.57   DEPTH*VELOCITY(FT*FT/SEC.) =   2.08
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    206.00 =    1206.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.63
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.628
 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        2.50      0.30     0.100    56
 COMMERCIAL                 B        0.30      0.30     0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
 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 =  0.115
 SUBAREA AREA(ACRES) =    4.10      SUBAREA RUNOFF(CFS) =   13.26
 EFFECTIVE AREA(ACRES) =     11.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
 TOTAL AREA(ACRES) =       11.7       PEAK FLOW RATE(CFS) =      37.08

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.63
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.628
 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        2.60      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        9.30      0.30     0.900    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 =  0.900
  SUBAREA AREA(ACRES) =   13.40      SUBAREA RUNOFF(CFS) =   40.50
  EFFECTIVE AREA(ACRES) =     25.10   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.65
  TOTAL AREA(ACRES) =       25.1       PEAK FLOW RATE(CFS) =      77.58

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 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) =   353.00
  FLOW LENGTH(FEET) =  1217.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.64
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      77.58
  PIPE TRAVEL TIME(MIN.) =   1.49    Tc(MIN.) =   11.12
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    207.00 =    2423.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.12
  *  50 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
  COMMERCIAL                 B        2.40      0.30     0.100    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  COMMERCIAL                 B        0.30      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    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 =  0.500
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =   16.45
  EFFECTIVE AREA(ACRES) =     30.90   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       30.9       PEAK FLOW RATE(CFS) =      86.63

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```



```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   353.00  DOWNSTREAM(FEET) =   343.00
  FLOW LENGTH(FEET) =  1021.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.14
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      86.63
  PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =   12.64
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    208.00 =    3444.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.64
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.051
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.40      0.30     0.100    56
  COMMERCIAL                 B        1.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.60      0.30     0.900    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 =  0.561
  SUBAREA AREA(ACRES) =    6.20      SUBAREA RUNOFF(CFS) =   16.08
  EFFECTIVE AREA(ACRES) =     37.10   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       37.1       PEAK FLOW RATE(CFS) =      95.77

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   343.00  DOWNSTREAM(FEET) =   340.00
  FLOW LENGTH(FEET) =   916.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  39.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.59
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      95.77
  PIPE TRAVEL TIME(MIN.) =   2.01    Tc(MIN.) =   14.65
  LONGEST FLOWPATH FROM NODE    203.00 TO NODE    209.00 =    4360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    209.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.65
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.722
  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
 COMMERCIAL                 B        0.60      0.30      0.100    56
 COMMERCIAL                 B        0.70      0.30      0.100    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.40      0.30      0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.80      0.30      0.900    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 =  0.500
 SUBAREA AREA(ACRES) =     3.20      SUBAREA RUNOFF(CFS) =     7.41
 EFFECTIVE AREA(ACRES) =     40.30   AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =       40.3       PEAK FLOW RATE(CFS) =      95.77
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    209.00 TO NODE    209.10 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) =   331.00
 FLOW LENGTH(FEET) =   960.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.31
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      95.77
 PIPE TRAVEL TIME(MIN.) =   1.41    Tc(MIN.) =   16.07
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    209.10 =    5320.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    209.10 TO NODE    209.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.07
 *  50 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
 COMMERCIAL                 B        1.00      0.30      0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.40      0.30      0.200    56
 COMMERCIAL                 B        0.40      0.30      0.100    56
 COMMERCIAL                 B        2.20      0.30      0.100    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.70      0.30      0.200    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        1.10      0.30      0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.176
 SUBAREA AREA(ACRES) =     5.80      SUBAREA RUNOFF(CFS) =    13.15
 EFFECTIVE AREA(ACRES) =     46.10   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
```



```
 TOTAL AREA(ACRES) =       46.1       PEAK FLOW RATE(CFS) =      99.91

****************************************************************************
 FLOW PROCESS FROM NODE    209.10 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   331.00  DOWNSTREAM(FEET) =   330.00
 FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.92
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      99.91
 PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   16.45
 LONGEST FLOWPATH FROM NODE    203.00 TO NODE    230.00 =    5525.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =   16.45
 RAINFALL INTENSITY(INCH/HR) =   2.54
 AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.55
 EFFECTIVE STREAM AREA(ACRES) =      46.10
 TOTAL STREAM AREA(ACRES) =      46.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      99.91

****************************************************************************
 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) =   328.00
 ELEVATION DATA: UPSTREAM(FEET) =    426.00  DOWNSTREAM(FEET) =    423.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.407
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.106
 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
 "11+ DWELLINGS/ACRE"       B        0.50      0.30      0.200    56    8.41
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        1.20      0.30      0.200    56    8.41
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      6.19
 TOTAL AREA(ACRES) =      1.70   PEAK FLOW RATE(CFS) =      6.19

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

```
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.00  DOWNSTREAM(FEET) =   421.00
  FLOW LENGTH(FEET) =   385.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.57
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.19
  PIPE TRAVEL TIME(MIN.) =   1.40    Tc(MIN.) =    9.81
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     713.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    9.81
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.557
  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        1.10      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.40      0.30     0.200    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 =  0.200
  SUBAREA AREA(ACRES) =    4.30      SUBAREA RUNOFF(CFS) =   13.53
  EFFECTIVE AREA(ACRES) =      6.00   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.0       PEAK FLOW RATE(CFS) =      18.89

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   421.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =   567.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.90
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.89
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =   11.01
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   11.01
```



```
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.319
  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        1.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.70      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) =    7.60      SUBAREA RUNOFF(CFS) =   22.29
  EFFECTIVE AREA(ACRES) =     13.60   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       13.6       PEAK FLOW RATE(CFS) =      39.88

****************************************************************************
  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) =   415.00  DOWNSTREAM(FEET) =   409.00
  FLOW LENGTH(FEET) =   747.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.55
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.88
  PIPE TRAVEL TIME(MIN.) =   1.46    Tc(MIN.) =   12.46
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =    2027.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   12.46
  *  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        0.30      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.90      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B       11.40      0.30     0.400    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 =  0.381
  SUBAREA AREA(ACRES) =   16.30      SUBAREA RUNOFF(CFS) =   43.52
  EFFECTIVE AREA(ACRES) =     29.90   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       29.9       PEAK FLOW RATE(CFS) =      80.49

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

```
 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) =   409.00  DOWNSTREAM(FEET) =   382.00
 FLOW LENGTH(FEET) =  1002.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.80
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      80.49
 PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =   13.52
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =    3029.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.52
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.908
 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        2.40      0.30     0.200    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        7.10      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        3.60      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B       10.50      0.30     0.400    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        9.40      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.419
 SUBAREA AREA(ACRES) =   33.30      SUBAREA RUNOFF(CFS) =   83.39
 EFFECTIVE AREA(ACRES) =     63.20   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       63.2       PEAK FLOW RATE(CFS) =     159.23

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.52
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.908
 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) =    0.75
```



```
 EFFECTIVE AREA(ACRES) =     63.50   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =       63.5       PEAK FLOW RATE(CFS) =     159.98

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    218.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   382.00  DOWNSTREAM(FEET) =   373.00
 FLOW LENGTH(FEET) =  1218.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  54.0 INCH PIPE IS  44.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.49
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     159.98
 PIPE TRAVEL TIME(MIN.) =   1.77    Tc(MIN.) =   15.29
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    218.00 =    4247.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    218.00 TO NODE    218.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.29
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.641
 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        7.70      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.40      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        1.70      0.30     0.200    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.212
 SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =   23.66
 EFFECTIVE AREA(ACRES) =     73.70   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.34
 TOTAL AREA(ACRES) =       73.7       PEAK FLOW RATE(CFS) =     168.38

****************************************************************************
 FLOW PROCESS FROM NODE    218.00 TO NODE    219.00 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) =   347.00
 FLOW LENGTH(FEET) =  2106.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  51.0 INCH PIPE IS  39.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.27
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     168.38
 PIPE TRAVEL TIME(MIN.) =   2.46    Tc(MIN.) =   17.74
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    219.00 =    6353.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.74
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.425
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.20      0.30     0.100    56
  COMMERCIAL                 B        2.40      0.30     0.100    56
  PUBLIC PARK                B        1.20      0.30     0.850    56
  PUBLIC PARK                B        1.70      0.30     0.850    56
  PUBLIC PARK                B        8.50      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.70      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.686
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =   29.36
  EFFECTIVE AREA(ACRES) =     88.40   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       88.4       PEAK FLOW RATE(CFS) =     183.42

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.74
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.425
  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        2.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       24.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.20      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 =  0.205
  SUBAREA AREA(ACRES) =   30.20      SUBAREA RUNOFF(CFS) =   64.24
  EFFECTIVE AREA(ACRES) =    118.60   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      118.6       PEAK FLOW RATE(CFS) =     247.66

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   17.74
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.425
  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        0.50      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.40      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        7.40      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) =    9.30      SUBAREA RUNOFF(CFS) =   19.29
  EFFECTIVE AREA(ACRES) =    127.90   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      127.9       PEAK FLOW RATE(CFS) =     266.95

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   347.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =  1244.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  45.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.70
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     266.95
  PIPE TRAVEL TIME(MIN.) =   1.24    Tc(MIN.) =   18.99
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    230.00 =    7597.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.99
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.316
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.20      0.30     0.100    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.90      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.124
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =   10.46
  EFFECTIVE AREA(ACRES) =    133.00   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =      133.0       PEAK FLOW RATE(CFS) =     266.95
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =   18.99
  RAINFALL INTENSITY(INCH/HR) =   2.32
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.34
  EFFECTIVE STREAM AREA(ACRES) =     133.00
  TOTAL STREAM AREA(ACRES) =     133.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     266.95

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       99.91   16.45    2.538  0.30( 0.16) 0.55      46.1     203.00
      2      266.95   18.99    2.316  0.30( 0.10) 0.34     133.0     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      354.49   16.45    2.538  0.30( 0.12) 0.40     161.3     203.00
      2      357.50   18.99    2.316  0.30( 0.12) 0.40     179.1     210.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     357.50    Tc(MIN.) =    18.99
  EFFECTIVE AREA(ACRES) =     179.10   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      179.1
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    230.00 =    7597.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    231.00 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) =   293.00
  FLOW LENGTH(FEET) =   389.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  37.54
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     357.50
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   19.16
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    231.00 =    7986.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   19.16
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.301
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.00      0.30      0.100    56
  COMMERCIAL                 B        4.60      0.30      0.100    56
  COMMERCIAL                 B        5.60      0.30      0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.60      0.30      1.000    66
  AGRICULTURAL FAIR COVER
  "ORCHARDS"                 B        0.70      0.30      1.000    65
  AGRICULTURAL FAIR COVER
  "ORCHARDS"                 B        0.20      0.30      1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =   29.44
  EFFECTIVE AREA(ACRES) =    193.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =      193.8       PEAK FLOW RATE(CFS) =     381.14

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      381.28   16.63    2.523  0.30( 0.12) 0.39     176.0     203.00
      2      381.14   19.16    2.301  0.30( 0.12) 0.39     193.8     210.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     381.28  Tc(MIN.) =   16.63
  AREA-AVERAGED Fm(INCH/HR) =  0.12  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.39  EFFECTIVE AREA(ACRES) =     176.05

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.63
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.523
  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        7.30      0.30      0.850    56
  PUBLIC PARK                B        0.80      0.30      0.850    56
  PUBLIC PARK                B        0.20      0.30      0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30      0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.00      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 =  0.875
  SUBAREA AREA(ACRES) =   16.60      SUBAREA RUNOFF(CFS) =   33.78
  EFFECTIVE AREA(ACRES) =    192.65   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      210.4       PEAK FLOW RATE(CFS) =     415.05
```

```
**************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN.) =   16.63
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.523
  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        0.50      0.30     0.500    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.10      0.30     1.000    65
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.40      0.30     1.000    65
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        2.30      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.576
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    6.98
  EFFECTIVE AREA(ACRES) =    195.95   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      213.7       PEAK FLOW RATE(CFS) =     422.03
==========================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      213.7  TC(MIN.) =     16.63
  EFFECTIVE AREA(ACRES) =    195.95  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.434
  PEAK FLOW RATE(CFS)   =     422.03

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      422.03   16.63    2.523  0.30( 0.13) 0.43     195.9     203.00
      2      417.91   19.16    2.301  0.30( 0.13) 0.43     213.7     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 1237

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED C                          *
* PHASED NO PA45 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL          *
* 100-YR EV FEB 2023 ROKAMOTO                                           *
 ***********************************************************************

  FILE NAME: 3C00EVRL.DAT
  TIME/DATE OF STUDY: 07:55 02/15/2023
==============================================================================
  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 0.0313 0.167 0.0150
  2   32.0     27.0    0.200/0.200/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.200/0.200/ ---    0.33    1.00 0.3120 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) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    644.00  DOWNSTREAM(FEET) =    641.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.438
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.540
  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
  "11+ DWELLINGS/ACRE"       B        1.60      0.30     0.200    56    8.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      6.45
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      6.45

******************************************************************************
  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) =  641.00  DOWNSTREAM ELEVATION(FEET) =  637.00
  STREET LENGTH(FEET) =   470.00   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) =      13.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   16.37
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.19
  STREET FLOW TRAVEL TIME(MIN.) =   3.00   Tc(MIN.) =   11.44
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.610
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL               B        0.10      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"     B        4.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.198
  SUBAREA AREA(ACRES) =    4.40      SUBAREA RUNOFF(CFS) =   14.06
  EFFECTIVE AREA(ACRES) =      6.00    AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.0        PEAK FLOW RATE(CFS) =      19.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  18.87
  FLOW VELOCITY(FEET/SEC.) =  2.84   DEPTH*VELOCITY(FT*FT/SEC.) =   1.42
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     800.00 FEET.

****************************************************************************
  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) =   637.00  DOWNSTREAM(FEET) =   634.00
  FLOW LENGTH(FEET) =   563.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.10
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.18
  PIPE TRAVEL TIME(MIN.) =   1.54    Tc(MIN.) =   12.97
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =    1363.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.97
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.339
  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        5.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.40      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) =    8.00      SUBAREA RUNOFF(CFS) =   23.61
  EFFECTIVE AREA(ACRES) =     14.00   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       14.0       PEAK FLOW RATE(CFS) =      41.31

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 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) =   630.00
  FLOW LENGTH(FEET) =  1072.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.49
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.31
  PIPE TRAVEL TIME(MIN.) =   2.75    Tc(MIN.) =   15.73
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =    2435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.73
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.904
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL               B        2.90      0.30     0.100    56
  COMMERCIAL               B        4.50      0.30     0.100    56
  PUBLIC PARK              B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"     B        5.70      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"     B        2.40      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"    B        0.50      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.164
  SUBAREA AREA(ACRES) =   16.10      SUBAREA RUNOFF(CFS) =   41.36
  EFFECTIVE AREA(ACRES) =     30.10   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       30.1       PEAK FLOW RATE(CFS) =      77.19

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.73
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.904
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  SCHOOL                     B        5.70      0.30     0.600    56
  SCHOOL                     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) =   12.40      SUBAREA RUNOFF(CFS) =   30.40
  EFFECTIVE AREA(ACRES) =     42.50   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       42.5       PEAK FLOW RATE(CFS) =     107.59

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 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) =   630.00  DOWNSTREAM(FEET) =   610.00
  FLOW LENGTH(FEET) =  1290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.99
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     107.59
  PIPE TRAVEL TIME(MIN.) =   1.54    Tc(MIN.) =   17.26
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =    3725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.26
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.740
  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        0.90      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  SCHOOL                     B        0.10      0.30     0.600    56
  SCHOOL                     B        0.50      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.216
  SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    7.71
  EFFECTIVE AREA(ACRES) =     45.70   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       45.7       PEAK FLOW RATE(CFS) =     109.04

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  3668.00
  ELEVATION DATA: UPSTREAM(FEET) =    663.00  DOWNSTREAM(FEET) =    610.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   18.909
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.565
  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        1.70      0.30     0.100    56   18.91
  COMMERCIAL                 B        4.40      0.30     0.100    56   18.91
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.60      0.30     0.200    56   20.15
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.30      0.30     0.200    56   20.15
  RESIDENTIAL
```



```
  "3-4 DWELLINGS/ACRE"       B        7.10      0.30     0.600    56   25.63
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.80      0.30     0.600    56   25.63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.387
  SUBAREA AREA(ACRES) =   17.90   INITIAL SUBAREA RUNOFF(CFS) =   39.45

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   17.26
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.740
  SUBAREA AREA(ACRES) =   17.90      SUBAREA RUNOFF(CFS) =   42.27
  EFFECTIVE AREA(ACRES) =     63.60   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =       63.6       PEAK FLOW RATE(CFS) =     151.31

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    317.00 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) =   535.00
  FLOW LENGTH(FEET) =  1537.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.51
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     151.31
  PIPE TRAVEL TIME(MIN.) =   1.09    Tc(MIN.) =   18.35
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    317.00 =    5262.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.624
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.30      0.30     0.100    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    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 =  0.139
  SUBAREA AREA(ACRES) =    4.00      SUBAREA RUNOFF(CFS) =    9.30
  EFFECTIVE AREA(ACRES) =     67.60   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       67.6       PEAK FLOW RATE(CFS) =     153.97

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 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.) =   18.35
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.31
  EFFECTIVE STREAM AREA(ACRES) =      67.60
  TOTAL STREAM AREA(ACRES) =      67.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     153.97

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 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) =    629.00  DOWNSTREAM(FEET) =    625.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.474
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.957
  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.)
  COMMERCIAL                 B        0.10      0.30     0.100    56    7.47
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.10      0.30     0.200    56    7.97
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.193
  SUBAREA RUNOFF(CFS) =      6.17
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      6.17

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  625.00  DOWNSTREAM ELEVATION(FEET) =  623.00
  STREET LENGTH(FEET) =   300.00   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) =      11.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   16.05
```



```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   2.19   Tc(MIN.) =    9.67
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.008
  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        0.20      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.70      0.30     0.200    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 =  0.141
  SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =   10.35
  EFFECTIVE AREA(ACRES) =      4.30    AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        4.3        PEAK FLOW RATE(CFS) =      15.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.09
  FLOW VELOCITY(FEET/SEC.) =  2.46   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    312.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    313.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   623.00  DOWNSTREAM(FEET) =   620.00
  FLOW LENGTH(FEET) =   369.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.83
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.33
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =   10.57
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    313.00 =     999.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.57
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.764
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.90      0.30     0.100    56
  COMMERCIAL                 B        2.50      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.80      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.70      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.125
```

```
  SUBAREA AREA(ACRES) =    5.90      SUBAREA RUNOFF(CFS) =   19.79
  EFFECTIVE AREA(ACRES) =     10.20   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =       10.2       PEAK FLOW RATE(CFS) =      34.17

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    314.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   620.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =   338.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.23
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.17
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   11.12
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    314.00 =    1337.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    314.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.12
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.667
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.20      0.30     0.100    56
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        6.10      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        6.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.208
  SUBAREA AREA(ACRES) =   12.70      SUBAREA RUNOFF(CFS) =   41.20
  EFFECTIVE AREA(ACRES) =     22.90   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       22.9       PEAK FLOW RATE(CFS) =      74.47

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    315.00 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) =   600.00
  FLOW LENGTH(FEET) =   578.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.44
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      74.47
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =   11.74
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    315.00 =    1915.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    315.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.74
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.556
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.70      0.30     0.100    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.00      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.10      0.30     0.200    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.70      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        6.00      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.347
  SUBAREA AREA(ACRES) =   17.80      SUBAREA RUNOFF(CFS) =   55.31
  EFFECTIVE AREA(ACRES) =     40.70   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.25
  TOTAL AREA(ACRES) =       40.7       PEAK FLOW RATE(CFS) =     127.51

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    316.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   600.00  DOWNSTREAM(FEET) =   569.00
  FLOW LENGTH(FEET) =  2176.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.08
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     127.51
  PIPE TRAVEL TIME(MIN.) =   2.57    Tc(MIN.) =   14.32
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    316.00 =    4091.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    316.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.32
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.102
  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        0.40      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
```

```
  "5-7 DWELLINGS/ACRE"       B        6.80      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B       19.10      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) =   26.60      SUBAREA RUNOFF(CFS) =   70.66
  EFFECTIVE AREA(ACRES) =     67.30   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =       67.3       PEAK FLOW RATE(CFS) =     181.52

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    317.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   569.00  DOWNSTREAM(FEET) =   535.00
  FLOW LENGTH(FEET) =   759.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.76
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     181.52
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   14.85
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    317.00 =    4850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 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        0.40      0.30     0.100    56
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        8.90      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        7.40      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.505
  SUBAREA AREA(ACRES) =   17.50      SUBAREA RUNOFF(CFS) =   44.99
  EFFECTIVE AREA(ACRES) =     84.80   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       84.8       PEAK FLOW RATE(CFS) =     220.81

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 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.) =   14.85
  RAINFALL INTENSITY(INCH/HR) =   3.01
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.38
  EFFECTIVE STREAM AREA(ACRES) =      84.80
  TOTAL STREAM AREA(ACRES) =      84.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     220.81

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      153.97   18.35    2.624  0.30( 0.09) 0.31      67.6     300.00
      2      220.81   14.85    3.008  0.30( 0.11) 0.38      84.8     310.00

  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      364.25   14.85    3.008  0.30( 0.11) 0.35     139.5     310.00
      2      345.51   18.35    2.624  0.30( 0.11) 0.35     152.4     300.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     364.25    Tc(MIN.) =    14.85
  EFFECTIVE AREA(ACRES) =     139.49   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      152.4
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    317.00 =    5262.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    307.00 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) =   374.00
  FLOW LENGTH(FEET) =  3798.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  41.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.48
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     364.25
  PIPE TRAVEL TIME(MIN.) =   2.30    Tc(MIN.) =   17.15
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    307.00 =    9060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.15
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.752
  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        1.40      0.30     0.100    56
```

```
  COMMERCIAL                  B        4.80      0.30     0.100    56
  COMMERCIAL                  B        5.00      0.30     0.100    56
  COMMERCIAL                  B        3.70      0.30     0.100    56
  PUBLIC PARK                 B        5.00      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.288
  SUBAREA AREA(ACRES) =   20.00      SUBAREA RUNOFF(CFS) =   47.98
  EFFECTIVE AREA(ACRES) =    159.49   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      172.4       PEAK FLOW RATE(CFS) =     380.13

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.15
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.752
  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        4.00      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       12.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.50      0.30     0.900    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 =  0.364
  SUBAREA AREA(ACRES) =   21.90      SUBAREA RUNOFF(CFS) =   52.09
  EFFECTIVE AREA(ACRES) =    181.39   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      194.3       PEAK FLOW RATE(CFS) =     432.22

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.15
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.752
  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        4.50      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.40      0.30     0.500    56
  SCHOOL                     B        2.20      0.30     0.600    56
  SCHOOL                     B        6.80      0.30     0.600    56
  SCHOOL                     B        7.90      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```



```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.574
  SUBAREA AREA(ACRES) =   22.80      SUBAREA RUNOFF(CFS) =   52.94
  EFFECTIVE AREA(ACRES) =    204.19   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      217.1       PEAK FLOW RATE(CFS) =     485.16

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 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) =   374.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =   847.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  41.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  36.68
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     485.16
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   17.54
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    330.00 =    9907.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   17.54
  RAINFALL INTENSITY(INCH/HR) =   2.71
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.37
  EFFECTIVE STREAM AREA(ACRES) =     204.19
  TOTAL STREAM AREA(ACRES) =     217.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     485.16

****************************************************************************
  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) =    636.00  DOWNSTREAM(FEET) =    633.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.438
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.540
  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
  "11+ DWELLINGS/ACRE"       B        2.80      0.30     0.200    56    8.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =     11.29
  TOTAL AREA(ACRES) =      2.80   PEAK FLOW RATE(CFS) =     11.29
```

```
****************************************************************************
  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) =  633.00  DOWNSTREAM ELEVATION(FEET) =  628.00
  STREET LENGTH(FEET) =   360.00   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) =      23.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   18.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.78
  STREET FLOW TRAVEL TIME(MIN.) =   1.67   Tc(MIN.) =   10.11
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.845
  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        6.30      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  SCHOOL                     B        0.70      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.237
  SUBAREA AREA(ACRES) =    7.30      SUBAREA RUNOFF(CFS) =   24.80
  EFFECTIVE AREA(ACRES) =     10.10    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.23
  TOTAL AREA(ACRES) =       10.1        PEAK FLOW RATE(CFS) =      34.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.60
  FLOW VELOCITY(FEET/SEC.) =  3.94   DEPTH*VELOCITY(FT*FT/SEC.) =   2.16
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    322.00 =     690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    323.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   628.00  DOWNSTREAM(FEET) =   624.00
  FLOW LENGTH(FEET) =   750.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.4 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.01
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.34
  PIPE TRAVEL TIME(MIN.) =   1.78    Tc(MIN.) =   11.89
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    323.00 =    1440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.531
  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        2.00      0.30     0.850    56
  PUBLIC PARK                B        2.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.90      0.30     0.200    56
  SCHOOL                     B        3.10      0.30     0.600    56
  SCHOOL                     B        0.30      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) =   14.00      SUBAREA RUNOFF(CFS) =   42.64
  EFFECTIVE AREA(ACRES) =     24.10   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       24.1       PEAK FLOW RATE(CFS) =      74.12

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.531
  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
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.31
  EFFECTIVE AREA(ACRES) =     24.20   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       24.2       PEAK FLOW RATE(CFS) =      74.43

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    324.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   624.00  DOWNSTREAM(FEET) =   614.00
  FLOW LENGTH(FEET) =   887.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.8 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.34
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      74.43
  PIPE TRAVEL TIME(MIN.) =   1.30    Tc(MIN.) =   13.19
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    324.00 =    2327.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.19
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.300
  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        1.10      0.30     0.100    56
  PUBLIC PARK                B        3.10      0.30     0.850    56
  PUBLIC PARK                B        2.60      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.80      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 =  0.416
  SUBAREA AREA(ACRES) =   16.10      SUBAREA RUNOFF(CFS) =   46.01
  EFFECTIVE AREA(ACRES) =     40.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       40.3       PEAK FLOW RATE(CFS) =     115.43

****************************************************************************
  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) =   614.00  DOWNSTREAM(FEET) =   571.00
  FLOW LENGTH(FEET) =  1805.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.59
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     115.43
  PIPE TRAVEL TIME(MIN.) =   1.81    Tc(MIN.) =   15.00
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    325.00 =    4132.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    325.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.00
  * 100 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
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.10      0.30     0.200    56
```



```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B       13.90      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B       18.60      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =   42.00      SUBAREA RUNOFF(CFS) =  107.50
  EFFECTIVE AREA(ACRES) =     82.30   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       82.3       PEAK FLOW RATE(CFS) =     211.32

****************************************************************************
  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) =   571.00  DOWNSTREAM(FEET) =   497.00
  FLOW LENGTH(FEET) =  1090.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.01
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     211.32
  PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   15.63
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    326.00 =    5222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.63
  * 100 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        1.00      0.30     0.100    56
  COMMERCIAL                 B        6.10      0.30     0.100    56
  COMMERCIAL                 B       12.90      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B       12.80      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) =   34.00      SUBAREA RUNOFF(CFS) =   85.28
  EFFECTIVE AREA(ACRES) =    116.30   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      116.3       PEAK FLOW RATE(CFS) =     291.67
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.63
  * 100 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
  ".4 DWELLING/ACRE"         B       23.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.890
  SUBAREA AREA(ACRES) =   23.80      SUBAREA RUNOFF(CFS) =   56.70
  EFFECTIVE AREA(ACRES) =    140.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      140.1       PEAK FLOW RATE(CFS) =     348.36

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    327.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =  1732.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  43.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.94
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     348.36
  PIPE TRAVEL TIME(MIN.) =   1.21    Tc(MIN.) =   16.84
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    327.00 =    6954.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.84
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.786
  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
  COMMERCIAL                 B        4.80      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  PUBLIC PARK                B        6.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.00      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       43.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.250
```



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  SUBAREA AREA(ACRES) =   64.30      SUBAREA RUNOFF(CFS) =  156.86
  EFFECTIVE AREA(ACRES) =    204.40   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      204.4       PEAK FLOW RATE(CFS) =     489.05

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.84
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.786
  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       38.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.30      0.30     0.900    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 =  0.293
  SUBAREA AREA(ACRES) =   44.60      SUBAREA RUNOFF(CFS) =  108.29
  EFFECTIVE AREA(ACRES) =    249.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      249.0       PEAK FLOW RATE(CFS) =     597.34

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    328.00 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) =   338.00
  FLOW LENGTH(FEET) =  2664.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  50.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.54
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     597.34
  PIPE TRAVEL TIME(MIN.) =   1.45    Tc(MIN.) =   18.29
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    328.00 =    9618.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.29
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.631
  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
  APARTMENTS                 B       14.80      0.30     0.200    56
  APARTMENTS                 B        1.90      0.30     0.200    56
  APARTMENTS                 B        9.90      0.30     0.200    56
  COMMERCIAL                 B        1.80      0.30     0.100    56
```

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  COMMERCIAL                  B        8.40      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.173
  SUBAREA AREA(ACRES) =   37.30      SUBAREA RUNOFF(CFS) =   86.58
  EFFECTIVE AREA(ACRES) =    286.30   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      286.3       PEAK FLOW RATE(CFS) =     649.26

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.29
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.631
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        7.60      0.30     0.100    56
  COMMERCIAL                  B       14.00      0.30     0.100    56
  PUBLIC PARK                 B        1.40      0.30     0.850    56
  PUBLIC PARK                 B        0.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        0.20      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        0.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.156
  SUBAREA AREA(ACRES) =   23.80      SUBAREA RUNOFF(CFS) =   55.35
  EFFECTIVE AREA(ACRES) =    310.10   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      310.1       PEAK FLOW RATE(CFS) =     704.61

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.29
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.631
  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       12.20      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B       17.60      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.30      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        9.30      0.30     0.900    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 =  0.383
  SUBAREA AREA(ACRES) =   40.50      SUBAREA RUNOFF(CFS) =   91.71
```



```
  EFFECTIVE AREA(ACRES) =    350.60   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =      350.6       PEAK FLOW RATE(CFS) =     796.32

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.29
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.631
  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        5.30      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B       28.30      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        3.80      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        4.10      0.30     0.400    56
  SCHOOL                      B        0.30      0.30     0.600    56
  SCHOOL                      B        0.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.483
  SUBAREA AREA(ACRES) =   42.10      SUBAREA RUNOFF(CFS) =   94.20
  EFFECTIVE AREA(ACRES) =    392.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      392.7       PEAK FLOW RATE(CFS) =     890.52

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    329.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   338.00  DOWNSTREAM(FEET) =   320.00
  FLOW LENGTH(FEET) =  1154.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  90.0 INCH PIPE IS  72.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.47
  ESTIMATED PIPE DIAMETER(INCH) =  90.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     890.52
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   19.11
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    329.00 =   10772.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.11
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.544
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B       11.60      0.30     0.100    56
  COMMERCIAL                  B        6.70      0.30     0.100    56
```

```
  COMMERCIAL                  B       12.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.20      0.30     0.900    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 =  0.110
  SUBAREA AREA(ACRES) =   31.50      SUBAREA RUNOFF(CFS) =   71.18
  EFFECTIVE AREA(ACRES) =    424.20   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      424.2       PEAK FLOW RATE(CFS) =     930.88

****************************************************************************
  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) =   320.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =  1981.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN 114.0 INCH PIPE IS  89.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.62
  ESTIMATED PIPE DIAMETER(INCH) = 114.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     930.88
  PIPE TRAVEL TIME(MIN.) =   2.11    Tc(MIN.) =   21.22
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    330.00 =   12753.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   21.22
  RAINFALL INTENSITY(INCH/HR) =   2.37
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.35
  EFFECTIVE STREAM AREA(ACRES) =     424.20
  TOTAL STREAM AREA(ACRES) =     424.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     930.88

****************************************************************************
  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) =   701.00   CHANNEL SLOPE =  0.0357
  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) =  2.793
  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,BROADLEAF"      B        0.20      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        5.90      0.30     1.000    72
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B       12.70      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.80      0.30     1.000    66
  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) =     149.83
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.90
  AVERAGE FLOW DEPTH(FEET) =   2.51   TRAVEL TIME(MIN.) =   1.48
  Tc(MIN.) =   16.77
  SUBAREA AREA(ACRES) =    35.10       SUBAREA RUNOFF(CFS) =   78.75
  EFFECTIVE AREA(ACRES) =     81.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       81.4         PEAK FLOW RATE(CFS) =     182.64

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.71   FLOW VELOCITY(FEET/SEC.) =   8.28
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    395.00 =    3560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    395.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.77
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.793
  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        1.00      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.70      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.50      0.30     1.000    65
  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 =  0.914
  SUBAREA AREA(ACRES) =    4.30      SUBAREA RUNOFF(CFS) =    9.75
  EFFECTIVE AREA(ACRES) =     85.70   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       85.7       PEAK FLOW RATE(CFS) =     192.39

****************************************************************************
  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) =   437.00
  FLOW LENGTH(FEET) =  6286.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  37.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.16
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     192.39
  PIPE TRAVEL TIME(MIN.) =   5.77    Tc(MIN.) =   22.53
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    370.00 =    9846.00 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) =    437.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1963.00   CHANNEL SLOPE =  0.0469
  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) =  2.071
  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        0.50      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.60      0.30     1.000    63
  COMMERCIAL                 B        1.50      0.30     0.100    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  COMMERCIAL                 B        1.60      0.30     0.100    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 =  0.265
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     197.77
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.37
  AVERAGE FLOW DEPTH(FEET) =   2.65   TRAVEL TIME(MIN.) =   3.49
  Tc(MIN.) =   26.03
  SUBAREA AREA(ACRES) =     6.00       SUBAREA RUNOFF(CFS) =   10.76
  EFFECTIVE AREA(ACRES) =     91.70     AREA-AVERAGED Fm(INCH/HR) =   0.28
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.95
  TOTAL AREA(ACRES) =       91.7         PEAK FLOW RATE(CFS) =     192.39
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.63   FLOW VELOCITY(FEET/SEC.) =   9.29
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    371.00 =   11809.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   26.03
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.071
  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        1.40      0.30     1.000    69
  NATURAL FAIR COVER
  "GRASS"                    B        2.80      0.30     1.000    69
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.40      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.40      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) =    8.40      SUBAREA RUNOFF(CFS) =   13.39
  EFFECTIVE AREA(ACRES) =    100.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =      100.1       PEAK FLOW RATE(CFS) =     192.39
  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.) =   26.03
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.071
  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        0.80      0.30     1.000    66
  PUBLIC PARK                B        0.10      0.30     0.850    56
  PUBLIC PARK                B        3.80      0.30     0.850    56
  PUBLIC PARK                B        2.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    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 =  0.877
  SUBAREA AREA(ACRES) =   10.30      SUBAREA RUNOFF(CFS) =   16.76
  EFFECTIVE AREA(ACRES) =    110.40   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =      110.4       PEAK FLOW RATE(CFS) =     192.39
  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.) =   26.03
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.071
  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        3.50      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.10      0.30     0.400    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.20      0.30     1.000    65
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        1.90      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.924
  SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =   10.98
  EFFECTIVE AREA(ACRES) =    117.20   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =      117.2       PEAK FLOW RATE(CFS) =     192.39
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    371.00 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) =   345.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =  1065.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.38
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     192.39
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =   26.86
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    330.00 =   12874.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   26.86
  RAINFALL INTENSITY(INCH/HR) =   2.03
  AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.94
  EFFECTIVE STREAM AREA(ACRES) =     117.20
  TOTAL STREAM AREA(ACRES) =     117.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     192.39

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      485.16   17.54    2.711  0.30( 0.11) 0.37     204.2     310.00
      1      448.18   21.06    2.379  0.30( 0.11) 0.37     217.1     300.00
      2      930.88   21.22    2.368  0.30( 0.11) 0.35     424.2     320.00
      3      192.39   26.86    2.034  0.30( 0.28) 0.94     117.2     390.00

  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     1545.21   17.54    2.711  0.30( 0.13) 0.43     631.2     310.00
      2     1556.87   21.06    2.379  0.30( 0.13) 0.43     729.9     300.00
      3     1557.96   21.22    2.368  0.30( 0.13) 0.43     733.9     320.00
      4     1365.73   26.86    2.034  0.30( 0.13) 0.45     758.5     390.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1557.96    Tc(MIN.) =    21.22
  EFFECTIVE AREA(ACRES) =     733.92   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      758.5
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    330.00 =   12874.00 FEET.
```

```
****************************************************************************
  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) =   310.00  DOWNSTREAM(FEET) =   280.00
  FLOW LENGTH(FEET) =   374.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  84.0 INCH PIPE IS  62.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  50.53
  ESTIMATED PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    1557.96
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   21.35
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    331.00 =   13248.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.360
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B       17.50      0.30      0.200    56
  APARTMENTS                 B        1.50      0.30      0.200    56
  APARTMENTS                 B        0.70      0.30      0.200    56
  NATURAL POOR COVER
  "BARREN"                   B        0.10      0.30      1.000    86
  COMMERCIAL                 B       44.60      0.30      0.100    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 =  0.132
  SUBAREA AREA(ACRES) =   65.10      SUBAREA RUNOFF(CFS) =  135.95
  EFFECTIVE AREA(ACRES) =    799.02   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =      823.6       PEAK FLOW RATE(CFS) =    1609.13

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1614.97   17.66    2.698  0.30( 0.12) 0.40     696.3     310.00
      2     1608.80   21.18    2.371  0.30( 0.12) 0.41     795.0     300.00
      3     1609.13   21.35    2.360  0.30( 0.12) 0.41     799.0     320.00
      4     1409.06   26.98    2.028  0.30( 0.13) 0.42     823.6     390.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =    1614.97  Tc(MIN.) =   17.66
  AREA-AVERAGED Fm(INCH/HR) =  0.12  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.40  EFFECTIVE AREA(ACRES) =     696.34

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.66
```



```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.698
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.00      0.30      0.100    56
  COMMERCIAL                 B        4.10      0.30      0.100    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 =  0.115
  SUBAREA AREA(ACRES) =    6.20      SUBAREA RUNOFF(CFS) =   14.86
  EFFECTIVE AREA(ACRES) =    702.54   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      829.8       PEAK FLOW RATE(CFS) =    1629.83

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  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) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =    618.00  DOWNSTREAM(FEET) =    590.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.048
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.574
  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
  "8-10 DWELLINGS/ACRE"      B        1.20      0.30      0.400    56    6.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      5.89
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      5.89

****************************************************************************
  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) =  590.00  DOWNSTREAM ELEVATION(FEET) =  588.00
  STREET LENGTH(FEET) =   274.00   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) =      22.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.53
    HALFSTREET FLOOD WIDTH(FEET) =   20.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.78
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.48
  STREET FLOW TRAVEL TIME(MIN.) =   1.64   Tc(MIN.) =    7.69
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.864
  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        3.30      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.40      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.486
  SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =   32.70
  EFFECTIVE AREA(ACRES) =      8.90    AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        8.9        PEAK FLOW RATE(CFS) =      37.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.62   HALFSTREET FLOOD WIDTH(FEET) =  25.43
  FLOW VELOCITY(FEET/SEC.) =  3.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.95
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     588.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   588.00  DOWNSTREAM(FEET) =   581.00
  FLOW LENGTH(FEET) =   805.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.77
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.82
  PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =    9.22
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1393.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.22
```



```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.202
  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
  ".4 DWELLING/ACRE"         B        2.00      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        8.80      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.10      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.90      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.577
  SUBAREA AREA(ACRES) =   15.90      SUBAREA RUNOFF(CFS) =   57.65
  EFFECTIVE AREA(ACRES) =     24.80   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       24.8       PEAK FLOW RATE(CFS) =      90.17

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 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.) =    9.22
  RAINFALL INTENSITY(INCH/HR) =   4.20
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =      24.80
  TOTAL STREAM AREA(ACRES) =      24.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      90.17

****************************************************************************
  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) =    725.00  DOWNSTREAM(FEET) =    630.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.196
  * 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        0.10      0.30     1.000    72    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.30      0.30     1.000    66    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      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) =      5.28
 TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      5.28

****************************************************************************
 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) =  4.008
 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        0.10      0.30     1.000    72
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        1.70      0.30     1.000    66
 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) =       8.45
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.92
 AVERAGE FLOW DEPTH(FEET) =   0.64   TRAVEL TIME(MIN.) =   0.47
 Tc(MIN.) =    9.67
 SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    6.34
 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) =      11.35

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.71   FLOW VELOCITY(FEET/SEC.) =   7.41
 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) =    582.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   520.00   CHANNEL SLOPE =  0.0288
 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) =  3.580
 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        3.70      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
```



```
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        1.20      0.30     0.600    56
 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 =  0.906
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.88
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.47
 AVERAGE FLOW DEPTH(FEET) =   1.25   TRAVEL TIME(MIN.) =   1.94
 Tc(MIN.) =   11.61
 SUBAREA AREA(ACRES) =     6.40       SUBAREA RUNOFF(CFS) =   19.06
 EFFECTIVE AREA(ACRES) =      9.80     AREA-AVERAGED Fm(INCH/HR) =   0.28
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.94
 TOTAL AREA(ACRES) =        9.8         PEAK FLOW RATE(CFS) =      29.09

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.42   FLOW VELOCITY(FEET/SEC.) =   4.84
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.00 =    1045.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    433.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   582.00  DOWNSTREAM(FEET) =   581.00
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.24
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      29.09
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   11.62
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    403.00 =    1055.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 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.) =   11.62
 RAINFALL INTENSITY(INCH/HR) =   3.58
 AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.94
 EFFECTIVE STREAM AREA(ACRES) =       9.80
 TOTAL STREAM AREA(ACRES) =       9.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      29.09

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       90.17    9.22    4.202  0.30( 0.16) 0.54      24.8     400.00
     2       29.09   11.62    3.579  0.30( 0.28) 0.94       9.8     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      117.62    9.22    4.202  0.30( 0.19) 0.64      32.6     400.00
     2      105.35   11.62    3.579  0.30( 0.20) 0.65      34.6     430.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     117.62    Tc(MIN.) =     9.22
 EFFECTIVE AREA(ACRES) =      32.58   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.64
 TOTAL AREA(ACRES) =       34.6
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1393.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    403.00 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) =   581.00  DOWNSTREAM(FEET) =   570.00
 FLOW LENGTH(FEET) =  1056.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  33.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.41
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     117.62
 PIPE TRAVEL TIME(MIN.) =   1.42    Tc(MIN.) =   10.64
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =    2449.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.64
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.752
 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        0.10      0.30     0.100    56
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.10      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        4.90      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        1.00      0.30     0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.842
 SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =   24.25
 EFFECTIVE AREA(ACRES) =     40.28   AREA-AVERAGED Fm(INCH/HR) =  0.20
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.67
 TOTAL AREA(ACRES) =       42.3       PEAK FLOW RATE(CFS) =     128.66

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 FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.64
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.752
 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        8.80      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        4.20      0.30     0.500    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        1.10      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.492
 SUBAREA AREA(ACRES) =   14.10      SUBAREA RUNOFF(CFS) =   45.73
 EFFECTIVE AREA(ACRES) =     54.38   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.63
 TOTAL AREA(ACRES) =       56.4       PEAK FLOW RATE(CFS) =     174.39

****************************************************************************
 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) =   570.00  DOWNSTREAM(FEET) =   565.00
 FLOW LENGTH(FEET) =  1526.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  66.0 INCH PIPE IS  51.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.74
 ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     174.39
 PIPE TRAVEL TIME(MIN.) =   2.91    Tc(MIN.) =   13.55
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    405.00 =    3975.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.55
 * 100 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
 COMMERCIAL                 B        0.10      0.30     0.100    56
 PUBLIC PARK                B        1.80      0.30     0.850    56
 PUBLIC PARK                B        0.40      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.80      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.80      0.30     0.900    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        6.10      0.30     0.500    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.698
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  SUBAREA AREA(ACRES) =   13.00      SUBAREA RUNOFF(CFS) =   35.43
  EFFECTIVE AREA(ACRES) =     67.38   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =       69.4       PEAK FLOW RATE(CFS) =     184.67

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.55
  * 100 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
  "5-7 DWELLINGS/ACRE"       B       11.20      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        7.80      0.30     0.400    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 =  0.455
  SUBAREA AREA(ACRES) =   20.40      SUBAREA RUNOFF(CFS) =   56.94
  EFFECTIVE AREA(ACRES) =     87.78   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       89.8       PEAK FLOW RATE(CFS) =     241.60

****************************************************************************
  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) =   565.00  DOWNSTREAM(FEET) =   495.00
  FLOW LENGTH(FEET) =  2168.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  38.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.21
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     241.60
  PIPE TRAVEL TIME(MIN.) =   1.63    Tc(MIN.) =   15.17
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    406.00 =    6143.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.17
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.963
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        5.50      0.30     0.100    56
  COMMERCIAL                 B        1.90      0.30     0.100    56
  PUBLIC PARK                B        2.50      0.30     0.850    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  RESIDENTIAL
```



```
  "11+ DWELLINGS/ACRE"       B       36.40      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       13.60      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.224
  SUBAREA AREA(ACRES) =   60.80      SUBAREA RUNOFF(CFS) =  158.43
  EFFECTIVE AREA(ACRES) =    148.58   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      150.6       PEAK FLOW RATE(CFS) =     378.30

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.17
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.963
  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        4.70      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  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 =  0.868
  SUBAREA AREA(ACRES) =    7.40      SUBAREA RUNOFF(CFS) =   18.00
  EFFECTIVE AREA(ACRES) =    155.98   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      158.0       PEAK FLOW RATE(CFS) =     396.30

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.17
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.963
  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        9.30      0.30     0.400    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 =  0.400
  SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =   26.09
  EFFECTIVE AREA(ACRES) =    166.18   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
```

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  TOTAL AREA(ACRES) =      168.2       PEAK FLOW RATE(CFS) =     422.39

****************************************************************************
  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) =   495.00  DOWNSTREAM(FEET) =   395.00
  FLOW LENGTH(FEET) =  2905.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  45.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.49
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     422.39
  PIPE TRAVEL TIME(MIN.) =   1.83    Tc(MIN.) =   17.00
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    407.00 =    9048.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.00
  * 100 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
  APARTMENTS                 B        0.30      0.30     0.200    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  COMMERCIAL                 B        9.10      0.30     0.100    56
  COMMERCIAL                 B        6.70      0.30     0.100    56
  PUBLIC PARK                B        0.50      0.30     0.850    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 =  0.219
  SUBAREA AREA(ACRES) =   19.80      SUBAREA RUNOFF(CFS) =   48.16
  EFFECTIVE AREA(ACRES) =    185.98   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      188.0       PEAK FLOW RATE(CFS) =     441.47

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.00
  * 100 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
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.40      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       10.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.60      0.30     0.200    56
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```
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.90      0.30     0.900    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 =  0.308
  SUBAREA AREA(ACRES) =   16.80      SUBAREA RUNOFF(CFS) =   40.45
  EFFECTIVE AREA(ACRES) =    202.78   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      204.8       PEAK FLOW RATE(CFS) =     481.92

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.00
  * 100 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
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       14.30      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       15.30      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.50      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        5.10      0.30     0.500    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 =  0.579
  SUBAREA AREA(ACRES) =   37.50      SUBAREA RUNOFF(CFS) =   87.56
  EFFECTIVE AREA(ACRES) =    240.28   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      242.3       PEAK FLOW RATE(CFS) =     569.48

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.00
  * 100 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
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        3.50      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        8.40      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.80      0.30     0.400    56
  SCHOOL                     B        0.60      0.30     0.600    56
  SCHOOL                     B        1.50      0.30     0.600    56
```

```
  SCHOOL                      B        3.50      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =   20.30      SUBAREA RUNOFF(CFS) =   48.08
  EFFECTIVE AREA(ACRES) =    260.58   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      262.6       PEAK FLOW RATE(CFS) =     617.56

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    430.00 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) =   372.00
  FLOW LENGTH(FEET) =   661.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  69.0 INCH PIPE IS  52.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.24
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     617.56
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   17.38
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    411.00 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) =    535.00  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.368
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.435
  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        0.50      0.30     0.900    56    7.53
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.20      0.30     0.600    56    6.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.814
  SUBAREA RUNOFF(CFS) =      3.27
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      3.27
```



```
****************************************************************************
  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) =   495.00  DOWNSTREAM(FEET) =   490.00
  FLOW LENGTH(FEET) =   267.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.27
  PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =    7.07
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    412.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.07
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.132
  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        0.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.788
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    7.49
  EFFECTIVE AREA(ACRES) =      2.40   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        2.4       PEAK FLOW RATE(CFS) =      10.57

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    413.00 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) =   480.00
  FLOW LENGTH(FEET) =   520.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.57
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =    8.08
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    413.00 =    1115.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    413.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.697
  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        0.40      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.810
  SUBAREA AREA(ACRES) =    3.10      SUBAREA RUNOFF(CFS) =   12.43
  EFFECTIVE AREA(ACRES) =      5.50   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        5.5       PEAK FLOW RATE(CFS) =      22.05

****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    414.00 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) =   470.00
  FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.52
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.05
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    8.49
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    414.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.49
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.518
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.50      0.30     0.100    56
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.80      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.00      0.30     0.900    56
  RESIDENTIAL
```



```
  "5-7 DWELLINGS/ACRE"       B        0.20      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 =  0.654
  SUBAREA AREA(ACRES) =    5.70      SUBAREA RUNOFF(CFS) =   22.17
  EFFECTIVE AREA(ACRES) =     11.20   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       11.2       PEAK FLOW RATE(CFS) =      43.34

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.49
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.518
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.10      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) =    0.10      SUBAREA RUNOFF(CFS) =    0.40
  EFFECTIVE AREA(ACRES) =     11.30   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       11.3       PEAK FLOW RATE(CFS) =      43.74

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 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) =   470.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =   528.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.90
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.74
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    9.01
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    415.00 =    1953.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    415.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.01
  * 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        0.90      0.30     0.100    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        6.30      0.30     0.500    56
  RESIDENTIAL
```

```
  "5-7 DWELLINGS/ACRE"       B        3.70      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.448
  SUBAREA AREA(ACRES) =   11.50      SUBAREA RUNOFF(CFS) =   43.04
  EFFECTIVE AREA(ACRES) =     22.80   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       22.8       PEAK FLOW RATE(CFS) =      84.49

****************************************************************************
  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) =   445.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =   650.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.09
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      84.49
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =    9.55
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    416.00 =    2603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.55
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.059
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        1.60      0.30     0.200    56
  APARTMENTS                 B       10.90      0.30     0.200    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.10      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        7.00      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.189
  SUBAREA AREA(ACRES) =   23.20      SUBAREA RUNOFF(CFS) =   83.58
  EFFECTIVE AREA(ACRES) =     46.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       46.0       PEAK FLOW RATE(CFS) =     163.28

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.55
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.059
  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        0.40      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.90      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        9.30      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.30      0.30     0.400    56
  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 =  0.500
  SUBAREA AREA(ACRES) =   15.00      SUBAREA RUNOFF(CFS) =   52.78
  EFFECTIVE AREA(ACRES) =     61.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       61.0       PEAK FLOW RATE(CFS) =     216.06

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 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) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.41
  EFFECTIVE STREAM AREA(ACRES) =      61.00
  TOTAL STREAM AREA(ACRES) =      61.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     216.06

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    421.00 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) =    535.00  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.368
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.435
  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        0.70      0.30     0.900    56    7.53
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.20      0.30     0.600    56    6.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.833
  SUBAREA RUNOFF(CFS) =      4.20
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      4.20

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

```
 FLOW PROCESS FROM NODE    421.00 TO NODE    422.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   487.00
 FLOW LENGTH(FEET) =   308.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.65
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.20
 PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    7.04
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    422.00 =     636.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    422.00 TO NODE    422.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.04
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.145
 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
 "3-4 DWELLINGS/ACRE"       B        0.50      0.30     0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.817
 SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    7.94
 EFFECTIVE AREA(ACRES) =      2.70   AREA-AVERAGED Fm(INCH/HR) =  0.25
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.82
 TOTAL AREA(ACRES) =        2.7       PEAK FLOW RATE(CFS) =      11.90

****************************************************************************
 FLOW PROCESS FROM NODE    422.00 TO NODE    423.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   478.00
 FLOW LENGTH(FEET) =   373.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.66
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.90
 PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =    7.68
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    423.00 =    1009.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    423.00 TO NODE    423.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.68
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.867
```



```
 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        0.80      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.40      0.30     0.600    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        1.70      0.30     0.600    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 =  0.750
 SUBAREA AREA(ACRES) =    4.40      SUBAREA RUNOFF(CFS) =   18.38
 EFFECTIVE AREA(ACRES) =      7.10   AREA-AVERAGED Fm(INCH/HR) =  0.23
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.78
 TOTAL AREA(ACRES) =        7.1       PEAK FLOW RATE(CFS) =      29.61

****************************************************************************
 FLOW PROCESS FROM NODE    423.00 TO NODE    424.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   454.00
 FLOW LENGTH(FEET) =   995.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.99
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      29.61
 PIPE TRAVEL TIME(MIN.) =   1.38    Tc(MIN.) =    9.07
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    424.00 =    2004.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.07
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.268
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 APARTMENTS                 B        0.80      0.30     0.200    56
 APARTMENTS                 B        0.40      0.30     0.200    56
 PUBLIC PARK                B        0.90      0.30     0.850    56
 PUBLIC PARK                B        0.40      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    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 =  0.626
 SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =   12.12
```

```
  EFFECTIVE AREA(ACRES) =     10.40   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       10.4       PEAK FLOW RATE(CFS) =      37.90

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.07
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.268
  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        3.30      0.30     0.600    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 =  0.600
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =   19.87
  EFFECTIVE AREA(ACRES) =     15.80   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       15.8       PEAK FLOW RATE(CFS) =      57.77

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 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) =   454.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =  1555.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.27
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.77
  PIPE TRAVEL TIME(MIN.) =   1.82    Tc(MIN.) =   10.88
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    416.00 =    3559.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.88
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.708
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        3.70      0.30     0.200    56
  APARTMENTS                 B        6.80      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.70      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.60      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.20      0.30     0.600    56
```



```
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        9.90      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.387
  SUBAREA AREA(ACRES) =   25.90      SUBAREA RUNOFF(CFS) =   83.73
  EFFECTIVE AREA(ACRES) =     41.70   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       41.7       PEAK FLOW RATE(CFS) =     133.54

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.88
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.708
  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        1.30      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) =    1.30      SUBAREA RUNOFF(CFS) =    4.16
  EFFECTIVE AREA(ACRES) =     43.00   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       43.0       PEAK FLOW RATE(CFS) =     137.70

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 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.) =   10.88
  RAINFALL INTENSITY(INCH/HR) =   3.71
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      43.00
  TOTAL STREAM AREA(ACRES) =      43.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     137.70

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      216.06    9.55    4.059  0.30( 0.12) 0.41      61.0     410.00
      2      137.70   10.88    3.708  0.30( 0.15) 0.50      43.0     420.00

  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      348.81    9.55    4.059  0.30( 0.13) 0.45      98.7     410.00
```

```
     2      334.48   10.88    3.708  0.30( 0.13) 0.45     104.0     420.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     348.81    Tc(MIN.) =     9.55
  EFFECTIVE AREA(ACRES) =      98.73   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      104.0
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    416.00 =    3559.00 FEET.

****************************************************************************
  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) =   415.00  DOWNSTREAM(FEET) =   395.00
  FLOW LENGTH(FEET) =  1084.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  47.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.02
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     348.81
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    417.00 =    4643.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.45
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.784
  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
  COMMERCIAL                 B        2.90      0.30     0.100    56
  PUBLIC PARK                B        3.60      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.50      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.50      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 =  0.313
  SUBAREA AREA(ACRES) =   17.30      SUBAREA RUNOFF(CFS) =   57.46
  EFFECTIVE AREA(ACRES) =    116.03   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      121.3       PEAK FLOW RATE(CFS) =     381.83

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.45
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.784
  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        0.80      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 =  0.400
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    3.30
  EFFECTIVE AREA(ACRES) =    117.03   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      122.3       PEAK FLOW RATE(CFS) =     385.13

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    430.00 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) =   372.00
  FLOW LENGTH(FEET) =  1572.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  54.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.49
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     385.13
  PIPE TRAVEL TIME(MIN.) =   1.42    Tc(MIN.) =   11.87
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    430.00 =    6215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.87
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.534
  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        0.20      0.30     0.100    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  PUBLIC PARK                B        5.70      0.30     0.850    56
  PUBLIC PARK                B        4.50      0.30     0.850    56
  PUBLIC PARK                B        9.40      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.803
  SUBAREA AREA(ACRES) =   20.90      SUBAREA RUNOFF(CFS) =   61.94
  EFFECTIVE AREA(ACRES) =    137.93   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      143.2       PEAK FLOW RATE(CFS) =     420.71

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.87
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.534
```

```
  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
  PUBLIC PARK                 B        8.90      0.30      0.850    56
  PUBLIC PARK                 B        1.20      0.30      0.850    56
  PUBLIC PARK                 B        3.70      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) =   14.50      SUBAREA RUNOFF(CFS) =   42.79
  EFFECTIVE AREA(ACRES) =    152.43   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      157.7       PEAK FLOW RATE(CFS) =     463.51

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 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       463.51   11.87    3.534  0.30( 0.16) 0.52     152.4     410.00
      2       445.50   13.23    3.294  0.30( 0.16) 0.52     157.7     420.00
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    430.00 =    6215.00 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       617.56   17.38    2.728  0.30( 0.13) 0.45     260.6     400.00
      2       556.56   19.99    2.450  0.30( 0.14) 0.45     262.6     430.00
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      1016.37   11.87    3.534  0.30( 0.14) 0.48     330.4     410.00
      2      1018.16   13.23    3.294  0.30( 0.14) 0.48     356.0     420.00
      3       982.71   17.38    2.728  0.30( 0.14) 0.48     418.3     400.00
      4       882.19   19.99    2.450  0.30( 0.14) 0.48     420.3     430.00
    TOTAL AREA(ACRES) =       420.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     1018.16  Tc(MIN.) =   13.227
  EFFECTIVE AREA(ACRES) =    356.04  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      420.3
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    431.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   372.00  DOWNSTREAM(FEET) =   300.00
  FLOW LENGTH(FEET) =  1358.00   MANNING'S N =  0.013
```



```
  DEPTH OF FLOW IN  75.0 INCH PIPE IS  60.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  38.33
  ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    1018.16
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   13.82
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    431.00 =   11067.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.82
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.190
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                  B        7.40      0.30      0.200    56
  APARTMENTS                  B       15.00      0.30      0.200    56
  APARTMENTS                  B        5.80      0.30      0.200    56
  APARTMENTS                  B        2.50      0.30      0.200    56
  COMMERCIAL                  B        9.10      0.30      0.100    56
  COMMERCIAL                  B        1.50      0.30      0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.174
  SUBAREA AREA(ACRES) =   41.30      SUBAREA RUNOFF(CFS) =  116.62
  EFFECTIVE AREA(ACRES) =    397.34   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      461.6       PEAK FLOW RATE(CFS) =    1092.65

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      1102.49   12.46    3.430  0.30( 0.13) 0.45     371.7     410.00
      2      1092.65   13.82    3.190  0.30( 0.13) 0.45     397.3     420.00
      3      1046.74   17.97    2.665  0.30( 0.13) 0.45     459.6     400.00
      4       944.74   20.60    2.409  0.30( 0.14) 0.45     461.6     430.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =    1102.49  Tc(MIN.) =   12.46
  AREA-AVERAGED Fm(INCH/HR) =  0.13  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.45  EFFECTIVE AREA(ACRES) =     371.68

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.46
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.430
  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        0.40      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) =    0.90      SUBAREA RUNOFF(CFS) =    2.75
  EFFECTIVE AREA(ACRES) =    372.58   AREA-AVERAGED Fm(INCH/HR) =  0.13
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      462.5       PEAK FLOW RATE(CFS) =    1105.24

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    331.00 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     1105.24   12.46    3.430  0.30( 0.13) 0.45     372.6     410.00
      2     1095.21   13.82    3.190  0.30( 0.13) 0.45     398.2     420.00
      3     1048.87   17.97    2.665  0.30( 0.13) 0.45     460.5     400.00
      4      946.67   20.60    2.409  0.30( 0.13) 0.45     462.5     430.00
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    331.00 =   11067.00 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     1629.83   17.66    2.698  0.30( 0.12) 0.40     702.5     310.00
      2     1621.84   21.18    2.371  0.30( 0.12) 0.40     801.2     300.00
      3     1622.11   21.35    2.360  0.30( 0.12) 0.40     805.2     320.00
      4     1420.18   26.98    2.028  0.30( 0.13) 0.42     829.8     390.00
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    331.00 =   13248.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     2581.36   12.46    3.430  0.30( 0.13) 0.42     868.1     410.00
      2     2613.64   13.82    3.190  0.30( 0.13) 0.42     947.8     420.00
      3     2682.12   17.66    2.698  0.30( 0.13) 0.42    1158.4     310.00
      4     2678.01   17.97    2.665  0.30( 0.13) 0.42    1171.6     400.00
      5     2569.83   20.60    2.409  0.30( 0.13) 0.42    1247.4     430.00
      6     2552.49   21.18    2.371  0.30( 0.13) 0.42    1263.7     300.00
      7     2548.24   21.35    2.360  0.30( 0.13) 0.42    1267.7     320.00
      8     2208.17   26.98    2.028  0.30( 0.13) 0.43    1292.3     390.00
    TOTAL AREA(ACRES) =      1292.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     2682.12  Tc(MIN.) =   17.663
  EFFECTIVE AREA(ACRES) =   1158.43  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =     1292.3
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    331.00 =   13248.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =     1292.3  TC(MIN.) =     17.66
  EFFECTIVE AREA(ACRES) =   1158.43  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.419
  PEAK FLOW RATE(CFS)   =    2682.12

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     2581.36   12.46    3.430  0.30( 0.13) 0.42     868.1     410.00
      2     2613.64   13.82    3.190  0.30( 0.13) 0.42     947.8     420.00
```



```
      3     2682.12   17.66    2.698  0.30( 0.13) 0.42    1158.4     310.00
      4     2678.01   17.97    2.665  0.30( 0.13) 0.42    1171.6     400.00
      5     2569.83   20.60    2.409  0.30( 0.13) 0.42    1247.4     430.00
      6     2552.49   21.18    2.371  0.30( 0.13) 0.42    1263.7     300.00
      7     2548.24   21.35    2.360  0.30( 0.13) 0.42    1267.7     320.00
      8     2208.17   26.98    2.028  0.30( 0.13) 0.43    1292.3     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 1237

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED C                            *
* PHASED NO PA45 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL            *
* 2-YR EV DEC 2022 ROKAMOTO                                                *
 ****************************************************************************

  FILE NAME: 3C02EVRL.DAT
  TIME/DATE OF STUDY: 12:36 12/02/2022
============================================================================
  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;  0.396
  10)   90.00;  0.336
  11)  120.00;  0.276
  12)  180.00;  0.216
  13)  360.00;  0.156
  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    0.200/0.200/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.200/0.200/ ---    0.33    1.00 0.3120 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) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    644.00  DOWNSTREAM(FEET) =    641.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.438
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.431
  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
  "11+ DWELLINGS/ACRE"       -        1.60      0.60     0.200    56    8.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.89
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      1.89

****************************************************************************
  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) =  641.00  DOWNSTREAM ELEVATION(FEET) =  637.00
  STREET LENGTH(FEET) =   470.00   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) =       3.84
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
  STREET FLOW TRAVEL TIME(MIN.) =   3.97   Tc(MIN.) =   12.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.097
  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             -        4.30      0.60      0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.198
  SUBAREA AREA(ACRES) =    4.40      SUBAREA RUNOFF(CFS) =    3.87
  EFFECTIVE AREA(ACRES) =      6.00    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.0        PEAK FLOW RATE(CFS) =       5.28

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.90
  FLOW VELOCITY(FEET/SEC.) =  2.10   DEPTH*VELOCITY(FT*FT/SEC.) =   0.75
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     800.00 FEET.

****************************************************************************
  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) =   637.00  DOWNSTREAM(FEET) =   634.00
  FLOW LENGTH(FEET) =   563.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.49
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.28
  PIPE TRAVEL TIME(MIN.) =   2.09    Tc(MIN.) =   14.50
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =    1363.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.50
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.974
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.60      0.60      0.200     -
  USER-DEFINED               -        2.40      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) =    8.00      SUBAREA RUNOFF(CFS) =    6.15
  EFFECTIVE AREA(ACRES) =     14.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       14.0       PEAK FLOW RATE(CFS) =      10.77

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 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) =   630.00
  FLOW LENGTH(FEET) =  1072.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.6 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.66
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.77
  PIPE TRAVEL TIME(MIN.) =   3.84    Tc(MIN.) =   18.34
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =    2435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.34
  *   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               -        2.90      0.60      0.100     -
  USER-DEFINED               -        4.50      0.60      0.100     -
  USER-DEFINED               -        0.10      0.60      0.850     -
  USER-DEFINED               -        5.70      0.60      0.200     -
  USER-DEFINED               -        2.40      0.60      0.200     -
  USER-DEFINED               -        0.50      0.60      0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.164
  SUBAREA AREA(ACRES) =   16.10      SUBAREA RUNOFF(CFS) =   10.61
  EFFECTIVE AREA(ACRES) =     30.10   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       30.1       PEAK FLOW RATE(CFS) =      19.57

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.34
  *   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               -        5.70      0.60      0.600     -
  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) =   12.40      SUBAREA RUNOFF(CFS) =    5.25
  EFFECTIVE AREA(ACRES) =     42.50   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       42.5       PEAK FLOW RATE(CFS) =      24.83

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 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) =   630.00  DOWNSTREAM(FEET) =   610.00
  FLOW LENGTH(FEET) =  1290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.66
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.83
  PIPE TRAVEL TIME(MIN.) =   2.23    Tc(MIN.) =   20.57
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =    3725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.57
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.762
  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               -        0.90      0.60     0.100     -
  USER-DEFINED               -        0.60      0.60     0.200     -
  USER-DEFINED               -        0.10      0.60     0.200     -
  USER-DEFINED               -        0.10      0.60     0.600     -
  USER-DEFINED               -        0.50      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.216
  SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    1.82
  EFFECTIVE AREA(ACRES) =     45.70   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       45.7       PEAK FLOW RATE(CFS) =      24.83
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  3668.00
  ELEVATION DATA: UPSTREAM(FEET) =    663.00  DOWNSTREAM(FEET) =    610.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   18.909
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.811
  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                 -        1.70      0.60     0.100    56   18.91
  COMMERCIAL                 -        4.40      0.60     0.100    56   18.91
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        0.60      0.60     0.200    56   20.15
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        1.30      0.60     0.200    56   20.15
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       -        7.10      0.60     0.600    56   25.63
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       -        2.80      0.60     0.600    56   25.63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.387
  SUBAREA AREA(ACRES) =   17.90   INITIAL SUBAREA RUNOFF(CFS) =    9.33
```



```
  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   20.57
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.762
  SUBAREA AREA(ACRES) =   17.90      SUBAREA RUNOFF(CFS) =    8.53
  EFFECTIVE AREA(ACRES) =     63.60   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =       63.6       PEAK FLOW RATE(CFS) =      32.55

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    317.00 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) =   535.00
  FLOW LENGTH(FEET) =  1537.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.73
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.55
  PIPE TRAVEL TIME(MIN.) =   1.63    Tc(MIN.) =   22.19
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    317.00 =    5262.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.19
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.727
  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     0.100     -
  USER-DEFINED               -        0.40      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.850     -
  USER-DEFINED               -        0.20      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.139
  SUBAREA AREA(ACRES) =    4.00      SUBAREA RUNOFF(CFS) =    2.32
  EFFECTIVE AREA(ACRES) =     67.60   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       67.6       PEAK FLOW RATE(CFS) =      32.87

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 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.) =   22.19
  RAINFALL INTENSITY(INCH/HR) =   0.73
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.31
  EFFECTIVE STREAM AREA(ACRES) =      67.60
  TOTAL STREAM AREA(ACRES) =      67.60
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.87

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 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) =    629.00  DOWNSTREAM(FEET) =    625.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.474
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.551
  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                 -        0.10      0.60     0.100    56    7.47
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        1.10      0.60     0.200    56    7.97
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        0.20      0.60     0.200    56    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.193
  SUBAREA RUNOFF(CFS) =      1.81
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      1.81

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  625.00  DOWNSTREAM ELEVATION(FEET) =  623.00
  STREET LENGTH(FEET) =   300.00   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) =       3.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.73
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.57
  STREET FLOW TRAVEL TIME(MIN.) =   2.90   Tc(MIN.) =   10.37
  *   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               -        1.50      0.60     0.100     -
```



```
  USER-DEFINED               -        0.20      0.60     0.100     -
  USER-DEFINED               -        0.70      0.60     0.200     -
  USER-DEFINED               -        0.50      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.141
  SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    2.95
  EFFECTIVE AREA(ACRES) =      4.30    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        4.3        PEAK FLOW RATE(CFS) =       4.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.51
  FLOW VELOCITY(FEET/SEC.) =  1.84   DEPTH*VELOCITY(FT*FT/SEC.) =   0.64
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    312.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    313.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   623.00  DOWNSTREAM(FEET) =   620.00
  FLOW LENGTH(FEET) =   369.00   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.) =   5.04
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.34
  PIPE TRAVEL TIME(MIN.) =   1.22    Tc(MIN.) =   11.59
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    313.00 =     999.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.59
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.145
  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     0.100     -
  USER-DEFINED               -        2.50      0.60     0.100     -
  USER-DEFINED               -        0.80      0.60     0.200     -
  USER-DEFINED               -        0.70      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.125
  SUBAREA AREA(ACRES) =    5.90      SUBAREA RUNOFF(CFS) =    5.68
  EFFECTIVE AREA(ACRES) =     10.20   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =       10.2       PEAK FLOW RATE(CFS) =       9.74

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    314.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   620.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =   338.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.74
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   12.33
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    314.00 =    1337.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    314.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.33
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.102
  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     0.100     -
  USER-DEFINED               -        0.10      0.60     0.100     -
  USER-DEFINED               -        0.20      0.60     0.850     -
  USER-DEFINED               -        6.10      0.60     0.200     -
  USER-DEFINED               -        6.10      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.208
  SUBAREA AREA(ACRES) =   12.70      SUBAREA RUNOFF(CFS) =   11.17
  EFFECTIVE AREA(ACRES) =     22.90   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       22.9       PEAK FLOW RATE(CFS) =      20.51

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    315.00 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) =   600.00
  FLOW LENGTH(FEET) =   578.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.29
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.51
  PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =   13.18
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    315.00 =    1915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    315.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.18
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.052
  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     -
  USER-DEFINED               -        1.30      0.60     0.100     -
```



```
  USER-DEFINED               -        3.00      0.60     0.200     -
  USER-DEFINED               -        2.10      0.60     0.200     -
  USER-DEFINED               -        3.70      0.60     0.500     -
  USER-DEFINED               -        6.00      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.347
  SUBAREA AREA(ACRES) =   17.80      SUBAREA RUNOFF(CFS) =   13.52
  EFFECTIVE AREA(ACRES) =     40.70   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.25
  TOTAL AREA(ACRES) =       40.7       PEAK FLOW RATE(CFS) =      33.00

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    316.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   600.00  DOWNSTREAM(FEET) =   569.00
  FLOW LENGTH(FEET) =  2176.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.03
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      33.00
  PIPE TRAVEL TIME(MIN.) =   3.62    Tc(MIN.) =   16.80
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    316.00 =    4091.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    316.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.80
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.884
  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               -        0.30      0.60     0.900     -
  USER-DEFINED               -        6.80      0.60     0.500     -
  USER-DEFINED               -       19.10      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) =   26.60      SUBAREA RUNOFF(CFS) =   13.97
  EFFECTIVE AREA(ACRES) =     67.30   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =       67.3       PEAK FLOW RATE(CFS) =      40.81

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    317.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   569.00  DOWNSTREAM(FEET) =   535.00
  FLOW LENGTH(FEET) =   759.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.36
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      40.81
  PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =   17.57
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    317.00 =    4850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.57
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.857
  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               -        0.10      0.60     0.100     -
  USER-DEFINED               -        0.70      0.60     0.900     -
  USER-DEFINED               -        8.90      0.60     0.500     -
  USER-DEFINED               -        7.40      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.505
  SUBAREA AREA(ACRES) =   17.50      SUBAREA RUNOFF(CFS) =    8.73
  EFFECTIVE AREA(ACRES) =     84.80   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       84.8       PEAK FLOW RATE(CFS) =      47.94

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 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.) =   17.57
  RAINFALL INTENSITY(INCH/HR) =   0.86
  AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.38
  EFFECTIVE STREAM AREA(ACRES) =      84.80
  TOTAL STREAM AREA(ACRES) =      84.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.94

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       32.87   22.19    0.727  0.60( 0.19) 0.31      67.6     300.00
      2       47.94   17.57    0.857  0.60( 0.23) 0.38      84.8     310.00

  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       80.23   17.57    0.857  0.60( 0.21) 0.35     138.3     310.00
      2       70.89   22.19    0.727  0.60( 0.21) 0.35     152.4     300.00
```



```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      80.23    Tc(MIN.) =    17.57
  EFFECTIVE AREA(ACRES) =     138.32   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      152.4
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    317.00 =    5262.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    307.00 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) =   374.00
  FLOW LENGTH(FEET) =  3798.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  21.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.22
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      80.23
  PIPE TRAVEL TIME(MIN.) =   3.29    Tc(MIN.) =   20.86
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    307.00 =    9060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.86
  *   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               -        0.10      0.60     0.200     -
  USER-DEFINED               -        1.40      0.60     0.100     -
  USER-DEFINED               -        4.80      0.60     0.100     -
  USER-DEFINED               -        5.00      0.60     0.100     -
  USER-DEFINED               -        3.70      0.60     0.100     -
  USER-DEFINED               -        5.00      0.60     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.288
  SUBAREA AREA(ACRES) =   20.00      SUBAREA RUNOFF(CFS) =   10.49
  EFFECTIVE AREA(ACRES) =    158.32   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      172.4       PEAK FLOW RATE(CFS) =      80.23
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.86
  *   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               -        4.00      0.60     0.200     -
  USER-DEFINED               -       12.70      0.60     0.200     -
```

```
  USER-DEFINED               -        1.10      0.60     0.900     -
  USER-DEFINED               -        1.50      0.60     0.900     -
  USER-DEFINED               -        2.50      0.60     0.900     -
  USER-DEFINED               -        0.10      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.364
  SUBAREA AREA(ACRES) =   21.90      SUBAREA RUNOFF(CFS) =   10.58
  EFFECTIVE AREA(ACRES) =    180.22   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      194.3       PEAK FLOW RATE(CFS) =      88.66

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.86
  *   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               -        4.50      0.60     0.500     -
  USER-DEFINED               -        1.40      0.60     0.500     -
  USER-DEFINED               -        2.20      0.60     0.600     -
  USER-DEFINED               -        6.80      0.60     0.600     -
  USER-DEFINED               -        7.90      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.574
  SUBAREA AREA(ACRES) =   22.80      SUBAREA RUNOFF(CFS) =    8.44
  EFFECTIVE AREA(ACRES) =    203.02   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      217.1       PEAK FLOW RATE(CFS) =      97.09

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 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) =   374.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =   847.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.69
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      97.09
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   21.44
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    330.00 =    9907.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   21.44
  RAINFALL INTENSITY(INCH/HR) =   0.74
  AREA-AVERAGED Fm(INCH/HR) =  0.22
```



```
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.37
  EFFECTIVE STREAM AREA(ACRES) =     203.02
  TOTAL STREAM AREA(ACRES) =     217.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      97.09

****************************************************************************
  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) =    636.00  DOWNSTREAM(FEET) =    633.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.438
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.431
  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
  "11+ DWELLINGS/ACRE"       -        2.80      0.60     0.200    56    8.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.30
  TOTAL AREA(ACRES) =      2.80   PEAK FLOW RATE(CFS) =      3.30

****************************************************************************
  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) =  633.00  DOWNSTREAM ELEVATION(FEET) =  628.00
  STREET LENGTH(FEET) =   360.00   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) =       6.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   10.90
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
  STREET FLOW TRAVEL TIME(MIN.) =   2.22   Tc(MIN.) =   10.66
  *   2 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               -        0.10      0.60     0.100     -
  USER-DEFINED               -        6.30      0.60     0.200     -
  USER-DEFINED               -        0.20      0.60     0.200     -
  USER-DEFINED               -        0.70      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.237
  SUBAREA AREA(ACRES) =     7.30      SUBAREA RUNOFF(CFS) =     6.95
  EFFECTIVE AREA(ACRES) =     10.10    AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.23
  TOTAL AREA(ACRES) =       10.1        PEAK FLOW RATE(CFS) =       9.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.77
  FLOW VELOCITY(FEET/SEC.) =  2.93   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    322.00 =     690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    323.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   628.00  DOWNSTREAM(FEET) =   624.00
  FLOW LENGTH(FEET) =   750.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.15
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.67
  PIPE TRAVEL TIME(MIN.) =   2.43    Tc(MIN.) =   13.08
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    323.00 =    1440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.08
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.057
  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     0.850     -
  USER-DEFINED               -        2.10      0.60     0.850     -
  USER-DEFINED               -        5.60      0.60     0.200     -
  USER-DEFINED               -        0.90      0.60     0.200     -
  USER-DEFINED               -        3.10      0.60     0.600     -
  USER-DEFINED               -        0.30      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) =   14.00      SUBAREA RUNOFF(CFS) =    9.64
  EFFECTIVE AREA(ACRES) =     24.10   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       24.1       PEAK FLOW RATE(CFS) =      18.01

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   13.08
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.057
  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     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =     0.10      SUBAREA RUNOFF(CFS) =     0.08
  EFFECTIVE AREA(ACRES) =     24.20   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       24.2       PEAK FLOW RATE(CFS) =      18.10

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    324.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   624.00  DOWNSTREAM(FEET) =   614.00
  FLOW LENGTH(FEET) =   887.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.05
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.10
  PIPE TRAVEL TIME(MIN.) =   1.84    Tc(MIN.) =   14.92
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    324.00 =    2327.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.92
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.950
  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               -        1.10      0.60     0.100     -
  USER-DEFINED               -        3.10      0.60     0.850     -
  USER-DEFINED               -        2.60      0.60     0.850     -
  USER-DEFINED               -        4.80      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 =  0.416
  SUBAREA AREA(ACRES) =   16.10      SUBAREA RUNOFF(CFS) =   10.14
  EFFECTIVE AREA(ACRES) =     40.30   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       40.3       PEAK FLOW RATE(CFS) =      25.89

****************************************************************************
  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) =   614.00  DOWNSTREAM(FEET) =   571.00
  FLOW LENGTH(FEET) =  1805.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.66
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.89
  PIPE TRAVEL TIME(MIN.) =   2.58    Tc(MIN.) =   17.50
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    325.00 =    4132.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    325.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.50
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.860
  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               -        5.00      0.60     0.200     -
  USER-DEFINED               -        0.20      0.60     0.900     -
  USER-DEFINED               -        1.20      0.60     0.900     -
  USER-DEFINED               -       13.90      0.60     0.500     -
  USER-DEFINED               -       18.60      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =   42.00      SUBAREA RUNOFF(CFS) =   22.16
  EFFECTIVE AREA(ACRES) =     82.30   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       82.3       PEAK FLOW RATE(CFS) =      44.79

****************************************************************************
  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) =   571.00  DOWNSTREAM(FEET) =   497.00
  FLOW LENGTH(FEET) =  1090.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.78
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.79
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   18.42
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    326.00 =    5222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.42
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.828
  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               -        6.10      0.60     0.100     -
  USER-DEFINED               -       12.90      0.60     0.100     -
  USER-DEFINED               -        0.30      0.60     0.200     -
  USER-DEFINED               -        0.90      0.60     0.900     -
  USER-DEFINED               -       12.80      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) =   34.00      SUBAREA RUNOFF(CFS) =   17.57
  EFFECTIVE AREA(ACRES) =    116.30   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      116.3       PEAK FLOW RATE(CFS) =      60.03

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.42
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.828
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       23.20      0.60     0.900     -
  USER-DEFINED               -        0.30      0.60     0.500     -
  USER-DEFINED               -        0.30      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.890
  SUBAREA AREA(ACRES) =   23.80      SUBAREA RUNOFF(CFS) =    6.30
  EFFECTIVE AREA(ACRES) =    140.10   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      140.1       PEAK FLOW RATE(CFS) =      66.34

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    327.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =  1732.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.66
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      66.34
  PIPE TRAVEL TIME(MIN.) =   1.84    Tc(MIN.) =   20.26
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    327.00 =    6954.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.26
  *   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               -        4.80      0.60     0.100     -
```

```
  USER-DEFINED               -        4.80      0.60     0.100     -
  USER-DEFINED               -        0.10      0.60     0.850     -
  USER-DEFINED               -        6.30      0.60     0.850     -
  USER-DEFINED               -        5.00      0.60     0.200     -
  USER-DEFINED               -       43.30      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.250
  SUBAREA AREA(ACRES) =   64.30      SUBAREA RUNOFF(CFS) =   35.80
  EFFECTIVE AREA(ACRES) =    204.40   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      204.4       PEAK FLOW RATE(CFS) =      94.60

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.26
  *   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               -       38.70      0.60     0.200     -
  USER-DEFINED               -        2.30      0.60     0.900     -
  USER-DEFINED               -        3.60      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.293
  SUBAREA AREA(ACRES) =   44.60      SUBAREA RUNOFF(CFS) =   23.80
  EFFECTIVE AREA(ACRES) =    249.00   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      249.0       PEAK FLOW RATE(CFS) =     118.40

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    328.00 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) =   338.00
  FLOW LENGTH(FEET) =  2664.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.38
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     118.40
  PIPE TRAVEL TIME(MIN.) =   2.18    Tc(MIN.) =   22.44
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    328.00 =    9618.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.44
  *   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               -        0.50      0.60     0.200     -
```



```
  USER-DEFINED               -       14.80      0.60     0.200     -
  USER-DEFINED               -        1.90      0.60     0.200     -
  USER-DEFINED               -        9.90      0.60     0.200     -
  USER-DEFINED               -        1.80      0.60     0.100     -
  USER-DEFINED               -        8.40      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.173
  SUBAREA AREA(ACRES) =   37.30      SUBAREA RUNOFF(CFS) =   20.75
  EFFECTIVE AREA(ACRES) =    286.30   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      286.3       PEAK FLOW RATE(CFS) =     128.71

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.44
  *   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               -        7.60      0.60     0.100     -
  USER-DEFINED               -       14.00      0.60     0.100     -
  USER-DEFINED               -        1.40      0.60     0.850     -
  USER-DEFINED               -        0.30      0.60     0.850     -
  USER-DEFINED               -        0.20      0.60     0.200     -
  USER-DEFINED               -        0.30      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.156
  SUBAREA AREA(ACRES) =   23.80      SUBAREA RUNOFF(CFS) =   13.46
  EFFECTIVE AREA(ACRES) =    310.10   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      310.1       PEAK FLOW RATE(CFS) =     142.17

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.44
  *   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               -       12.20      0.60     0.200     -
  USER-DEFINED               -       17.60      0.60     0.200     -
  USER-DEFINED               -        0.30      0.60     0.900     -
  USER-DEFINED               -        0.90      0.60     0.900     -
  USER-DEFINED               -        9.30      0.60     0.900     -
  USER-DEFINED               -        0.20      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.383
  SUBAREA AREA(ACRES) =   40.50      SUBAREA RUNOFF(CFS) =   17.94
  EFFECTIVE AREA(ACRES) =    350.60   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =      350.6       PEAK FLOW RATE(CFS) =     160.11
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.44
  *   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               -        5.30      0.60     0.500     -
  USER-DEFINED               -       28.30      0.60     0.500     -
  USER-DEFINED               -        3.80      0.60     0.400     -
  USER-DEFINED               -        4.10      0.60     0.400     -
  USER-DEFINED               -        0.30      0.60     0.600     -
  USER-DEFINED               -        0.30      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.483
  SUBAREA AREA(ACRES) =   42.10      SUBAREA RUNOFF(CFS) =   16.38
  EFFECTIVE AREA(ACRES) =    392.70   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      392.7       PEAK FLOW RATE(CFS) =     176.49

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    329.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   338.00  DOWNSTREAM(FEET) =   320.00
  FLOW LENGTH(FEET) =  1154.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.92
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     176.49
  PIPE TRAVEL TIME(MIN.) =   1.21    Tc(MIN.) =   23.65
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    329.00 =   10772.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.65
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.696
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       11.60      0.60     0.100     -
  USER-DEFINED               -        6.70      0.60     0.100     -
  USER-DEFINED               -       12.80      0.60     0.100     -
  USER-DEFINED               -        0.20      0.60     0.900     -
  USER-DEFINED               -        0.20      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.110
  SUBAREA AREA(ACRES) =   31.50      SUBAREA RUNOFF(CFS) =   17.86
  EFFECTIVE AREA(ACRES) =    424.20   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.35
```



```
  TOTAL AREA(ACRES) =      424.2       PEAK FLOW RATE(CFS) =     185.21

****************************************************************************
  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) =   320.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =  1981.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  47.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.49
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     185.21
  PIPE TRAVEL TIME(MIN.) =   3.15    Tc(MIN.) =   26.80
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    330.00 =   12753.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   26.80
  RAINFALL INTENSITY(INCH/HR) =   0.64
  AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.35
  EFFECTIVE STREAM AREA(ACRES) =     424.20
  TOTAL STREAM AREA(ACRES) =     424.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     185.21

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



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 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) =   701.00   CHANNEL SLOPE =  0.0357
  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) =  0.723
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        6.30      0.60     1.000     -
  USER-DEFINED               -        0.20      0.60     1.000     -
  USER-DEFINED               -        5.90      0.60     1.000     -
  USER-DEFINED               -       12.70      0.60     1.000     -
  USER-DEFINED               -        6.80      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) =       9.98
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.01
  AVERAGE FLOW DEPTH(FEET) =   0.91   TRAVEL TIME(MIN.) =   2.91
  Tc(MIN.) =   22.38
  SUBAREA AREA(ACRES) =    35.10       SUBAREA RUNOFF(CFS) =    3.89
  EFFECTIVE AREA(ACRES) =     81.40     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       81.4         PEAK FLOW RATE(CFS) =       9.02

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.87   FLOW VELOCITY(FEET/SEC.) =   3.93
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    395.00 =    3560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    395.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.38
  *   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     0.900     -
  USER-DEFINED               -        2.70      0.60     0.900     -
  USER-DEFINED               -        0.50      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 =  0.914
  SUBAREA AREA(ACRES) =     4.30      SUBAREA RUNOFF(CFS) =    0.68
  EFFECTIVE AREA(ACRES) =     85.70   AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       85.7       PEAK FLOW RATE(CFS) =       9.70
```



```
****************************************************************************
  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) =   437.00
  FLOW LENGTH(FEET) =  6286.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.86
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.70
  PIPE TRAVEL TIME(MIN.) =  11.82    Tc(MIN.) =   34.20
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    370.00 =    9846.00 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) =    437.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1963.00   CHANNEL SLOPE =  0.0469
  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               -        0.50      0.60     1.000     -
  USER-DEFINED               -        0.60      0.60     1.000     -
  USER-DEFINED               -        1.50      0.60     0.100     -
  USER-DEFINED               -        0.70      0.60     0.100     -
  USER-DEFINED               -        1.60      0.60     0.100     -
  USER-DEFINED               -        1.10      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.265
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.52
  AVERAGE FLOW DEPTH(FEET) =   0.89   TRAVEL TIME(MIN.) =   7.24
  Tc(MIN.) =   41.44
  SUBAREA AREA(ACRES) =     6.00       SUBAREA RUNOFF(CFS) =    1.99
  EFFECTIVE AREA(ACRES) =     91.70     AREA-AVERAGED Fm(INCH/HR) =   0.57
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   0.95
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TOTAL AREA(ACRES) =       91.7         PEAK FLOW RATE(CFS) =       9.70
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.86   FLOW VELOCITY(FEET/SEC.) =   4.40
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    371.00 =   11809.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
```

```
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   41.44
  *   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     1.000     -
  USER-DEFINED               -        2.80      0.60     1.000     -
  USER-DEFINED               -        0.10      0.60     1.000     -
  USER-DEFINED               -        0.40      0.60     1.000     -
  USER-DEFINED               -        0.30      0.60     1.000     -
  USER-DEFINED               -        3.40      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  SUBAREA AREA(ACRES) =    8.40      SUBAREA RUNOFF(CFS) =    0.00
  EFFECTIVE AREA(ACRES) =    100.10   AREA-AVERAGED Fm(INCH/HR) =  0.57
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.95
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TOTAL AREA(ACRES) =      100.1       PEAK FLOW RATE(CFS) =       9.70
  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.) =   41.44
  *   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               -        0.80      0.60     1.000     -
  USER-DEFINED               -        0.10      0.60     0.850     -
  USER-DEFINED               -        3.80      0.60     0.850     -
  USER-DEFINED               -        2.50      0.60     0.850     -
  USER-DEFINED               -        2.40      0.60     0.900     -
  USER-DEFINED               -        0.70      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.877
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  SUBAREA AREA(ACRES) =   10.30      SUBAREA RUNOFF(CFS) =    0.57
  EFFECTIVE AREA(ACRES) =    110.40   AREA-AVERAGED Fm(INCH/HR) =  0.57
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.95
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TOTAL AREA(ACRES) =      110.4       PEAK FLOW RATE(CFS) =       9.70
  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.) =   41.44
  *   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               -        3.50      0.60     0.900     -
  USER-DEFINED               -        1.10      0.60     0.900     -
  USER-DEFINED               -        0.10      0.60     0.400     -
  USER-DEFINED               -        0.20      0.60     1.000     -
  USER-DEFINED               -        1.90      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.924
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =    0.23
  EFFECTIVE AREA(ACRES) =    117.20   AREA-AVERAGED Fm(INCH/HR) =  0.57
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.94
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
  * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
  TOTAL AREA(ACRES) =      117.2       PEAK FLOW RATE(CFS) =       9.70
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

********************************************************************************
  FLOW PROCESS FROM NODE    371.00 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) =   345.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =  1065.00   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.) =  10.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.70
  PIPE TRAVEL TIME(MIN.) =   1.71    Tc(MIN.) =   43.15
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    330.00 =   12874.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   43.15
  RAINFALL INTENSITY(INCH/HR) =   0.49
  AREA-AVERAGED Fm(INCH/HR) =  0.57
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.94
  EFFECTIVE STREAM AREA(ACRES) =     117.20
  TOTAL STREAM AREA(ACRES) =     117.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.70

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	97.09	21.44	0.743	0.60(0.22)	0.37	203.0	310.00
1	85.14	26.21	0.649	0.60(0.22)	0.37	217.1	300.00
2	185.21	26.80	0.640	0.60(0.21)	0.35	424.2	320.00
3	9.70	43.15	0.492	0.60(0.57)	0.94	117.2	390.00

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	290.73	21.44	0.743	0.60(0.25)	0.42	600.6	310.00
2	279.76	26.21	0.649	0.60(0.25)	0.42	703.3	300.00
3	278.27	26.80	0.640	0.60(0.25)	0.42	714.1	320.00
4	209.36	43.15	0.492	0.60(0.27)	0.45	758.5	390.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 290.73 Tc(MIN.) = 21.44
EFFECTIVE AREA(ACRES) = 600.59 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 758.5
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 330.00 = 12874.00 FEET.

****
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) = 310.00 DOWNSTREAM(FEET) = 280.00
FLOW LENGTH(FEET) = 374.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.27
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 290.73
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 21.62
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 21.62
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.739
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	17.50	0.60	0.200	-
USER-DEFINED	-	1.50	0.60	0.200	-
USER-DEFINED	-	0.70	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	44.60	0.60	0.100	-
USER-DEFINED	-	0.70	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.132
SUBAREA AREA(ACRES) = 65.10 SUBAREA RUNOFF(CFS) = 38.69

EFFECTIVE AREA(ACRES) = 665.69 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 823.6 PEAK FLOW RATE(CFS) = 303.27

****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 21.62
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.739
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.00	0.60	0.100	-
USER-DEFINED	-	4.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.115
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 3.74
EFFECTIVE AREA(ACRES) = 671.89 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 829.8 PEAK FLOW RATE(CFS) = 307.01

****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 10

>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==

****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 13

>>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
==

****
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) = 314.00
ELEVATION DATA: UPSTREAM(FEET) = 618.00 DOWNSTREAM(FEET) = 590.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.048
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.727
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "8-10 DWELLINGS/ACRE"	-	1.20	0.60	0.400	56	6.05

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA RUNOFF(CFS) = 1.61
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 1.61

```
****************************************************************************
  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) =  590.00  DOWNSTREAM ELEVATION(FEET) =  588.00
  STREET LENGTH(FEET) =   274.00   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) =       5.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   2.26   Tc(MIN.) =    8.31
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.448
  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     0.600     -
  USER-DEFINED               -        4.40      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.486
  SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =    8.01
  EFFECTIVE AREA(ACRES) =      8.90    AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        8.9        PEAK FLOW RATE(CFS) =       9.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.49
  FLOW VELOCITY(FEET/SEC.) =  2.25   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     588.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   588.00  DOWNSTREAM(FEET) =   581.00
  FLOW LENGTH(FEET) =   805.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.24
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.32
  PIPE TRAVEL TIME(MIN.) =   2.15    Tc(MIN.) =   10.46
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1393.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.46
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.211
  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               -        2.00      0.60     0.900     -
  USER-DEFINED               -        8.80      0.60     0.600     -
  USER-DEFINED               -        0.10      0.60     0.400     -
  USER-DEFINED               -        4.90      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.577
  SUBAREA AREA(ACRES) =   15.90      SUBAREA RUNOFF(CFS) =   12.38
  EFFECTIVE AREA(ACRES) =     24.80   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       24.8       PEAK FLOW RATE(CFS) =      19.80

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 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.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   1.21
  AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =      24.80
  TOTAL STREAM AREA(ACRES) =      24.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.80

****************************************************************************
  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) =    725.00  DOWNSTREAM(FEET) =    630.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.196
  *   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"     -        0.10      0.60     1.000    56    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        1.30      0.60     1.000    56    9.20
```

```
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        0.10      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) =      1.00
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      1.00

****************************************************************************
  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) =  1.248
  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               -        1.70      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) =       1.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.51
  AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =   0.72
  Tc(MIN.) =    9.92
  SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    1.11
  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) =       1.98

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   4.80
  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) =    582.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   520.00   CHANNEL SLOPE =  0.0288
  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) =  1.065
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.70      0.60     1.000     -
  USER-DEFINED               -        1.20      0.60     0.900     -
  USER-DEFINED               -        1.20      0.60     0.600     -
  USER-DEFINED               -        0.30      0.60     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
```



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  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.906
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.86
  AVERAGE FLOW DEPTH(FEET) =   0.64   TRAVEL TIME(MIN.) =   3.03
  Tc(MIN.) =   12.95
  SUBAREA AREA(ACRES) =     6.40       SUBAREA RUNOFF(CFS) =    3.01
  EFFECTIVE AREA(ACRES) =      9.80     AREA-AVERAGED Fm(INCH/HR) =   0.56
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   0.94
  TOTAL AREA(ACRES) =        9.8         PEAK FLOW RATE(CFS) =       4.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   3.02
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.00 =    1045.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    433.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   582.00  DOWNSTREAM(FEET) =   581.00
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.59
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.43
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   12.96
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    403.00 =    1055.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 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.) =   12.96
  RAINFALL INTENSITY(INCH/HR) =   1.06
  AREA-AVERAGED Fm(INCH/HR) =  0.56
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.94
  EFFECTIVE STREAM AREA(ACRES) =       9.80
  TOTAL STREAM AREA(ACRES) =       9.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.80   10.46    1.211  0.60( 0.32) 0.54      24.8     400.00
      2        4.43   12.96    1.065  0.60( 0.56) 0.94       9.8     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       24.23   10.46    1.211  0.60( 0.38) 0.64      32.7     400.00
    2       20.96   12.96    1.065  0.60( 0.39) 0.65      34.6     430.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.23    Tc(MIN.) =    10.46
  EFFECTIVE AREA(ACRES) =      32.71   AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =       34.6
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1393.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 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) =   581.00  DOWNSTREAM(FEET) =   570.00
  FLOW LENGTH(FEET) =  1056.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.39
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.23
  PIPE TRAVEL TIME(MIN.) =   2.10    Tc(MIN.) =   12.55
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =    2449.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.55
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.088
  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     0.100     -
  USER-DEFINED               -        0.10      0.60     1.000     -
  USER-DEFINED               -        4.90      0.60     0.900     -
  USER-DEFINED               -        1.50      0.60     0.900     -
  USER-DEFINED               -        1.00      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.842
  SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =    4.04
  EFFECTIVE AREA(ACRES) =     40.41   AREA-AVERAGED Fm(INCH/HR) =  0.41
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =       42.3       PEAK FLOW RATE(CFS) =      24.84

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.55
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.088
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```



```
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        8.80      0.60     0.500     -
  USER-DEFINED               -        4.20      0.60     0.500     -
  USER-DEFINED               -        1.10      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.492
  SUBAREA AREA(ACRES) =   14.10      SUBAREA RUNOFF(CFS) =   10.06
  EFFECTIVE AREA(ACRES) =     54.51   AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =       56.4       PEAK FLOW RATE(CFS) =      34.90

****************************************************************************
  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) =   570.00  DOWNSTREAM(FEET) =   565.00
  FLOW LENGTH(FEET) =  1526.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.84
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.90
  PIPE TRAVEL TIME(MIN.) =   4.36    Tc(MIN.) =   16.91
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    405.00 =    3975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.91
  *   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     0.100     -
  USER-DEFINED               -        1.80      0.60     0.850     -
  USER-DEFINED               -        0.40      0.60     0.850     -
  USER-DEFINED               -        1.80      0.60     0.900     -
  USER-DEFINED               -        2.80      0.60     0.900     -
  USER-DEFINED               -        6.10      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.698
  SUBAREA AREA(ACRES) =   13.00      SUBAREA RUNOFF(CFS) =    5.39
  EFFECTIVE AREA(ACRES) =     67.51   AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =       69.4       PEAK FLOW RATE(CFS) =      34.90
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.91
  *   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                -       11.20      0.60      0.500     -
  USER-DEFINED                -        7.80      0.60      0.400     -
  USER-DEFINED                -        1.40      0.60      0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =   20.40      SUBAREA RUNOFF(CFS) =   11.14
  EFFECTIVE AREA(ACRES) =     87.91   AREA-AVERAGED Fm(INCH/HR) =  0.36
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       89.8       PEAK FLOW RATE(CFS) =      41.20

****************************************************************************
  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) =   565.00  DOWNSTREAM(FEET) =   495.00
  FLOW LENGTH(FEET) =  2168.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.68
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.20
  PIPE TRAVEL TIME(MIN.) =   2.46    Tc(MIN.) =   19.37
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    406.00 =    6143.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.37
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.795
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        5.50      0.60      0.100     -
  USER-DEFINED                -        1.90      0.60      0.100     -
  USER-DEFINED                -        2.50      0.60      0.850     -
  USER-DEFINED                -        0.90      0.60      0.850     -
  USER-DEFINED                -       36.40      0.60      0.200     -
  USER-DEFINED                -       13.60      0.60      0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.224
  SUBAREA AREA(ACRES) =   60.80      SUBAREA RUNOFF(CFS) =   36.17
  EFFECTIVE AREA(ACRES) =    148.71   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      150.6       PEAK FLOW RATE(CFS) =      70.71

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.37
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.795
  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      0.900     -
  USER-DEFINED                -        2.10      0.60      0.900     -
  USER-DEFINED                -        0.10      0.60      0.600     -
  USER-DEFINED                -        0.30      0.60      0.500     -
  USER-DEFINED                -        0.10      0.60      0.500     -
  USER-DEFINED                -        0.10      0.60      0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.868
  SUBAREA AREA(ACRES) =    7.40      SUBAREA RUNOFF(CFS) =    1.83
  EFFECTIVE AREA(ACRES) =    156.11   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =      158.0       PEAK FLOW RATE(CFS) =      72.54

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.37
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.795
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        9.30      0.60      0.400     -
  USER-DEFINED                -        0.90      0.60      0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =    5.10
  EFFECTIVE AREA(ACRES) =    166.31   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      168.2       PEAK FLOW RATE(CFS) =      77.64

****************************************************************************
  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) =   495.00  DOWNSTREAM(FEET) =   395.00
  FLOW LENGTH(FEET) =  2905.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.54
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      77.64
  PIPE TRAVEL TIME(MIN.) =   2.76    Tc(MIN.) =   22.13
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    407.00 =    9048.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.13
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.728
  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      0.200     -
  USER-DEFINED             -        0.60      0.60      0.100     -
  USER-DEFINED             -        9.10      0.60      0.100     -
  USER-DEFINED             -        6.70      0.60      0.100     -
  USER-DEFINED             -        0.50      0.60      0.850     -
  USER-DEFINED             -        2.60      0.60      0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.219
  SUBAREA AREA(ACRES) =   19.80      SUBAREA RUNOFF(CFS) =   10.64
  EFFECTIVE AREA(ACRES) =    186.11   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      188.0       PEAK FLOW RATE(CFS) =      78.23

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.13
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.728
  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      0.200     -
  USER-DEFINED             -        2.40      0.60      0.200     -
  USER-DEFINED             -       10.60      0.60      0.200     -
  USER-DEFINED             -        0.60      0.60      0.200     -
  USER-DEFINED             -        1.90      0.60      0.900     -
  USER-DEFINED             -        0.70      0.60      0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.308
  SUBAREA AREA(ACRES) =   16.80      SUBAREA RUNOFF(CFS) =    8.22
  EFFECTIVE AREA(ACRES) =    202.91   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      204.8       PEAK FLOW RATE(CFS) =      86.45

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.13
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.728
  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      0.600     -
  USER-DEFINED             -       15.30      0.60      0.600     -
  USER-DEFINED             -        0.40      0.60      0.500     -
  USER-DEFINED             -        1.50      0.60      0.500     -
  USER-DEFINED             -        5.10      0.60      0.500     -
  USER-DEFINED             -        0.90      0.60      0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.579
  SUBAREA AREA(ACRES) =   37.50      SUBAREA RUNOFF(CFS) =   12.86
  EFFECTIVE AREA(ACRES) =    240.41   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.45
```



```
  TOTAL AREA(ACRES) =      242.3       PEAK FLOW RATE(CFS) =      99.31

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.13
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.728
  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             -        8.40      0.60      0.400     -
  USER-DEFINED             -        2.80      0.60      0.400     -
  USER-DEFINED             -        0.60      0.60      0.600     -
  USER-DEFINED             -        1.50      0.60      0.600     -
  USER-DEFINED             -        3.50      0.60      0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =   20.30      SUBAREA RUNOFF(CFS) =    8.32
  EFFECTIVE AREA(ACRES) =    260.71   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      262.6       PEAK FLOW RATE(CFS) =     107.63

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    430.00 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) =   372.00
  FLOW LENGTH(FEET) =   661.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.93
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     107.63
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   22.72
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    411.00 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) =    535.00  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.368
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.688
  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"         -        0.50      0.60     0.900    56    7.53
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       -        0.20      0.60     0.600    56    6.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.814
  SUBAREA RUNOFF(CFS) =      0.76
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      0.76

****************************************************************************
  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) =   495.00  DOWNSTREAM(FEET) =   490.00
  FLOW LENGTH(FEET) =   267.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.76
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =    7.44
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    412.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.44
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.555
  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     0.900     -
  USER-DEFINED               -        0.30      0.60     0.900     -
  USER-DEFINED               -        0.10      0.60     0.600     -
  USER-DEFINED               -        0.10      0.60     0.500     -
  USER-DEFINED               -        0.30      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.788
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    1.66
  EFFECTIVE AREA(ACRES) =      2.40   AREA-AVERAGED Fm(INCH/HR) =  0.48
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        2.4       PEAK FLOW RATE(CFS) =       2.33

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    413.00 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) =   480.00
  FLOW LENGTH(FEET) =   520.00   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.) =   5.81
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.33
  PIPE TRAVEL TIME(MIN.) =   1.49    Tc(MIN.) =    8.93
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    413.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    413.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.93
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.370
  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               -        0.40      0.60     0.900     -
  USER-DEFINED               -        0.40      0.60     0.500     -
  USER-DEFINED               -        0.30      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.810
  SUBAREA AREA(ACRES) =    3.10      SUBAREA RUNOFF(CFS) =    2.47
  EFFECTIVE AREA(ACRES) =      5.50   AREA-AVERAGED Fm(INCH/HR) =  0.48
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        5.5       PEAK FLOW RATE(CFS) =       4.40

****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    414.00 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) =   470.00
  FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.38
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.40
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =    9.55
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    414.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.55
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.294
```

```
  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               -        0.10      0.60     0.100     -
  USER-DEFINED               -        2.80      0.60     0.900     -
  USER-DEFINED               -        1.00      0.60     0.900     -
  USER-DEFINED               -        0.20      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 =  0.654
  SUBAREA AREA(ACRES) =    5.70      SUBAREA RUNOFF(CFS) =    4.62
  EFFECTIVE AREA(ACRES) =     11.20   AREA-AVERAGED Fm(INCH/HR) =  0.44
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       11.2       PEAK FLOW RATE(CFS) =       8.64

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.55
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.294
  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     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.11
  EFFECTIVE AREA(ACRES) =     11.30   AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       11.3       PEAK FLOW RATE(CFS) =       8.75

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 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) =   470.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =   528.00   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.) =  11.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.75
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =   10.31
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    415.00 =    1953.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    415.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.31
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.220
  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               -        0.60      0.60     0.100     -
  USER-DEFINED               -        6.30      0.60     0.500     -
  USER-DEFINED               -        3.70      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.448
  SUBAREA AREA(ACRES) =   11.50      SUBAREA RUNOFF(CFS) =    9.85
  EFFECTIVE AREA(ACRES) =     22.80   AREA-AVERAGED Fm(INCH/HR) =  0.35
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       22.8       PEAK FLOW RATE(CFS) =      17.84

****************************************************************************
  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) =   445.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =   650.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.56
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.84
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   11.11
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    416.00 =    2603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.11
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.173
  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     0.200     -
  USER-DEFINED               -       10.90      0.60     0.200     -
  USER-DEFINED               -        1.30      0.60     0.100     -
  USER-DEFINED               -        1.30      0.60     0.100     -
  USER-DEFINED               -        1.10      0.60     0.200     -
  USER-DEFINED               -        7.00      0.60     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.189
  SUBAREA AREA(ACRES) =   23.20      SUBAREA RUNOFF(CFS) =   22.13
  EFFECTIVE AREA(ACRES) =     46.00   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       46.0       PEAK FLOW RATE(CFS) =      39.01

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.11
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.173
```

```
  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     0.600     -
  USER-DEFINED               -        4.90      0.60     0.500     -
  USER-DEFINED               -        9.30      0.60     0.500     -
  USER-DEFINED               -        0.30      0.60     0.400     -
  USER-DEFINED               -        0.10      0.60     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =   15.00      SUBAREA RUNOFF(CFS) =   11.79
  EFFECTIVE AREA(ACRES) =     61.00   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       61.0       PEAK FLOW RATE(CFS) =      50.80

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 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.) =   11.11
  RAINFALL INTENSITY(INCH/HR) =   1.17
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.41
  EFFECTIVE STREAM AREA(ACRES) =      61.00
  TOTAL STREAM AREA(ACRES) =      61.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      50.80

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    421.00 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) =    535.00  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.368
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.688
  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"         -        0.70      0.60     0.900    56    7.53
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       -        0.20      0.60     0.600    56    6.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.833
  SUBAREA RUNOFF(CFS) =      0.96
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      0.96

****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    422.00 IS CODE =  31
----------------------------------------------------------------------------
```



```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   487.00
  FLOW LENGTH(FEET) =   308.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.98
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.96
  PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =    7.40
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    422.00 =     636.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    422.00 TO NODE    422.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.40
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.560
  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               -        0.50      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.817
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    1.73
  EFFECTIVE AREA(ACRES) =      2.70   AREA-AVERAGED Fm(INCH/HR) =  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =        2.7       PEAK FLOW RATE(CFS) =       2.59

****************************************************************************
  FLOW PROCESS FROM NODE    422.00 TO NODE    423.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =   373.00   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.) =   6.51
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.59
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =    8.35
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    423.00 =    1009.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    423.00 TO NODE    423.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.35
  *   2 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               -        0.80      0.60     0.900     -
  USER-DEFINED               -        1.20      0.60     0.900     -
  USER-DEFINED               -        0.20      0.60     0.900     -
  USER-DEFINED               -        0.40      0.60     0.600     -
  USER-DEFINED               -        1.70      0.60     0.600     -
  USER-DEFINED               -        0.10      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.750
  SUBAREA AREA(ACRES) =    4.40      SUBAREA RUNOFF(CFS) =    3.93
  EFFECTIVE AREA(ACRES) =      7.10   AREA-AVERAGED Fm(INCH/HR) =  0.47
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.78
  TOTAL AREA(ACRES) =        7.1       PEAK FLOW RATE(CFS) =       6.23

****************************************************************************
  FLOW PROCESS FROM NODE    423.00 TO NODE    424.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   454.00
  FLOW LENGTH(FEET) =   995.00   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.) =   8.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.23
  PIPE TRAVEL TIME(MIN.) =   2.00    Tc(MIN.) =   10.36
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    424.00 =    2004.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.36
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.217
  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     0.200     -
  USER-DEFINED               -        0.40      0.60     0.200     -
  USER-DEFINED               -        0.90      0.60     0.850     -
  USER-DEFINED               -        0.40      0.60     0.850     -
  USER-DEFINED               -        0.10      0.60     0.900     -
  USER-DEFINED               -        0.70      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.626
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    2.50
  EFFECTIVE AREA(ACRES) =     10.40   AREA-AVERAGED Fm(INCH/HR) =  0.44
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       10.4       PEAK FLOW RATE(CFS) =       7.30

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.36
```



```
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.217
  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     0.600     -
  USER-DEFINED               -        2.10      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =    4.17
  EFFECTIVE AREA(ACRES) =     15.80   AREA-AVERAGED Fm(INCH/HR) =  0.41
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       15.8       PEAK FLOW RATE(CFS) =      11.46

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 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) =   454.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =  1555.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.46
  PIPE TRAVEL TIME(MIN.) =   2.66    Tc(MIN.) =   13.02
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    416.00 =    3559.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.02
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.061
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.70      0.60     0.200     -
  USER-DEFINED               -        6.80      0.60     0.200     -
  USER-DEFINED               -        0.70      0.60     0.200     -
  USER-DEFINED               -        2.60      0.60     0.200     -
  USER-DEFINED               -        2.20      0.60     0.600     -
  USER-DEFINED               -        9.90      0.60     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.387
  SUBAREA AREA(ACRES) =   25.90      SUBAREA RUNOFF(CFS) =   19.33
  EFFECTIVE AREA(ACRES) =     41.70   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       41.7       PEAK FLOW RATE(CFS) =      28.57

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.02
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.061
```

```
  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      0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    0.89
  EFFECTIVE AREA(ACRES) =     43.00   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       43.0       PEAK FLOW RATE(CFS) =      29.46

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 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.) =   13.02
  RAINFALL INTENSITY(INCH/HR) =   1.06
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      43.00
  TOTAL STREAM AREA(ACRES) =      43.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      29.46

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       50.80   11.11    1.173  0.60( 0.25) 0.41      61.0     410.00
      2       29.46   13.02    1.061  0.60( 0.30) 0.50      43.0     420.00

  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       79.64   11.11    1.173  0.60( 0.27) 0.45      97.7     410.00
      2       74.11   13.02    1.061  0.60( 0.27) 0.45     104.0     420.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      79.64    Tc(MIN.) =    11.11
  EFFECTIVE AREA(ACRES) =      97.69   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      104.0
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    416.00 =    3559.00 FEET.

****************************************************************************
  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) =   415.00  DOWNSTREAM(FEET) =   395.00
  FLOW LENGTH(FEET) =  1084.00   MANNING'S N =  0.013
```



```
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.81
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      79.64
  PIPE TRAVEL TIME(MIN.) =   1.31    Tc(MIN.) =   12.42
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    417.00 =    4643.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.42
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.096
  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     -
  USER-DEFINED               -        2.90      0.60      0.100     -
  USER-DEFINED               -        3.60      0.60      0.850     -
  USER-DEFINED               -        4.50      0.60      0.200     -
  USER-DEFINED               -        4.50      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 =  0.313
  SUBAREA AREA(ACRES) =   17.30      SUBAREA RUNOFF(CFS) =   14.15
  EFFECTIVE AREA(ACRES) =    114.99   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      121.3       PEAK FLOW RATE(CFS) =      87.04

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.42
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.096
  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      0.400     -
  USER-DEFINED               -        0.20      0.60      0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    0.77
  EFFECTIVE AREA(ACRES) =    115.99   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      122.3       PEAK FLOW RATE(CFS) =      87.82

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    430.00 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) =   372.00
  FLOW LENGTH(FEET) =  1572.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.7 INCHES
```

```
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.97
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      87.82
 PIPE TRAVEL TIME(MIN.) =   2.02    Tc(MIN.) =   14.44
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    430.00 =    6215.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.44
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.978
 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               -        0.20      0.60     0.100     -
 USER-DEFINED               -        0.40      0.60     0.100     -
 USER-DEFINED               -        5.70      0.60     0.850     -
 USER-DEFINED               -        4.50      0.60     0.850     -
 USER-DEFINED               -        9.40      0.60     0.850     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.803
 SUBAREA AREA(ACRES) =   20.90      SUBAREA RUNOFF(CFS) =    9.33
 EFFECTIVE AREA(ACRES) =    136.89   AREA-AVERAGED Fm(INCH/HR) =  0.29
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =      143.2       PEAK FLOW RATE(CFS) =      87.82
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.44
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.978
 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               -        8.90      0.60     0.850     -
 USER-DEFINED               -        1.20      0.60     0.850     -
 USER-DEFINED               -        3.70      0.60     0.850     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =   14.50      SUBAREA RUNOFF(CFS) =    6.11
 EFFECTIVE AREA(ACRES) =    151.39   AREA-AVERAGED Fm(INCH/HR) =  0.31
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.52
 TOTAL AREA(ACRES) =      157.7       PEAK FLOW RATE(CFS) =      90.90

****************************************************************************
 FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 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       90.90   14.44    0.978  0.60( 0.31) 0.52     151.4     410.00
    2       83.34   16.38    0.898  0.60( 0.31) 0.52     157.7     420.00
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    430.00 =    6215.00 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      107.63   22.72    0.716  0.60( 0.27) 0.45     260.7     400.00
    2       92.34   25.91    0.653  0.60( 0.27) 0.45     262.6     430.00
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1      198.53   14.44    0.978  0.60( 0.29) 0.48     317.1     410.00
    2      190.97   16.38    0.898  0.60( 0.29) 0.48     345.8     420.00
    3      165.17   22.72    0.716  0.60( 0.29) 0.48     418.4     400.00
    4      140.98   25.91    0.653  0.60( 0.29) 0.48     420.3     430.00
  TOTAL AREA(ACRES) =       420.3

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      198.53  Tc(MIN.) =   14.435
 EFFECTIVE AREA(ACRES) =    317.06  AREA-AVERAGED Fm(INCH/HR) =  0.29
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =      420.3
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    430.00 TO NODE    431.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   372.00  DOWNSTREAM(FEET) =   300.00
 FLOW LENGTH(FEET) =  1358.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  25.86
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     198.53
 PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =   15.31
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    431.00 =   11067.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.31
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.934
 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     0.200     -
 USER-DEFINED               -       15.00      0.60     0.200     -
 USER-DEFINED               -        5.80      0.60     0.200     -
 USER-DEFINED               -        2.50      0.60     0.200     -
```

```
  USER-DEFINED                -        9.10      0.60     0.100     -
  USER-DEFINED                -        1.50      0.60     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.174
  SUBAREA AREA(ACRES) =   41.30      SUBAREA RUNOFF(CFS) =   30.84
  EFFECTIVE AREA(ACRES) =    358.36   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      461.6       PEAK FLOW RATE(CFS) =     214.91

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.31
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.934
  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                -        0.40      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) =    0.90      SUBAREA RUNOFF(CFS) =    0.71
  EFFECTIVE AREA(ACRES) =    359.26   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      462.5       PEAK FLOW RATE(CFS) =     215.62

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    331.00 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      215.62   15.31    0.934  0.60( 0.27) 0.45     359.3     410.00
      2      209.27   17.26    0.868  0.60( 0.27) 0.45     388.0     420.00
      3      177.36   23.63    0.696  0.60( 0.27) 0.45     460.6     400.00
      4      153.55   26.88    0.638  0.60( 0.27) 0.45     462.5     430.00
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    331.00 =   11067.00 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      307.01   21.62    0.739  0.60( 0.23) 0.39     671.9     310.00
      2      286.78   26.40    0.646  0.60( 0.23) 0.39     774.6     300.00
      3      284.23   26.98    0.637  0.60( 0.23) 0.39     785.4     320.00
      4      212.31   43.35    0.491  0.60( 0.25) 0.42     829.8     390.00
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    331.00 =   13248.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      516.54   15.31    0.934  0.60( 0.25) 0.41     835.0     410.00
      2      516.28   17.26    0.868  0.60( 0.25) 0.41     924.4     420.00
      3      494.44   21.62    0.739  0.60( 0.25) 0.41    1109.6     310.00
```



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      4      475.85   23.63    0.696  0.60( 0.25) 0.41    1175.7     400.00
      5      443.81   26.40    0.646  0.60( 0.25) 0.41    1236.8     300.00
      6      438.25   26.88    0.638  0.60( 0.25) 0.41    1245.9     430.00
      7      437.09   26.98    0.637  0.60( 0.25) 0.41    1247.9     320.00
      8      324.81   43.35    0.491  0.60( 0.26) 0.43    1292.3     390.00
    TOTAL AREA(ACRES) =      1292.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      516.54  Tc(MIN.) =   15.311
  EFFECTIVE AREA(ACRES) =    835.00  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =     1292.3
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    331.00 =   13248.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =     1292.3  TC(MIN.) =     15.31
  EFFECTIVE AREA(ACRES) =    835.00  AREA-AVERAGED Fm(INCH/HR)=  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap = 0.412
  PEAK FLOW RATE(CFS)   =     516.54

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      516.54   15.31    0.934  0.60( 0.25) 0.41     835.0     410.00
      2      516.28   17.26    0.868  0.60( 0.25) 0.41     924.4     420.00
      3      494.44   21.62    0.739  0.60( 0.25) 0.41    1109.6     310.00
      4      475.85   23.63    0.696  0.60( 0.25) 0.41    1175.7     400.00
      5      443.81   26.40    0.646  0.60( 0.25) 0.41    1236.8     300.00
      6      438.25   26.88    0.638  0.60( 0.25) 0.41    1245.9     430.00
      7      437.09   26.98    0.637  0.60( 0.25) 0.41    1247.9     320.00
      8      324.81   43.35    0.491  0.60( 0.26) 0.43    1292.3     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 1237

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED C                            *
* PHASED NO PA45 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL            *
* 5-YR EV DEC 2022 ROKAMOTO                                                *
 ****************************************************************************

  FILE NAME: 3C05EVRL.DAT
  TIME/DATE OF STUDY: 12:33 12/02/2022
============================================================================
  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    0.200/0.200/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.200/0.200/ ---    0.33    1.00 0.3120 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) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    644.00  DOWNSTREAM(FEET) =    641.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.438
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.081
  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
  "11+ DWELLINGS/ACRE"       -        1.60      0.50     0.200    56    8.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.85
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      2.85

****************************************************************************
  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) =  641.00  DOWNSTREAM ELEVATION(FEET) =  637.00
  STREET LENGTH(FEET) =   470.00   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) =       5.85
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   11.37
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.17
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
  STREET FLOW TRAVEL TIME(MIN.) =   3.61   Tc(MIN.) =   12.05
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.601
  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             -        4.30      0.50      0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.198
  SUBAREA AREA(ACRES) =    4.40      SUBAREA RUNOFF(CFS) =    5.95
  EFFECTIVE AREA(ACRES) =      6.00    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.0        PEAK FLOW RATE(CFS) =       8.11

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.16
  FLOW VELOCITY(FEET/SEC.) =  2.33   DEPTH*VELOCITY(FT*FT/SEC.) =   0.93
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     800.00 FEET.

****************************************************************************
  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) =   637.00  DOWNSTREAM(FEET) =   634.00
  FLOW LENGTH(FEET) =   563.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.99
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.11
  PIPE TRAVEL TIME(MIN.) =   1.88    Tc(MIN.) =   13.93
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =    1363.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.93
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.421
  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               -        2.40      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) =    8.00      SUBAREA RUNOFF(CFS) =    9.51
  EFFECTIVE AREA(ACRES) =     14.00   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       14.0       PEAK FLOW RATE(CFS) =      16.64

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 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) =   630.00
  FLOW LENGTH(FEET) =  1072.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.6 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.12
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.64
  PIPE TRAVEL TIME(MIN.) =   3.49    Tc(MIN.) =   17.41
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =    2435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.41
  *   5 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               -        2.90      0.50      0.100     -
  USER-DEFINED               -        4.50      0.50      0.100     -
  USER-DEFINED               -        0.10      0.50      0.850     -
  USER-DEFINED               -        5.70      0.50      0.200     -
  USER-DEFINED               -        2.40      0.50      0.200     -
  USER-DEFINED               -        0.50      0.50      0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.164
  SUBAREA AREA(ACRES) =   16.10      SUBAREA RUNOFF(CFS) =   16.58
  EFFECTIVE AREA(ACRES) =     30.10   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       30.1       PEAK FLOW RATE(CFS) =      30.77

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.41
  *   5 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               -        5.70      0.50      0.600     -
  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) =   12.40      SUBAREA RUNOFF(CFS) =   10.34
  EFFECTIVE AREA(ACRES) =     42.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       42.5       PEAK FLOW RATE(CFS) =      41.11

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 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) =   630.00  DOWNSTREAM(FEET) =   610.00
  FLOW LENGTH(FEET) =  1290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.08
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.11
  PIPE TRAVEL TIME(MIN.) =   1.94    Tc(MIN.) =   19.36
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =    3725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.36
  *   5 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               -        1.00      0.50     0.100     -
  USER-DEFINED               -        0.90      0.50     0.100     -
  USER-DEFINED               -        0.60      0.50     0.200     -
  USER-DEFINED               -        0.10      0.50     0.200     -
  USER-DEFINED               -        0.10      0.50     0.600     -
  USER-DEFINED               -        0.50      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.216
  SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    3.01
  EFFECTIVE AREA(ACRES) =     45.70   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       45.7       PEAK FLOW RATE(CFS) =      41.29

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  3668.00
  ELEVATION DATA: UPSTREAM(FEET) =    663.00  DOWNSTREAM(FEET) =    610.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   18.909
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.169
  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                 -        1.70      0.50     0.100    56   18.91
  COMMERCIAL                 -        4.40      0.50     0.100    56   18.91
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        0.60      0.50     0.200    56   20.15
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        1.30      0.50     0.200    56   20.15
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       -        7.10      0.50     0.600    56   25.63
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       -        2.80      0.50     0.600    56   25.63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.387
  SUBAREA AREA(ACRES) =   17.90   INITIAL SUBAREA RUNOFF(CFS) =   15.72

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
```



```
  MAINLINE Tc(MIN.) =   19.36
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.152
  SUBAREA AREA(ACRES) =   17.90      SUBAREA RUNOFF(CFS) =   15.45
  EFFECTIVE AREA(ACRES) =     63.60   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =       63.6       PEAK FLOW RATE(CFS) =      56.74

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    317.00 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) =   535.00
  FLOW LENGTH(FEET) =  1537.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.40
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      56.74
  PIPE TRAVEL TIME(MIN.) =   1.39    Tc(MIN.) =   20.75
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    317.00 =    5262.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.75
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.106
  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     0.100     -
  USER-DEFINED               -        0.40      0.50     0.100     -
  USER-DEFINED               -        0.10      0.50     0.850     -
  USER-DEFINED               -        0.20      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.139
  SUBAREA AREA(ACRES) =    4.00      SUBAREA RUNOFF(CFS) =    3.73
  EFFECTIVE AREA(ACRES) =     67.60   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       67.6       PEAK FLOW RATE(CFS) =      57.84

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 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.) =   20.75
  RAINFALL INTENSITY(INCH/HR) =   1.11
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.31
  EFFECTIVE STREAM AREA(ACRES) =      67.60
  TOTAL STREAM AREA(ACRES) =      67.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      57.84
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 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) =    629.00  DOWNSTREAM(FEET) =    625.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.474
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.257
  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                 -        0.10      0.50     0.100    56    7.47
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        1.10      0.50     0.200    56    7.97
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        0.20      0.50     0.200    56    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.193
  SUBAREA RUNOFF(CFS) =      2.72
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      2.72

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  625.00  DOWNSTREAM ELEVATION(FEET) =  623.00
  STREET LENGTH(FEET) =   300.00   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) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.21
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.89
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   2.65   Tc(MIN.) =   10.12
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.785
  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     0.100     -
```



```
  USER-DEFINED               -        0.70      0.50     0.200     -
  USER-DEFINED               -        0.50      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.141
  SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    4.47
  EFFECTIVE AREA(ACRES) =      4.30    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        4.3        PEAK FLOW RATE(CFS) =       6.60

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.70
  FLOW VELOCITY(FEET/SEC.) =  2.02   DEPTH*VELOCITY(FT*FT/SEC.) =   0.79
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    312.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    313.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   623.00  DOWNSTREAM(FEET) =   620.00
  FLOW LENGTH(FEET) =   369.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.56
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.60
  PIPE TRAVEL TIME(MIN.) =   1.11    Tc(MIN.) =   11.23
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    313.00 =     999.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.23
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.679
  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     0.100     -
  USER-DEFINED               -        2.50      0.50     0.100     -
  USER-DEFINED               -        0.80      0.50     0.200     -
  USER-DEFINED               -        0.70      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.125
  SUBAREA AREA(ACRES) =    5.90      SUBAREA RUNOFF(CFS) =    8.58
  EFFECTIVE AREA(ACRES) =     10.20   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =       10.2       PEAK FLOW RATE(CFS) =      14.78

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    314.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   620.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =   338.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.46
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.78
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =   11.90
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    314.00 =    1337.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    314.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.90
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.615
  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     0.100     -
  USER-DEFINED               -        0.10      0.50     0.100     -
  USER-DEFINED               -        0.20      0.50     0.850     -
  USER-DEFINED               -        6.10      0.50     0.200     -
  USER-DEFINED               -        6.10      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.208
  SUBAREA AREA(ACRES) =   12.70      SUBAREA RUNOFF(CFS) =   17.27
  EFFECTIVE AREA(ACRES) =     22.90   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       22.9       PEAK FLOW RATE(CFS) =      31.46

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    315.00 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) =   600.00
  FLOW LENGTH(FEET) =   578.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.47
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.46
  PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =   12.67
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    315.00 =    1915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    315.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.67
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.541
  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     -
  USER-DEFINED               -        1.30      0.50     0.100     -
  USER-DEFINED               -        3.00      0.50     0.200     -
  USER-DEFINED               -        2.10      0.50     0.200     -
```



```
  USER-DEFINED               -        3.70      0.50     0.500     -
  USER-DEFINED               -        6.00      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.347
  SUBAREA AREA(ACRES) =   17.80      SUBAREA RUNOFF(CFS) =   21.91
  EFFECTIVE AREA(ACRES) =     40.70   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.25
  TOTAL AREA(ACRES) =       40.7       PEAK FLOW RATE(CFS) =      51.85

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    316.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   600.00  DOWNSTREAM(FEET) =   569.00
  FLOW LENGTH(FEET) =  2176.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.35
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      51.85
  PIPE TRAVEL TIME(MIN.) =   3.20    Tc(MIN.) =   15.86
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    316.00 =    4091.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    316.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.86
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.285
  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               -        0.30      0.50     0.900     -
  USER-DEFINED               -        6.80      0.50     0.500     -
  USER-DEFINED               -       19.10      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) =   26.60      SUBAREA RUNOFF(CFS) =   24.78
  EFFECTIVE AREA(ACRES) =     67.30   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =       67.3       PEAK FLOW RATE(CFS) =      67.25

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    317.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   569.00  DOWNSTREAM(FEET) =   535.00
  FLOW LENGTH(FEET) =   759.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.71
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      67.25
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   16.54
```

```
 LONGEST FLOWPATH FROM NODE    310.00 TO NODE    317.00 =    4850.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.54
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.259
 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               -        0.10      0.50     0.100     -
 USER-DEFINED               -        0.70      0.50     0.900     -
 USER-DEFINED               -        8.90      0.50     0.500     -
 USER-DEFINED               -        7.40      0.50     0.500     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.505
 SUBAREA AREA(ACRES) =   17.50      SUBAREA RUNOFF(CFS) =   15.86
 EFFECTIVE AREA(ACRES) =     84.80   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.38
 TOTAL AREA(ACRES) =       84.8       PEAK FLOW RATE(CFS) =      81.55

****************************************************************************
 FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 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.) =   16.54
 RAINFALL INTENSITY(INCH/HR) =   1.26
 AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.50
 AREA-AVERAGED Ap =  0.38
 EFFECTIVE STREAM AREA(ACRES) =      84.80
 TOTAL STREAM AREA(ACRES) =      84.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      81.55

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       57.84   20.75    1.106  0.50( 0.16) 0.31      67.6     300.00
     2       81.55   16.54    1.259  0.50( 0.19) 0.38      84.8     310.00

 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      135.09   16.54    1.259  0.50( 0.18) 0.35     138.7     310.00
     2      127.72   20.75    1.106  0.50( 0.18) 0.35     152.4     300.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     135.09    Tc(MIN.) =    16.54
```



```
 EFFECTIVE AREA(ACRES) =     138.69   AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.35
 TOTAL AREA(ACRES) =      152.4
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    317.00 =    5262.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    317.00 TO NODE    307.00 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) =   374.00
 FLOW LENGTH(FEET) =  3798.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  21.77
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     135.09
 PIPE TRAVEL TIME(MIN.) =   2.91    Tc(MIN.) =   19.45
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    307.00 =    9060.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.45
 *   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               -        0.10      0.50     0.200     -
 USER-DEFINED               -        1.40      0.50     0.100     -
 USER-DEFINED               -        4.80      0.50     0.100     -
 USER-DEFINED               -        5.00      0.50     0.100     -
 USER-DEFINED               -        3.70      0.50     0.100     -
 USER-DEFINED               -        5.00      0.50     0.850     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.288
 SUBAREA AREA(ACRES) =   20.00      SUBAREA RUNOFF(CFS) =   18.09
 EFFECTIVE AREA(ACRES) =    158.69   AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.35
 TOTAL AREA(ACRES) =      172.4       PEAK FLOW RATE(CFS) =     139.38

****************************************************************************
 FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.45
 *   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               -        4.00      0.50     0.200     -
 USER-DEFINED               -       12.70      0.50     0.200     -
 USER-DEFINED               -        1.10      0.50     0.900     -
 USER-DEFINED               -        1.50      0.50     0.900     -
 USER-DEFINED               -        2.50      0.50     0.900     -
```

```
  USER-DEFINED               -        0.10      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.364
  SUBAREA AREA(ACRES) =   21.90      SUBAREA RUNOFF(CFS) =   19.05
  EFFECTIVE AREA(ACRES) =    180.59   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      194.3       PEAK FLOW RATE(CFS) =     158.44

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.45
  *   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               -        4.50      0.50     0.500     -
  USER-DEFINED               -        1.40      0.50     0.500     -
  USER-DEFINED               -        2.20      0.50     0.600     -
  USER-DEFINED               -        6.80      0.50     0.600     -
  USER-DEFINED               -        7.90      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.574
  SUBAREA AREA(ACRES) =   22.80      SUBAREA RUNOFF(CFS) =   17.68
  EFFECTIVE AREA(ACRES) =    203.39   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      217.1       PEAK FLOW RATE(CFS) =     176.12

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 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) =   374.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =   847.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  26.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.95
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     176.12
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   19.94
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    330.00 =    9907.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   19.94
  RAINFALL INTENSITY(INCH/HR) =   1.13
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.37
  EFFECTIVE STREAM AREA(ACRES) =     203.39
```



```
  TOTAL STREAM AREA(ACRES) =     217.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     176.12

****************************************************************************
  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) =    636.00  DOWNSTREAM(FEET) =    633.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.438
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.081
  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
  "11+ DWELLINGS/ACRE"       -        2.80      0.50     0.200    56    8.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.99
  TOTAL AREA(ACRES) =      2.80   PEAK FLOW RATE(CFS) =      4.99

****************************************************************************
  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) =  633.00  DOWNSTREAM ELEVATION(FEET) =  628.00
  STREET LENGTH(FEET) =   360.00   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) =      10.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
  STREET FLOW TRAVEL TIME(MIN.) =   2.01   Tc(MIN.) =   10.45
  *   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     0.100     -
  USER-DEFINED               -        6.30      0.50     0.200     -
  USER-DEFINED               -        0.20      0.50     0.200     -
```

```
  USER-DEFINED               -        0.70      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.237
  SUBAREA AREA(ACRES) =    7.30      SUBAREA RUNOFF(CFS) =   10.74
  EFFECTIVE AREA(ACRES) =     10.10    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.23
  TOTAL AREA(ACRES) =       10.1        PEAK FLOW RATE(CFS) =      14.91

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.35
  FLOW VELOCITY(FEET/SEC.) =  3.24   DEPTH*VELOCITY(FT*FT/SEC.) =   1.42
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    322.00 =     690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    323.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   628.00  DOWNSTREAM(FEET) =   624.00
  FLOW LENGTH(FEET) =   750.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.68
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.91
  PIPE TRAVEL TIME(MIN.) =   2.20    Tc(MIN.) =   12.65
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    323.00 =    1440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.65
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.543
  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     0.850     -
  USER-DEFINED                -        2.10      0.50     0.850     -
  USER-DEFINED                -        5.60      0.50     0.200     -
  USER-DEFINED                -        0.90      0.50     0.200     -
  USER-DEFINED                -        3.10      0.50     0.600     -
  USER-DEFINED                -        0.30      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) =   14.00      SUBAREA RUNOFF(CFS) =   16.37
  EFFECTIVE AREA(ACRES) =     24.10   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       24.1       PEAK FLOW RATE(CFS) =      29.36

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.65
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.543
```



```
  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     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.13
  EFFECTIVE AREA(ACRES) =     24.20   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       24.2       PEAK FLOW RATE(CFS) =      29.49

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    324.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   624.00  DOWNSTREAM(FEET) =   614.00
  FLOW LENGTH(FEET) =   887.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.92
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.49
  PIPE TRAVEL TIME(MIN.) =   1.66    Tc(MIN.) =   14.31
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    324.00 =    2327.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.31
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.384
  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                -        1.10      0.50     0.100     -
  USER-DEFINED                -        3.10      0.50     0.850     -
  USER-DEFINED                -        2.60      0.50     0.850     -
  USER-DEFINED                -        4.80      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 =  0.416
  SUBAREA AREA(ACRES) =   16.10      SUBAREA RUNOFF(CFS) =   17.04
  EFFECTIVE AREA(ACRES) =     40.30   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       40.3       PEAK FLOW RATE(CFS) =      43.07

****************************************************************************
  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) =   614.00  DOWNSTREAM(FEET) =   571.00
  FLOW LENGTH(FEET) =  1805.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.0 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.98
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.07
  PIPE TRAVEL TIME(MIN.) =   2.32    Tc(MIN.) =   16.63
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    325.00 =    4132.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    325.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.63
  *   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               -        3.10      0.50     0.200     -
  USER-DEFINED               -        5.00      0.50     0.200     -
  USER-DEFINED               -        0.20      0.50     0.900     -
  USER-DEFINED               -        1.20      0.50     0.900     -
  USER-DEFINED               -       13.90      0.50     0.500     -
  USER-DEFINED               -       18.60      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =   42.00      SUBAREA RUNOFF(CFS) =   38.87
  EFFECTIVE AREA(ACRES) =     82.30   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       82.3       PEAK FLOW RATE(CFS) =      77.30

****************************************************************************
  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) =   571.00  DOWNSTREAM(FEET) =   497.00
  FLOW LENGTH(FEET) =  1090.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.74
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      77.30
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   17.43
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    326.00 =    5222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.43
  *   5 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      0.50     0.100     -
  USER-DEFINED               -        6.10      0.50     0.100     -
  USER-DEFINED               -       12.90      0.50     0.100     -
  USER-DEFINED               -        0.30      0.50     0.200     -
```



```
  USER-DEFINED               -        0.90      0.50     0.900     -
  USER-DEFINED               -       12.80      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) =   34.00      SUBAREA RUNOFF(CFS) =   31.03
  EFFECTIVE AREA(ACRES) =    116.30   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      116.3       PEAK FLOW RATE(CFS) =     106.09

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.43
  *   5 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               -       23.20      0.50     0.900     -
  USER-DEFINED               -        0.30      0.50     0.500     -
  USER-DEFINED               -        0.30      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.890
  SUBAREA AREA(ACRES) =   23.80      SUBAREA RUNOFF(CFS) =   16.72
  EFFECTIVE AREA(ACRES) =    140.10   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      140.1       PEAK FLOW RATE(CFS) =     122.81

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    327.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =  1732.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.53
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     122.81
  PIPE TRAVEL TIME(MIN.) =   1.56    Tc(MIN.) =   18.98
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    327.00 =    6954.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.98
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.167
  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               -        4.80      0.50     0.100     -
  USER-DEFINED               -        0.10      0.50     0.850     -
  USER-DEFINED               -        6.30      0.50     0.850     -
```

```
  USER-DEFINED               -        5.00      0.50     0.200     -
  USER-DEFINED               -       43.30      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.250
  SUBAREA AREA(ACRES) =   64.30      SUBAREA RUNOFF(CFS) =   60.28
  EFFECTIVE AREA(ACRES) =    204.40   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      204.4       PEAK FLOW RATE(CFS) =     175.62

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.98
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.167
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       38.70      0.50     0.200     -
  USER-DEFINED               -        2.30      0.50     0.900     -
  USER-DEFINED               -        3.60      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.293
  SUBAREA AREA(ACRES) =   44.60      SUBAREA RUNOFF(CFS) =   40.95
  EFFECTIVE AREA(ACRES) =    249.00   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      249.0       PEAK FLOW RATE(CFS) =     216.58

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    328.00 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) =   338.00
  FLOW LENGTH(FEET) =  2664.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.67
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     216.58
  PIPE TRAVEL TIME(MIN.) =   1.88    Tc(MIN.) =   20.86
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    328.00 =    9618.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.86
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.103
  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               -       14.80      0.50     0.200     -
  USER-DEFINED               -        1.90      0.50     0.200     -
  USER-DEFINED               -        9.90      0.50     0.200     -
```



```
  USER-DEFINED               -        1.80      0.50     0.100     -
  USER-DEFINED               -        8.40      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.173
  SUBAREA AREA(ACRES) =   37.30      SUBAREA RUNOFF(CFS) =   34.14
  EFFECTIVE AREA(ACRES) =    286.30   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      286.3       PEAK FLOW RATE(CFS) =     236.52

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.86
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.103
  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     0.100     -
  USER-DEFINED               -       14.00      0.50     0.100     -
  USER-DEFINED               -        1.40      0.50     0.850     -
  USER-DEFINED               -        0.30      0.50     0.850     -
  USER-DEFINED               -        0.20      0.50     0.200     -
  USER-DEFINED               -        0.30      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.156
  SUBAREA AREA(ACRES) =   23.80      SUBAREA RUNOFF(CFS) =   21.96
  EFFECTIVE AREA(ACRES) =    310.10   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      310.1       PEAK FLOW RATE(CFS) =     258.48

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.86
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.103
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       12.20      0.50     0.200     -
  USER-DEFINED               -       17.60      0.50     0.200     -
  USER-DEFINED               -        0.30      0.50     0.900     -
  USER-DEFINED               -        0.90      0.50     0.900     -
  USER-DEFINED               -        9.30      0.50     0.900     -
  USER-DEFINED               -        0.20      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.383
  SUBAREA AREA(ACRES) =   40.50      SUBAREA RUNOFF(CFS) =   33.23
  EFFECTIVE AREA(ACRES) =    350.60   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =      350.6       PEAK FLOW RATE(CFS) =     291.71

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   20.86
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.103
  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     0.500     -
  USER-DEFINED                -       28.30      0.50     0.500     -
  USER-DEFINED                -        3.80      0.50     0.400     -
  USER-DEFINED                -        4.10      0.50     0.400     -
  USER-DEFINED                -        0.30      0.50     0.600     -
  USER-DEFINED                -        0.30      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.483
  SUBAREA AREA(ACRES) =   42.10      SUBAREA RUNOFF(CFS) =   32.65
  EFFECTIVE AREA(ACRES) =    392.70   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      392.7       PEAK FLOW RATE(CFS) =     324.36

********************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    329.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   338.00  DOWNSTREAM(FEET) =   320.00
  FLOW LENGTH(FEET) =  1154.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  47.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.43
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     324.36
  PIPE TRAVEL TIME(MIN.) =   1.04    Tc(MIN.) =   21.90
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    329.00 =   10772.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   21.90
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.073
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -       11.60      0.50     0.100     -
  USER-DEFINED                -        6.70      0.50     0.100     -
  USER-DEFINED                -       12.80      0.50     0.100     -
  USER-DEFINED                -        0.20      0.50     0.900     -
  USER-DEFINED                -        0.20      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.110
  SUBAREA AREA(ACRES) =   31.50      SUBAREA RUNOFF(CFS) =   28.86
  EFFECTIVE AREA(ACRES) =    424.20   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      424.2       PEAK FLOW RATE(CFS) =     342.60

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



```
  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) =   320.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =  1981.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  78.0 INCH PIPE IS  61.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.13
  ESTIMATED PIPE DIAMETER(INCH) =  78.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     342.60
  PIPE TRAVEL TIME(MIN.) =   2.72    Tc(MIN.) =   24.62
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    330.00 =   12753.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   24.62
  RAINFALL INTENSITY(INCH/HR) =   0.99
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.35
  EFFECTIVE STREAM AREA(ACRES) =     424.20
  TOTAL STREAM AREA(ACRES) =     424.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     342.60

********************************************************************************
  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) =   701.00   CHANNEL SLOPE =  0.0357
  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) =  1.151
  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               -       0.20      0.50     1.000     -
  USER-DEFINED               -       5.90      0.50     1.000     -
  USER-DEFINED               -      12.70      0.50     1.000     -
  USER-DEFINED               -       6.80      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) =      40.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.68
  AVERAGE FLOW DEPTH(FEET) =   1.54   TRAVEL TIME(MIN.) =   2.06
  Tc(MIN.) =   19.40
  SUBAREA AREA(ACRES) =    35.10       SUBAREA RUNOFF(CFS) =   20.55
  EFFECTIVE AREA(ACRES) =     81.40     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       81.4         PEAK FLOW RATE(CFS) =      47.66

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.64   FLOW VELOCITY(FEET/SEC.) =   5.93
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    395.00 =    3560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    395.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.40
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.151
  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     0.900     -
  USER-DEFINED               -       2.70      0.50     0.900     -
  USER-DEFINED               -       0.50      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 =  0.914
  SUBAREA AREA(ACRES) =    4.30      SUBAREA RUNOFF(CFS) =    2.68
  EFFECTIVE AREA(ACRES) =     85.70   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       85.7       PEAK FLOW RATE(CFS) =      50.34

****************************************************************************
  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) =   437.00
  FLOW LENGTH(FEET) =  6286.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.15
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.34
  PIPE TRAVEL TIME(MIN.) =   7.96    Tc(MIN.) =   27.36
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    370.00 =    9846.00 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) =    437.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1963.00   CHANNEL SLOPE =  0.0469
  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) =  0.853
  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               -       0.60      0.50     1.000     -
  USER-DEFINED               -       1.50      0.50     0.100     -
  USER-DEFINED               -       0.70      0.50     0.100     -
  USER-DEFINED               -       1.60      0.50     0.100     -
  USER-DEFINED               -       1.10      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.265
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      52.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.70
  AVERAGE FLOW DEPTH(FEET) =   1.61   TRAVEL TIME(MIN.) =   4.88
  Tc(MIN.) =   32.25
  SUBAREA AREA(ACRES) =     6.00       SUBAREA RUNOFF(CFS) =    3.89
  EFFECTIVE AREA(ACRES) =     91.70     AREA-AVERAGED Fm(INCH/HR) =   0.47
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   0.95
  TOTAL AREA(ACRES) =       91.7         PEAK FLOW RATE(CFS) =      50.34
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.59   FLOW VELOCITY(FEET/SEC.) =   6.64
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    371.00 =   11809.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   32.25
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.853
  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             -       2.80      0.50     1.000     -
  USER-DEFINED             -       0.10      0.50     1.000     -
  USER-DEFINED             -       0.40      0.50     1.000     -
  USER-DEFINED             -       0.30      0.50     1.000     -
  USER-DEFINED             -       3.40      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) =    8.40      SUBAREA RUNOFF(CFS) =    2.67
  EFFECTIVE AREA(ACRES) =    100.10   AREA-AVERAGED Fm(INCH/HR) =  0.48
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =      100.1       PEAK FLOW RATE(CFS) =      50.34
  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.) =   32.25
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.853
  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     1.000     -
  USER-DEFINED             -       0.10      0.50     0.850     -
  USER-DEFINED             -       3.80      0.50     0.850     -
  USER-DEFINED             -       2.50      0.50     0.850     -
  USER-DEFINED             -       2.40      0.50     0.900     -
  USER-DEFINED             -       0.70      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.877
  SUBAREA AREA(ACRES) =   10.30      SUBAREA RUNOFF(CFS) =    3.85
  EFFECTIVE AREA(ACRES) =    110.40   AREA-AVERAGED Fm(INCH/HR) =  0.47
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =      110.4       PEAK FLOW RATE(CFS) =      50.34
  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.) =   32.25
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.853
  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     0.900     -
  USER-DEFINED             -       1.10      0.50     0.900     -
  USER-DEFINED             -       0.10      0.50     0.400     -
  USER-DEFINED             -       0.20      0.50     1.000     -
  USER-DEFINED             -       1.90      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.924
  SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =    2.40
  EFFECTIVE AREA(ACRES) =    117.20   AREA-AVERAGED Fm(INCH/HR) =  0.47
```



```
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =      117.2       PEAK FLOW RATE(CFS) =      50.34
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 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) =   345.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =  1065.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.24
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.34
  PIPE TRAVEL TIME(MIN.) =   1.16    Tc(MIN.) =   33.41
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    330.00 =   12874.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   33.41
  RAINFALL INTENSITY(INCH/HR) =   0.84
  AREA-AVERAGED Fm(INCH/HR) =  0.47
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.94
  EFFECTIVE STREAM AREA(ACRES) =     117.20
  TOTAL STREAM AREA(ACRES) =     117.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      50.34

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      176.12   19.94    1.130  0.50( 0.19) 0.37     203.4     310.00
      1      163.11   24.27    1.005  0.50( 0.18) 0.37     217.1     300.00
      2      342.60   24.62    0.995  0.50( 0.18) 0.35     424.2     320.00
      3       50.34   33.41    0.839  0.50( 0.47) 0.94     117.2     390.00

  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      549.77   19.94    1.130  0.50( 0.21) 0.43     616.7     310.00
      2      555.33   24.27    1.005  0.50( 0.21) 0.43     720.2     300.00
      3      554.01   24.62    0.995  0.50( 0.21) 0.43     727.7     320.00
      4      457.63   33.41    0.839  0.50( 0.22) 0.45     758.5     390.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     555.33    Tc(MIN.) =    24.27
  EFFECTIVE AREA(ACRES) =     720.25   AREA-AVERAGED Fm(INCH/HR) =  0.21
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      758.5
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    330.00 =   12874.00 FEET.

****************************************************************************
  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) =   310.00  DOWNSTREAM(FEET) =   280.00
  FLOW LENGTH(FEET) =   374.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  39.03
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     555.33
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   24.43
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    331.00 =   13248.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   24.43
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.001
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       17.50      0.50     0.200     -
  USER-DEFINED               -        1.50      0.50     0.200     -
  USER-DEFINED               -        0.70      0.50     0.200     -
  USER-DEFINED               -        0.10      0.50     1.000     -
  USER-DEFINED               -       44.60      0.50     0.100     -
  USER-DEFINED               -        0.70      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.132
  SUBAREA AREA(ACRES) =   65.10      SUBAREA RUNOFF(CFS) =   54.76
  EFFECTIVE AREA(ACRES) =    785.35   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      823.6       PEAK FLOW RATE(CFS) =     564.90

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      568.41   20.10    1.125  0.50( 0.20) 0.40     681.8     310.00
      2      564.90   24.43    1.001  0.50( 0.20) 0.40     785.3     300.00
      3      562.72   24.78    0.990  0.50( 0.20) 0.40     792.8     320.00
      4      463.19   33.58    0.837  0.50( 0.21) 0.42     823.6     390.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     568.41  Tc(MIN.) =   20.10
  AREA-AVERAGED Fm(INCH/HR) =  0.20  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.40  EFFECTIVE AREA(ACRES) =     681.85

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   20.10
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.125
  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     0.100     -
  USER-DEFINED               -        4.10      0.50     0.100     -
  USER-DEFINED               -        0.10      0.50     1.000     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.115
  SUBAREA AREA(ACRES) =    6.20      SUBAREA RUNOFF(CFS) =    5.96
  EFFECTIVE AREA(ACRES) =    688.05   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      829.8       PEAK FLOW RATE(CFS) =     574.37

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  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) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =    618.00  DOWNSTREAM(FEET) =    590.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.048
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.516
  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
  "8-10 DWELLINGS/ACRE"      -        1.20      0.50     0.400    56    6.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      2.50
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      2.50

****************************************************************************
  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) =  590.00  DOWNSTREAM ELEVATION(FEET) =  588.00
  STREET LENGTH(FEET) =   274.00   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) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
  STREET FLOW TRAVEL TIME(MIN.) =   2.03   Tc(MIN.) =    8.07
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.147
  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     0.600     -
  USER-DEFINED               -        4.40      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.486
  SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =   13.20
  EFFECTIVE AREA(ACRES) =      8.90    AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        8.9        PEAK FLOW RATE(CFS) =      15.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.77
  FLOW VELOCITY(FEET/SEC.) =  2.54   DEPTH*VELOCITY(FT*FT/SEC.) =   1.22
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     588.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   588.00  DOWNSTREAM(FEET) =   581.00
  FLOW LENGTH(FEET) =   805.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.02
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.30
  PIPE TRAVEL TIME(MIN.) =   1.91    Tc(MIN.) =    9.99
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1393.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.99
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.800
```



```
  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               -        2.00      0.50     0.900     -
  USER-DEFINED               -        8.80      0.50     0.600     -
  USER-DEFINED               -        0.10      0.50     0.400     -
  USER-DEFINED               -        4.90      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.577
  SUBAREA AREA(ACRES) =   15.90      SUBAREA RUNOFF(CFS) =   21.62
  EFFECTIVE AREA(ACRES) =     24.80   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       24.8       PEAK FLOW RATE(CFS) =      34.13

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 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.) =    9.99
  RAINFALL INTENSITY(INCH/HR) =   1.80
  AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =      24.80
  TOTAL STREAM AREA(ACRES) =      24.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.13

****************************************************************************
  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) =    725.00  DOWNSTREAM(FEET) =    630.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.196
  *   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"     -        0.10      0.50     1.000    56    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        1.30      0.50     1.000    56    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        0.10      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) =      1.95
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      1.95

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

```
 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) =  1.833
 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               -        1.70      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) =       3.09
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.37
 AVERAGE FLOW DEPTH(FEET) =   0.44   TRAVEL TIME(MIN.) =   0.61
 Tc(MIN.) =    9.80
 SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    2.28
 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) =       4.08

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   5.77
 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) =    582.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   520.00   CHANNEL SLOPE =  0.0288
 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) =  1.573
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        3.70      0.50     1.000     -
 USER-DEFINED               -        1.20      0.50     0.900     -
 USER-DEFINED               -        1.20      0.50     0.600     -
 USER-DEFINED               -        0.30      0.50     1.000     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.906
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.32
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.43
 AVERAGE FLOW DEPTH(FEET) =   0.84   TRAVEL TIME(MIN.) =   2.53
 Tc(MIN.) =   12.33
 SUBAREA AREA(ACRES) =     6.40       SUBAREA RUNOFF(CFS) =    6.45
 EFFECTIVE AREA(ACRES) =      9.80     AREA-AVERAGED Fm(INCH/HR) =   0.47
 AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   0.94
```



```
 TOTAL AREA(ACRES) =        9.8         PEAK FLOW RATE(CFS) =       9.74

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.94   FLOW VELOCITY(FEET/SEC.) =   3.66
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.00 =    1045.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    433.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   582.00  DOWNSTREAM(FEET) =   581.00
 FLOW LENGTH(FEET) =    10.00   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.) =  15.71
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.74
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   12.34
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    403.00 =    1055.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 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.) =   12.34
 RAINFALL INTENSITY(INCH/HR) =   1.57
 AREA-AVERAGED Fm(INCH/HR) =  0.47
 AREA-AVERAGED Fp(INCH/HR) =  0.50
 AREA-AVERAGED Ap =  0.94
 EFFECTIVE STREAM AREA(ACRES) =       9.80
 TOTAL STREAM AREA(ACRES) =       9.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.74

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       34.13    9.99    1.800  0.50( 0.27) 0.54      24.8     400.00
     2        9.74   12.34    1.572  0.50( 0.47) 0.94       9.8     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       43.63    9.99    1.800  0.50( 0.32) 0.64      32.7     400.00
     2       38.80   12.34    1.572  0.50( 0.33) 0.65      34.6     430.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      43.63    Tc(MIN.) =     9.99
 EFFECTIVE AREA(ACRES) =      32.73   AREA-AVERAGED Fm(INCH/HR) =  0.32
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.64
```

```
  TOTAL AREA(ACRES) =       34.6
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1393.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 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) =   581.00  DOWNSTREAM(FEET) =   570.00
  FLOW LENGTH(FEET) =  1056.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.68
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.63
  PIPE TRAVEL TIME(MIN.) =   1.82    Tc(MIN.) =   11.80
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =    2449.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.80
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.624
  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     0.100     -
  USER-DEFINED               -        0.10      0.50     1.000     -
  USER-DEFINED               -        4.90      0.50     0.900     -
  USER-DEFINED               -        1.50      0.50     0.900     -
  USER-DEFINED               -        1.00      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.842
  SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =    8.34
  EFFECTIVE AREA(ACRES) =     40.43   AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =       42.3       PEAK FLOW RATE(CFS) =      46.80

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.80
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.624
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        8.80      0.50     0.500     -
  USER-DEFINED               -        4.20      0.50     0.500     -
  USER-DEFINED               -        1.10      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.492
  SUBAREA AREA(ACRES) =   14.10      SUBAREA RUNOFF(CFS) =   17.49
  EFFECTIVE AREA(ACRES) =     54.53   AREA-AVERAGED Fm(INCH/HR) =  0.31
```



```
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =       56.4       PEAK FLOW RATE(CFS) =      64.28

****************************************************************************
  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) =   570.00  DOWNSTREAM(FEET) =   565.00
  FLOW LENGTH(FEET) =  1526.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.78
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.28
  PIPE TRAVEL TIME(MIN.) =   3.75    Tc(MIN.) =   15.56
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    405.00 =    3975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.56
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.297
  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               -        1.80      0.50     0.850     -
  USER-DEFINED               -        0.40      0.50     0.850     -
  USER-DEFINED               -        1.80      0.50     0.900     -
  USER-DEFINED               -        2.80      0.50     0.900     -
  USER-DEFINED               -        6.10      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.698
  SUBAREA AREA(ACRES) =   13.00      SUBAREA RUNOFF(CFS) =   11.09
  EFFECTIVE AREA(ACRES) =     67.53   AREA-AVERAGED Fm(INCH/HR) =  0.32
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =       69.4       PEAK FLOW RATE(CFS) =      64.28
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.56
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.297
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       11.20      0.50     0.500     -
  USER-DEFINED               -        7.80      0.50     0.400     -
  USER-DEFINED               -        1.40      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =   20.40      SUBAREA RUNOFF(CFS) =   19.63
```

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  EFFECTIVE AREA(ACRES) =     87.93   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       89.8       PEAK FLOW RATE(CFS) =      78.94

****************************************************************************
  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) =   565.00  DOWNSTREAM(FEET) =   495.00
  FLOW LENGTH(FEET) =  2168.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.11
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      78.94
  PIPE TRAVEL TIME(MIN.) =   2.11    Tc(MIN.) =   17.67
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    406.00 =    6143.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.67
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.217
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.50      0.50     0.100     -
  USER-DEFINED               -        1.90      0.50     0.100     -
  USER-DEFINED               -        2.50      0.50     0.850     -
  USER-DEFINED               -        0.90      0.50     0.850     -
  USER-DEFINED               -       36.40      0.50     0.200     -
  USER-DEFINED               -       13.60      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.224
  SUBAREA AREA(ACRES) =   60.80      SUBAREA RUNOFF(CFS) =   60.44
  EFFECTIVE AREA(ACRES) =    148.73   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      150.6       PEAK FLOW RATE(CFS) =     133.03

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.67
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.217
  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     0.900     -
  USER-DEFINED               -        2.10      0.50     0.900     -
  USER-DEFINED               -        0.10      0.50     0.600     -
  USER-DEFINED               -        0.30      0.50     0.500     -
  USER-DEFINED               -        0.10      0.50     0.500     -
  USER-DEFINED               -        0.10      0.50     0.400     -
```



```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.868
  SUBAREA AREA(ACRES) =    7.40      SUBAREA RUNOFF(CFS) =    5.21
  EFFECTIVE AREA(ACRES) =    156.13   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =      158.0       PEAK FLOW RATE(CFS) =     138.24

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.67
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.217
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        9.30      0.50     0.400     -
  USER-DEFINED               -        0.90      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =    9.33
  EFFECTIVE AREA(ACRES) =    166.33   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      168.2       PEAK FLOW RATE(CFS) =     147.57

****************************************************************************
  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) =   495.00  DOWNSTREAM(FEET) =   395.00
  FLOW LENGTH(FEET) =  2905.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.59
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     147.57
  PIPE TRAVEL TIME(MIN.) =   2.35    Tc(MIN.) =   20.02
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    407.00 =    9048.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.02
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.127
  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     0.200     -
  USER-DEFINED               -        0.60      0.50     0.100     -
  USER-DEFINED               -        9.10      0.50     0.100     -
  USER-DEFINED               -        6.70      0.50     0.100     -
  USER-DEFINED               -        0.50      0.50     0.850     -
  USER-DEFINED               -        2.60      0.50     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.219
  SUBAREA AREA(ACRES) =   19.80      SUBAREA RUNOFF(CFS) =   18.14
  EFFECTIVE AREA(ACRES) =    186.13   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      188.0       PEAK FLOW RATE(CFS) =     152.37

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.02
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.127
  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     0.200     -
  USER-DEFINED               -        2.40      0.50     0.200     -
  USER-DEFINED               -       10.60      0.50     0.200     -
  USER-DEFINED               -        0.60      0.50     0.200     -
  USER-DEFINED               -        1.90      0.50     0.900     -
  USER-DEFINED               -        0.70      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.308
  SUBAREA AREA(ACRES) =   16.80      SUBAREA RUNOFF(CFS) =   14.72
  EFFECTIVE AREA(ACRES) =    202.93   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      204.8       PEAK FLOW RATE(CFS) =     167.08

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.02
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.127
  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     0.600     -
  USER-DEFINED               -       15.30      0.50     0.600     -
  USER-DEFINED               -        0.40      0.50     0.500     -
  USER-DEFINED               -        1.50      0.50     0.500     -
  USER-DEFINED               -        5.10      0.50     0.500     -
  USER-DEFINED               -        0.90      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.579
  SUBAREA AREA(ACRES) =   37.50      SUBAREA RUNOFF(CFS) =   28.28
  EFFECTIVE AREA(ACRES) =    240.43   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      242.3       PEAK FLOW RATE(CFS) =     195.36

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.02
```



```
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.127
  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               -        8.40      0.50     0.400     -
  USER-DEFINED               -        2.80      0.50     0.400     -
  USER-DEFINED               -        0.60      0.50     0.600     -
  USER-DEFINED               -        1.50      0.50     0.600     -
  USER-DEFINED               -        3.50      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =   20.30      SUBAREA RUNOFF(CFS) =   16.44
  EFFECTIVE AREA(ACRES) =    260.73   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      262.6       PEAK FLOW RATE(CFS) =     211.80

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    430.00 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) =   372.00
  FLOW LENGTH(FEET) =   661.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.09
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     211.80
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   20.52
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    411.00 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) =    535.00  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.368
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.458
  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"         -        0.50      0.50     0.900    56    7.53
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       -        0.20      0.50     0.600    56    6.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.814
  SUBAREA RUNOFF(CFS) =      1.29
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      1.29

****************************************************************************
  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) =   495.00  DOWNSTREAM(FEET) =   490.00
  FLOW LENGTH(FEET) =   267.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.86
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.29
  PIPE TRAVEL TIME(MIN.) =   0.91    Tc(MIN.) =    7.28
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    412.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.28
  *   5 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
  USER-DEFINED               -        0.90      0.50     0.900     -
  USER-DEFINED               -        0.30      0.50     0.900     -
  USER-DEFINED               -        0.10      0.50     0.600     -
  USER-DEFINED               -        0.10      0.50     0.500     -
  USER-DEFINED               -        0.30      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.788
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    2.90
  EFFECTIVE AREA(ACRES) =      2.40   AREA-AVERAGED Fm(INCH/HR) =  0.40
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        2.4       PEAK FLOW RATE(CFS) =       4.09

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    413.00 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) =   480.00
  FLOW LENGTH(FEET) =   520.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.81
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.09
  PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =    8.56
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    413.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    413.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.56
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.060
  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               -        0.40      0.50     0.900     -
  USER-DEFINED               -        0.40      0.50     0.500     -
  USER-DEFINED               -        0.30      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.810
  SUBAREA AREA(ACRES) =    3.10      SUBAREA RUNOFF(CFS) =    4.62
  EFFECTIVE AREA(ACRES) =      5.50   AREA-AVERAGED Fm(INCH/HR) =  0.40
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        5.5       PEAK FLOW RATE(CFS) =       8.21

****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    414.00 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) =   470.00
  FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.21
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    414.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.08
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.965
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.50      0.50     0.100     -
  USER-DEFINED               -        0.10      0.50     0.100     -
  USER-DEFINED               -        2.80      0.50     0.900     -
  USER-DEFINED               -        1.00      0.50     0.900     -
  USER-DEFINED               -        0.20      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 =  0.654
  SUBAREA AREA(ACRES) =    5.70      SUBAREA RUNOFF(CFS) =    8.40
  EFFECTIVE AREA(ACRES) =     11.20   AREA-AVERAGED Fm(INCH/HR) =  0.36
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       11.2       PEAK FLOW RATE(CFS) =      16.14

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.08
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.965
  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      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.17
  EFFECTIVE AREA(ACRES) =     11.30   AREA-AVERAGED Fm(INCH/HR) =  0.36
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       11.3       PEAK FLOW RATE(CFS) =      16.31

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 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) =   470.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =   528.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.47
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.31
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =    9.73
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    415.00 =    1953.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    415.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.73
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.846
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        0.90      0.50     0.100     -
  USER-DEFINED               -        0.60      0.50     0.100     -
  USER-DEFINED               -        6.30      0.50     0.500     -
  USER-DEFINED               -        3.70      0.50     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.448
  SUBAREA AREA(ACRES) =   11.50      SUBAREA RUNOFF(CFS) =   16.79
```



```
  EFFECTIVE AREA(ACRES) =     22.80   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       22.8       PEAK FLOW RATE(CFS) =      31.89

****************************************************************************
  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) =   445.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =   650.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  17.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.31
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.89
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   10.44
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    416.00 =    2603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.44
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.755
  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     0.200     -
  USER-DEFINED               -       10.90      0.50     0.200     -
  USER-DEFINED               -        1.30      0.50     0.100     -
  USER-DEFINED               -        1.30      0.50     0.100     -
  USER-DEFINED               -        1.10      0.50     0.200     -
  USER-DEFINED               -        7.00      0.50     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.189
  SUBAREA AREA(ACRES) =   23.20      SUBAREA RUNOFF(CFS) =   34.67
  EFFECTIVE AREA(ACRES) =     46.00   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       46.0       PEAK FLOW RATE(CFS) =      64.69

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.44
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.755
  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     0.600     -
  USER-DEFINED               -        4.90      0.50     0.500     -
  USER-DEFINED               -        9.30      0.50     0.500     -
  USER-DEFINED               -        0.30      0.50     0.400     -
  USER-DEFINED               -        0.10      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =   15.00      SUBAREA RUNOFF(CFS) =   20.32
  EFFECTIVE AREA(ACRES) =     61.00   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       61.0       PEAK FLOW RATE(CFS) =      85.01

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 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.) =   10.44
  RAINFALL INTENSITY(INCH/HR) =   1.76
  AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.41
  EFFECTIVE STREAM AREA(ACRES) =      61.00
  TOTAL STREAM AREA(ACRES) =      61.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      85.01

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    421.00 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) =    535.00  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.368
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.458
  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"          -        0.70      0.50     0.900    56    7.53
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        -        0.20      0.50     0.600    56    6.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.833
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    422.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   487.00
  FLOW LENGTH(FEET) =   308.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.86
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```



```
  PIPE-FLOW(CFS) =       1.65
  PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =    7.24
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    422.00 =     636.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    422.00 TO NODE    422.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.24
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.299
  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                -        0.50      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.817
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    3.06
  EFFECTIVE AREA(ACRES) =      2.70   AREA-AVERAGED Fm(INCH/HR) =  0.41
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =        2.7       PEAK FLOW RATE(CFS) =       4.59

****************************************************************************
  FLOW PROCESS FROM NODE    422.00 TO NODE    423.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =   373.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.59
  PIPE TRAVEL TIME(MIN.) =   0.81    Tc(MIN.) =    8.06
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    423.00 =    1009.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    423.00 TO NODE    423.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.06
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.150
  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     0.900     -
  USER-DEFINED                -        1.20      0.50     0.900     -
  USER-DEFINED                -        0.20      0.50     0.900     -
  USER-DEFINED                -        0.40      0.50     0.600     -
  USER-DEFINED                -        1.70      0.50     0.600     -
  USER-DEFINED                -        0.10      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.750
  SUBAREA AREA(ACRES) =    4.40      SUBAREA RUNOFF(CFS) =    7.03
```

```
  EFFECTIVE AREA(ACRES) =      7.10   AREA-AVERAGED Fm(INCH/HR) =  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.78
  TOTAL AREA(ACRES) =        7.1       PEAK FLOW RATE(CFS) =      11.26

****************************************************************************
  FLOW PROCESS FROM NODE    423.00 TO NODE    424.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   454.00
  FLOW LENGTH(FEET) =   995.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.26
  PIPE TRAVEL TIME(MIN.) =   1.74    Tc(MIN.) =    9.80
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    424.00 =    2004.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.80
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.834
  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     0.200     -
  USER-DEFINED               -        0.40      0.50     0.200     -
  USER-DEFINED               -        0.90      0.50     0.850     -
  USER-DEFINED               -        0.40      0.50     0.850     -
  USER-DEFINED               -        0.10      0.50     0.900     -
  USER-DEFINED               -        0.70      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.626
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    4.52
  EFFECTIVE AREA(ACRES) =     10.40   AREA-AVERAGED Fm(INCH/HR) =  0.36
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       10.4       PEAK FLOW RATE(CFS) =      13.75

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.80
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.834
  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     0.600     -
  USER-DEFINED               -        2.10      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =    7.46
  EFFECTIVE AREA(ACRES) =     15.80   AREA-AVERAGED Fm(INCH/HR) =  0.34
```



```
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       15.8       PEAK FLOW RATE(CFS) =      21.21

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 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) =   454.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =  1555.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.19
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.21
  PIPE TRAVEL TIME(MIN.) =   2.32    Tc(MIN.) =   12.11
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    416.00 =    3559.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.11
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.595
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        3.70      0.50     0.200     -
  USER-DEFINED               -        6.80      0.50     0.200     -
  USER-DEFINED               -        0.70      0.50     0.200     -
  USER-DEFINED               -        2.60      0.50     0.200     -
  USER-DEFINED               -        2.20      0.50     0.600     -
  USER-DEFINED               -        9.90      0.50     0.600     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.387
  SUBAREA AREA(ACRES) =   25.90      SUBAREA RUNOFF(CFS) =   32.66
  EFFECTIVE AREA(ACRES) =     41.70   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       41.7       PEAK FLOW RATE(CFS) =      50.46

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.11
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.595
  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     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    1.57
  EFFECTIVE AREA(ACRES) =     43.00   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       43.0       PEAK FLOW RATE(CFS) =      52.04
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 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.) =   12.11
  RAINFALL INTENSITY(INCH/HR) =   1.59
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      43.00
  TOTAL STREAM AREA(ACRES) =      43.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      52.04

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       85.01   10.44    1.755  0.50( 0.21) 0.41      61.0     410.00
      2       52.04   12.11    1.595  0.50( 0.25) 0.50      43.0     420.00

  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      135.20   10.44    1.755  0.50( 0.22) 0.45      98.1     410.00
      2      128.24   12.11    1.595  0.50( 0.22) 0.45     104.0     420.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     135.20    Tc(MIN.) =    10.44
  EFFECTIVE AREA(ACRES) =      98.06   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      104.0
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    416.00 =    3559.00 FEET.

****************************************************************************
  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) =   415.00  DOWNSTREAM(FEET) =   395.00
  FLOW LENGTH(FEET) =  1084.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.89
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     135.20
  PIPE TRAVEL TIME(MIN.) =   1.14    Tc(MIN.) =   11.57
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    417.00 =    4643.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
```



```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.57
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.646
  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     -
  USER-DEFINED               -        2.90      0.50     0.100     -
  USER-DEFINED               -        3.60      0.50     0.850     -
  USER-DEFINED               -        4.50      0.50     0.200     -
  USER-DEFINED               -        4.50      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 =  0.313
  SUBAREA AREA(ACRES) =   17.30      SUBAREA RUNOFF(CFS) =   23.19
  EFFECTIVE AREA(ACRES) =    115.36   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      121.3       PEAK FLOW RATE(CFS) =     148.78

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.57
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.646
  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     0.400     -
  USER-DEFINED               -        0.20      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    1.30
  EFFECTIVE AREA(ACRES) =    116.36   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      122.3       PEAK FLOW RATE(CFS) =     150.08

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    430.00 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) =   372.00
  FLOW LENGTH(FEET) =  1572.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  36.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.87
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     150.08
  PIPE TRAVEL TIME(MIN.) =   1.76    Tc(MIN.) =   13.34
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    430.00 =    6215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
  MAINLINE Tc(MIN.) =   13.34
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.477
  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               -        0.20      0.50     0.100     -
  USER-DEFINED               -        0.40      0.50     0.100     -
  USER-DEFINED               -        5.70      0.50     0.850     -
  USER-DEFINED               -        4.50      0.50     0.850     -
  USER-DEFINED               -        9.40      0.50     0.850     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.803
  SUBAREA AREA(ACRES) =   20.90      SUBAREA RUNOFF(CFS) =   20.23
  EFFECTIVE AREA(ACRES) =    137.26   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      143.2       PEAK FLOW RATE(CFS) =     152.63

********************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   13.34
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.477
  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               -        8.90      0.50     0.850     -
  USER-DEFINED               -        1.20      0.50     0.850     -
  USER-DEFINED               -        3.70      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) =   14.50      SUBAREA RUNOFF(CFS) =   13.73
  EFFECTIVE AREA(ACRES) =    151.76   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      157.7       PEAK FLOW RATE(CFS) =     166.36

********************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 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      166.36   13.34    1.477  0.50( 0.26) 0.52     151.8     410.00
      2      149.95   15.07    1.315  0.50( 0.26) 0.52     157.7     420.00
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    430.00 =    6215.00 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      211.80   20.52    1.113  0.50( 0.22) 0.45     260.7     400.00
      2      194.26   23.26    1.034  0.50( 0.23) 0.45     262.6     430.00
```



```
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      360.49   13.34    1.477  0.50( 0.24) 0.48     321.2     410.00
      2      340.93   15.07    1.315  0.50( 0.24) 0.48     349.2     420.00
      3      333.04   20.52    1.113  0.50( 0.24) 0.48     418.4     400.00
      4      304.28   23.26    1.034  0.50( 0.24) 0.48     420.3     430.00
    TOTAL AREA(ACRES) =       420.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      360.49  Tc(MIN.) =   13.337
  EFFECTIVE AREA(ACRES) =    321.24  AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      420.3
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    431.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   372.00  DOWNSTREAM(FEET) =   300.00
  FLOW LENGTH(FEET) =  1358.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  40.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.63
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     360.49
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =   14.10
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    431.00 =   11067.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   14.10
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.404
  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     0.200     -
  USER-DEFINED               -       15.00      0.50     0.200     -
  USER-DEFINED               -        5.80      0.50     0.200     -
  USER-DEFINED               -        2.50      0.50     0.200     -
  USER-DEFINED               -        9.10      0.50     0.100     -
  USER-DEFINED               -        1.50      0.50     0.100     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.174
  SUBAREA AREA(ACRES) =   41.30      SUBAREA RUNOFF(CFS) =   48.95
  EFFECTIVE AREA(ACRES) =    362.54   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      461.6       PEAK FLOW RATE(CFS) =     385.20

********************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
```

```
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   14.10
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.404
  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               -        0.40      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) =    0.90      SUBAREA RUNOFF(CFS) =    1.10
  EFFECTIVE AREA(ACRES) =    363.44   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      462.5       PEAK FLOW RATE(CFS) =     386.29

********************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    331.00 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      386.29   14.10    1.404  0.50( 0.22) 0.45     363.4     410.00
      2      374.30   15.84    1.286  0.50( 0.22) 0.45     391.4     420.00
      3      359.48   21.29    1.091  0.50( 0.22) 0.45     460.6     400.00
      4      327.32   24.06    1.011  0.50( 0.22) 0.45     462.5     430.00
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    331.00 =   11067.00 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      574.37   20.10    1.125  0.50( 0.20) 0.40     688.0     310.00
      2      570.16   24.43    1.001  0.50( 0.20) 0.40     791.5     300.00
      3      567.92   24.78    0.990  0.50( 0.20) 0.40     799.0     320.00
      4      467.54   33.58    0.837  0.50( 0.21) 0.42     829.8     390.00
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    331.00 =   13248.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      910.51   14.10    1.404  0.50( 0.21) 0.42     846.2     410.00
      2      905.48   15.84    1.286  0.50( 0.21) 0.42     933.6     420.00
      3      937.09   20.10    1.125  0.50( 0.21) 0.42    1133.5     310.00
      4      932.69   21.29    1.091  0.50( 0.21) 0.42    1177.1     400.00
      5      897.84   24.06    1.011  0.50( 0.21) 0.42    1245.2     430.00
      6      893.06   24.43    1.001  0.50( 0.21) 0.42    1254.0     300.00
      7      886.52   24.78    0.990  0.50( 0.21) 0.42    1261.5     320.00
      8      722.18   33.58    0.837  0.50( 0.22) 0.43    1292.3     390.00
    TOTAL AREA(ACRES) =      1292.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      937.09  Tc(MIN.) =   20.095
  EFFECTIVE AREA(ACRES) =   1133.54  AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.42
```



```
  TOTAL AREA(ACRES) =     1292.3
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    331.00 =   13248.00 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =     1292.3  TC(MIN.) =     20.10
  EFFECTIVE AREA(ACRES) =   1133.54  AREA-AVERAGED Fm(INCH/HR)=  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap = 0.416
  PEAK FLOW RATE(CFS)   =     937.09

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      910.51   14.10    1.404  0.50( 0.21) 0.42     846.2     410.00
      2      905.48   15.84    1.286  0.50( 0.21) 0.42     933.6     420.00
      3      937.09   20.10    1.125  0.50( 0.21) 0.42    1133.5     310.00
      4      932.69   21.29    1.091  0.50( 0.21) 0.42    1177.1     400.00
      5      897.84   24.06    1.011  0.50( 0.21) 0.42    1245.2     430.00
      6      893.06   24.43    1.001  0.50( 0.21) 0.42    1254.0     300.00
      7      886.52   24.78    0.990  0.50( 0.21) 0.42    1261.5     320.00
      8      722.18   33.58    0.837  0.50( 0.22) 0.43    1292.3     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 1237

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED C                            *
* PHASED NO PA45 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL            *
* 10-YR EV FEB 2023 ROKAMOTO                                               *
 ****************************************************************************

  FILE NAME: 3C10EVRL.DAT
  TIME/DATE OF STUDY: 07:55 02/15/2023
============================================================================
  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    0.200/0.200/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.200/0.200/ ---    0.33    1.00 0.3120 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) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    644.00  DOWNSTREAM(FEET) =    641.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.438
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.974
  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
  "11+ DWELLINGS/ACRE"       B        1.60      0.30     0.200    56    8.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.20
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      4.20

****************************************************************************
  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) =  641.00  DOWNSTREAM ELEVATION(FEET) =  637.00
  STREET LENGTH(FEET) =   470.00   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) =       8.71
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.41
   HALFSTREET FLOOD WIDTH(FEET) =   13.63
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.35
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   3.33   Tc(MIN.) =   11.77
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.325
  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        4.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.198
  SUBAREA AREA(ACRES) =    4.40      SUBAREA RUNOFF(CFS) =    8.97
  EFFECTIVE AREA(ACRES) =      6.00    AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.0        PEAK FLOW RATE(CFS) =      12.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.66
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.13
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     800.00 FEET.

****************************************************************************
  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) =   637.00  DOWNSTREAM(FEET) =   634.00
  FLOW LENGTH(FEET) =   563.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.51
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.24
  PIPE TRAVEL TIME(MIN.) =   1.70    Tc(MIN.) =   13.47
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =    1363.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.47
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.092
  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        5.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"     B        2.40      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) =    8.00      SUBAREA RUNOFF(CFS) =   14.63
  EFFECTIVE AREA(ACRES) =     14.00   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       14.0       PEAK FLOW RATE(CFS) =      25.61

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 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) =   630.00
  FLOW LENGTH(FEET) =  1072.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.78
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.61
  PIPE TRAVEL TIME(MIN.) =   3.09    Tc(MIN.) =   16.57
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =    2435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.57
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.798
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL               B        2.90      0.30     0.100    56
  COMMERCIAL               B        4.50      0.30     0.100    56
  PUBLIC PARK              B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"     B        5.70      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"     B        2.40      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"    B        0.50      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.164
  SUBAREA AREA(ACRES) =   16.10      SUBAREA RUNOFF(CFS) =   25.34
  EFFECTIVE AREA(ACRES) =     30.10   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       30.1       PEAK FLOW RATE(CFS) =      47.24

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.57
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.798
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  SCHOOL                   B        5.70      0.30     0.600    56
  SCHOOL                   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) =   12.40      SUBAREA RUNOFF(CFS) =   18.06
  EFFECTIVE AREA(ACRES) =     42.50   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       42.5       PEAK FLOW RATE(CFS) =      65.30

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 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) =   630.00  DOWNSTREAM(FEET) =   610.00
  FLOW LENGTH(FEET) =  1290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.46
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      65.30
  PIPE TRAVEL TIME(MIN.) =   1.73    Tc(MIN.) =   18.29
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =    3725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   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
  COMMERCIAL                 B        1.00      0.30     0.100    56
  COMMERCIAL                 B        0.90      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  SCHOOL                     B        0.10      0.30     0.600    56
  SCHOOL                     B        0.50      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.216
  SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    4.72
  EFFECTIVE AREA(ACRES) =     45.70   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       45.7       PEAK FLOW RATE(CFS) =      66.45

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  3668.00
  ELEVATION DATA: UPSTREAM(FEET) =    663.00  DOWNSTREAM(FEET) =    610.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   18.909
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.671
  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        1.70      0.30     0.100    56   18.91
  COMMERCIAL                 B        4.40      0.30     0.100    56   18.91
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.60      0.30     0.200    56   20.15
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.30      0.30     0.200    56   20.15
  RESIDENTIAL
```



```
  "3-4 DWELLINGS/ACRE"       B        7.10      0.30     0.600    56   25.63
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.80      0.30     0.600    56   25.63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.387
  SUBAREA AREA(ACRES) =   17.90   INITIAL SUBAREA RUNOFF(CFS) =   25.05

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   18.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.705
  SUBAREA AREA(ACRES) =   17.90      SUBAREA RUNOFF(CFS) =   25.59
  EFFECTIVE AREA(ACRES) =     63.60   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =       63.6       PEAK FLOW RATE(CFS) =      92.04

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    317.00 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) =   535.00
  FLOW LENGTH(FEET) =  1537.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.87
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      92.04
  PIPE TRAVEL TIME(MIN.) =   1.23    Tc(MIN.) =   19.52
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    317.00 =    5262.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.52
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.638
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.30      0.30     0.100    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    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 =  0.139
  SUBAREA AREA(ACRES) =    4.00      SUBAREA RUNOFF(CFS) =    5.75
  EFFECTIVE AREA(ACRES) =     67.60   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       67.6       PEAK FLOW RATE(CFS) =      93.98

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 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.) =   19.52
  RAINFALL INTENSITY(INCH/HR) =   1.64
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.31
  EFFECTIVE STREAM AREA(ACRES) =      67.60
  TOTAL STREAM AREA(ACRES) =      67.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      93.98

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 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) =    629.00  DOWNSTREAM(FEET) =    625.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.474
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.224
  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    7.47
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.10      0.30     0.200    56    7.97
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.193
  SUBAREA RUNOFF(CFS) =      3.99
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      3.99

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  625.00  DOWNSTREAM ELEVATION(FEET) =  623.00
  STREET LENGTH(FEET) =   300.00   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) =       7.34
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.32
```



```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   2.42   Tc(MIN.) =    9.90
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.595
  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        0.20      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.70      0.30     0.200    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 =  0.141
  SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    6.66
  EFFECTIVE AREA(ACRES) =      4.30    AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        4.3        PEAK FLOW RATE(CFS) =       9.86

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.12
  FLOW VELOCITY(FEET/SEC.) =  2.21   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    312.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    313.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   623.00  DOWNSTREAM(FEET) =   620.00
  FLOW LENGTH(FEET) =   369.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.14
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.86
  PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =   10.90
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    313.00 =     999.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.90
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.445
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.90      0.30     0.100    56
  COMMERCIAL                 B        2.50      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.80      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.70      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.125
```

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  SUBAREA AREA(ACRES) =    5.90      SUBAREA RUNOFF(CFS) =   12.78
  EFFECTIVE AREA(ACRES) =     10.20   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =       10.2       PEAK FLOW RATE(CFS) =      22.06

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    314.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   620.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =   338.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.32
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.06
  PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =   11.50
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    314.00 =    1337.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    314.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.362
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.20      0.30     0.100    56
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        6.10      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        6.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.208
  SUBAREA AREA(ACRES) =   12.70      SUBAREA RUNOFF(CFS) =   26.29
  EFFECTIVE AREA(ACRES) =     22.90   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       22.9       PEAK FLOW RATE(CFS) =      47.59

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    315.00 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) =   600.00
  FLOW LENGTH(FEET) =   578.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.05
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.59
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   12.19
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    315.00 =    1915.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    315.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.19
  *  10 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        1.70      0.30     0.100    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.00      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.10      0.30     0.200    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.70      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        6.00      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.347
  SUBAREA AREA(ACRES) =   17.80      SUBAREA RUNOFF(CFS) =   34.67
  EFFECTIVE AREA(ACRES) =     40.70   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.25
  TOTAL AREA(ACRES) =       40.7       PEAK FLOW RATE(CFS) =      80.33

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    316.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   600.00  DOWNSTREAM(FEET) =   569.00
  FLOW LENGTH(FEET) =  2176.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.67
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      80.33
  PIPE TRAVEL TIME(MIN.) =   2.86    Tc(MIN.) =   15.05
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    316.00 =    4091.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    316.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.05
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.880
  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        0.40      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
```

```
  "5-7 DWELLINGS/ACRE"       B        6.80      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B       19.10      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) =   26.60      SUBAREA RUNOFF(CFS) =   41.42
  EFFECTIVE AREA(ACRES) =     67.30   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =       67.3       PEAK FLOW RATE(CFS) =     107.54

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    317.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   569.00  DOWNSTREAM(FEET) =   535.00
  FLOW LENGTH(FEET) =   759.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.06
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     107.54
  PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =   15.65
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    317.00 =    4850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.65
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.848
  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
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        8.90      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        7.40      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.505
  SUBAREA AREA(ACRES) =   17.50      SUBAREA RUNOFF(CFS) =   26.72
  EFFECTIVE AREA(ACRES) =     84.80   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       84.8       PEAK FLOW RATE(CFS) =     132.29

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 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.) =   15.65
  RAINFALL INTENSITY(INCH/HR) =   1.85
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.38
  EFFECTIVE STREAM AREA(ACRES) =      84.80
  TOTAL STREAM AREA(ACRES) =      84.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     132.29

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       93.98   19.52    1.638  0.30( 0.09) 0.31      67.6     300.00
      2      132.29   15.65    1.848  0.30( 0.11) 0.38      84.8     310.00

  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      217.86   15.65    1.848  0.30( 0.11) 0.35     139.0     310.00
      2      210.26   19.52    1.638  0.30( 0.11) 0.35     152.4     300.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     217.86    Tc(MIN.) =    15.65
  EFFECTIVE AREA(ACRES) =     139.00   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      152.4
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    317.00 =    5262.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    307.00 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) =   374.00
  FLOW LENGTH(FEET) =  3798.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.27
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     217.86
  PIPE TRAVEL TIME(MIN.) =   2.61    Tc(MIN.) =   18.26
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    307.00 =    9060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.26
  *  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
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        1.40      0.30     0.100    56
```

```
  COMMERCIAL                  B        4.80      0.30     0.100    56
  COMMERCIAL                  B        5.00      0.30     0.100    56
  COMMERCIAL                  B        3.70      0.30     0.100    56
  PUBLIC PARK                 B        5.00      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.288
  SUBAREA AREA(ACRES) =   20.00      SUBAREA RUNOFF(CFS) =   29.16
  EFFECTIVE AREA(ACRES) =    159.00   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      172.4       PEAK FLOW RATE(CFS) =     229.34

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.26
  *  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
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.00      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       12.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.50      0.30     0.900    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 =  0.364
  SUBAREA AREA(ACRES) =   21.90      SUBAREA RUNOFF(CFS) =   31.48
  EFFECTIVE AREA(ACRES) =    180.90   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      194.3       PEAK FLOW RATE(CFS) =     260.82

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.26
  *  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
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.50      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.40      0.30     0.500    56
  SCHOOL                     B        2.20      0.30     0.600    56
  SCHOOL                     B        6.80      0.30     0.600    56
  SCHOOL                     B        7.90      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```



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  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.574
  SUBAREA AREA(ACRES) =   22.80      SUBAREA RUNOFF(CFS) =   31.48
  EFFECTIVE AREA(ACRES) =    203.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      217.1       PEAK FLOW RATE(CFS) =     292.30

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 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) =   374.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =   847.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.42
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     292.30
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   18.69
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    330.00 =    9907.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   18.69
  RAINFALL INTENSITY(INCH/HR) =   1.68
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.37
  EFFECTIVE STREAM AREA(ACRES) =     203.70
  TOTAL STREAM AREA(ACRES) =     217.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     292.30

****************************************************************************
  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) =    636.00  DOWNSTREAM(FEET) =    633.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.438
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.974
  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
  "11+ DWELLINGS/ACRE"       B        2.80      0.30     0.200    56    8.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      7.34
  TOTAL AREA(ACRES) =      2.80   PEAK FLOW RATE(CFS) =      7.34
```

```
****************************************************************************
  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) =  633.00  DOWNSTREAM ELEVATION(FEET) =  628.00
  STREET LENGTH(FEET) =   360.00   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) =      15.44
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.27
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.44
  STREET FLOW TRAVEL TIME(MIN.) =   1.84   Tc(MIN.) =   10.27
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.530
  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        6.30      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  SCHOOL                     B        0.70      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.237
  SUBAREA AREA(ACRES) =    7.30      SUBAREA RUNOFF(CFS) =   16.16
  EFFECTIVE AREA(ACRES) =     10.10    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.23
  TOTAL AREA(ACRES) =       10.1        PEAK FLOW RATE(CFS) =      22.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.16
  FLOW VELOCITY(FEET/SEC.) =  3.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.74
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    322.00 =     690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    323.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   628.00  DOWNSTREAM(FEET) =   624.00
  FLOW LENGTH(FEET) =   750.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.1 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.38
  PIPE TRAVEL TIME(MIN.) =   1.95    Tc(MIN.) =   12.22
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    323.00 =    1440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.22
  *  10 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        2.00      0.30     0.850    56
  PUBLIC PARK                B        2.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.90      0.30     0.200    56
  SCHOOL                     B        3.10      0.30     0.600    56
  SCHOOL                     B        0.30      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) =   14.00      SUBAREA RUNOFF(CFS) =   26.68
  EFFECTIVE AREA(ACRES) =     24.10   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       24.1       PEAK FLOW RATE(CFS) =      46.63

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.22
  *  10 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
  APARTMENTS                 B        0.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.20
  EFFECTIVE AREA(ACRES) =     24.20   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       24.2       PEAK FLOW RATE(CFS) =      46.83

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    324.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   624.00  DOWNSTREAM(FEET) =   614.00
  FLOW LENGTH(FEET) =   887.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.0 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.12
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      46.83
  PIPE TRAVEL TIME(MIN.) =   1.46    Tc(MIN.) =   13.68
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    324.00 =    2327.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.68
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.063
  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        1.10      0.30     0.100    56
  PUBLIC PARK                B        3.10      0.30     0.850    56
  PUBLIC PARK                B        2.60      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.80      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 =  0.416
  SUBAREA AREA(ACRES) =   16.10      SUBAREA RUNOFF(CFS) =   28.08
  EFFECTIVE AREA(ACRES) =     40.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       40.3       PEAK FLOW RATE(CFS) =      70.55

****************************************************************************
  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) =   614.00  DOWNSTREAM(FEET) =   571.00
  FLOW LENGTH(FEET) =  1805.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.78
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      70.55
  PIPE TRAVEL TIME(MIN.) =   2.04    Tc(MIN.) =   15.72
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    325.00 =    4132.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    325.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.72
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.844
  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
  "11+ DWELLINGS/ACRE"       B        5.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B       13.90      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B       18.60      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =   42.00      SUBAREA RUNOFF(CFS) =   64.54
  EFFECTIVE AREA(ACRES) =     82.30   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       82.3       PEAK FLOW RATE(CFS) =     127.14

****************************************************************************
  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) =   571.00  DOWNSTREAM(FEET) =   497.00
  FLOW LENGTH(FEET) =  1090.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.08
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     127.14
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   16.45
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    326.00 =    5222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.45
  *  10 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        1.00      0.30     0.100    56
  COMMERCIAL                 B        6.10      0.30     0.100    56
  COMMERCIAL                 B       12.90      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B       12.80      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) =   34.00      SUBAREA RUNOFF(CFS) =   51.34
  EFFECTIVE AREA(ACRES) =    116.30   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      116.3       PEAK FLOW RATE(CFS) =     175.57
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.45
  *  10 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
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B       23.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.890
  SUBAREA AREA(ACRES) =   23.80      SUBAREA RUNOFF(CFS) =   32.94
  EFFECTIVE AREA(ACRES) =    140.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      140.1       PEAK FLOW RATE(CFS) =     208.51

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    327.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =  1732.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.21
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     208.51
  PIPE TRAVEL TIME(MIN.) =   1.36    Tc(MIN.) =   17.81
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    327.00 =    6954.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.81
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.731
  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
  COMMERCIAL                 B        4.80      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  PUBLIC PARK                B        6.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.00      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       43.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.250
```



```
  SUBAREA AREA(ACRES) =   64.30      SUBAREA RUNOFF(CFS) =   95.83
  EFFECTIVE AREA(ACRES) =    204.40   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      204.4       PEAK FLOW RATE(CFS) =     295.04

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.81
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.731
  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       38.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.30      0.30     0.900    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 =  0.293
  SUBAREA AREA(ACRES) =   44.60      SUBAREA RUNOFF(CFS) =   65.96
  EFFECTIVE AREA(ACRES) =    249.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      249.0       PEAK FLOW RATE(CFS) =     360.99

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    328.00 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) =   338.00
  FLOW LENGTH(FEET) =  2664.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  42.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.78
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     360.99
  PIPE TRAVEL TIME(MIN.) =   1.66    Tc(MIN.) =   19.46
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    328.00 =    9618.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.641
  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
  APARTMENTS                 B       14.80      0.30     0.200    56
  APARTMENTS                 B        1.90      0.30     0.200    56
  APARTMENTS                 B        9.90      0.30     0.200    56
  COMMERCIAL                 B        1.80      0.30     0.100    56
```

```
  COMMERCIAL                  B        8.40      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.173
  SUBAREA AREA(ACRES) =   37.30      SUBAREA RUNOFF(CFS) =   53.35
  EFFECTIVE AREA(ACRES) =    286.30   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      286.3       PEAK FLOW RATE(CFS) =     394.20

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.641
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        7.60      0.30     0.100    56
  COMMERCIAL                  B       14.00      0.30     0.100    56
  PUBLIC PARK                 B        1.40      0.30     0.850    56
  PUBLIC PARK                 B        0.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        0.20      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        0.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.156
  SUBAREA AREA(ACRES) =   23.80      SUBAREA RUNOFF(CFS) =   34.15
  EFFECTIVE AREA(ACRES) =    310.10   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      310.1       PEAK FLOW RATE(CFS) =     428.36

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.641
  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       12.20      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B       17.60      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.30      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        9.30      0.30     0.900    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 =  0.383
  SUBAREA AREA(ACRES) =   40.50      SUBAREA RUNOFF(CFS) =   55.63
```



```
  EFFECTIVE AREA(ACRES) =    350.60   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =      350.6       PEAK FLOW RATE(CFS) =     483.98

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.641
  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        5.30      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B       28.30      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        3.80      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        4.10      0.30     0.400    56
  SCHOOL                      B        0.30      0.30     0.600    56
  SCHOOL                      B        0.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.483
  SUBAREA AREA(ACRES) =   42.10      SUBAREA RUNOFF(CFS) =   56.69
  EFFECTIVE AREA(ACRES) =    392.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      392.7       PEAK FLOW RATE(CFS) =     540.68

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    329.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   338.00  DOWNSTREAM(FEET) =   320.00
  FLOW LENGTH(FEET) =  1154.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  75.0 INCH PIPE IS  59.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.78
  ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     540.68
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =   20.39
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    329.00 =   10772.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.39
  *  10 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
  COMMERCIAL                  B       11.60      0.30     0.100    56
  COMMERCIAL                  B        6.70      0.30     0.100    56
```

```
  COMMERCIAL                  B       12.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.20      0.30     0.900    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 =  0.110
  SUBAREA AREA(ACRES) =   31.50      SUBAREA RUNOFF(CFS) =   44.31
  EFFECTIVE AREA(ACRES) =    424.20   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      424.2       PEAK FLOW RATE(CFS) =     569.01

****************************************************************************
  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) =   320.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =  1981.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  96.0 INCH PIPE IS  72.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.88
  ESTIMATED PIPE DIAMETER(INCH) =  96.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     569.01
  PIPE TRAVEL TIME(MIN.) =   2.38    Tc(MIN.) =   22.77
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    330.00 =   12753.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   22.77
  RAINFALL INTENSITY(INCH/HR) =   1.50
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.35
  EFFECTIVE STREAM AREA(ACRES) =     424.20
  TOTAL STREAM AREA(ACRES) =     424.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     569.01

****************************************************************************
  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
  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) =   701.00   CHANNEL SLOPE =  0.0357
  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) =  1.731
  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,BROADLEAF"      B        0.20      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        5.90      0.30     1.000    72
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B       12.70      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.80      0.30     1.000    66
  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) =      86.07
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.88
  AVERAGE FLOW DEPTH(FEET) =   2.04   TRAVEL TIME(MIN.) =   1.70
  Tc(MIN.) =   17.81
  SUBAREA AREA(ACRES) =    35.10       SUBAREA RUNOFF(CFS) =   45.20
  EFFECTIVE AREA(ACRES) =     81.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       81.4         PEAK FLOW RATE(CFS) =     104.83

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.20   FLOW VELOCITY(FEET/SEC.) =   7.22
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    395.00 =    3560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    395.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.81
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.731
  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        1.00      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.70      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.50      0.30     1.000    65
  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 =  0.914
  SUBAREA AREA(ACRES) =    4.30      SUBAREA RUNOFF(CFS) =    5.64
  EFFECTIVE AREA(ACRES) =     85.70   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       85.7       PEAK FLOW RATE(CFS) =     110.47

****************************************************************************
  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) =   437.00
  FLOW LENGTH(FEET) =  6286.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.81
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     110.47
  PIPE TRAVEL TIME(MIN.) =   6.62    Tc(MIN.) =   24.43
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    370.00 =    9846.00 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) =    437.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1963.00   CHANNEL SLOPE =  0.0469
  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) =  1.305
  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        0.50      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.60      0.30     1.000    63
  COMMERCIAL                 B        1.50      0.30     0.100    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  COMMERCIAL                 B        1.60      0.30     0.100    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 =  0.265
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     113.78
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.16
  AVERAGE FLOW DEPTH(FEET) =   2.16   TRAVEL TIME(MIN.) =   4.01
  Tc(MIN.) =   28.44
  SUBAREA AREA(ACRES) =     6.00       SUBAREA RUNOFF(CFS) =    6.62
  EFFECTIVE AREA(ACRES) =     91.70     AREA-AVERAGED Fm(INCH/HR) =   0.28
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.95
  TOTAL AREA(ACRES) =       91.7         PEAK FLOW RATE(CFS) =     110.47
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.13   FLOW VELOCITY(FEET/SEC.) =   8.11
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    371.00 =   11809.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   28.44
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.305
  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        1.40      0.30     1.000    69
  NATURAL FAIR COVER
  "GRASS"                    B        2.80      0.30     1.000    69
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.40      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.40      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) =    8.40      SUBAREA RUNOFF(CFS) =    7.60
  EFFECTIVE AREA(ACRES) =    100.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
```

```
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.95
 TOTAL AREA(ACRES) =      100.1       PEAK FLOW RATE(CFS) =     110.47
 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.) =   28.44
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.305
 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        0.80      0.30     1.000    66
 PUBLIC PARK                B        0.10      0.30     0.850    56
 PUBLIC PARK                B        3.80      0.30     0.850    56
 PUBLIC PARK                B        2.50      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    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 =  0.877
 SUBAREA AREA(ACRES) =   10.30      SUBAREA RUNOFF(CFS) =    9.66
 EFFECTIVE AREA(ACRES) =    110.40   AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.95
 TOTAL AREA(ACRES) =      110.4       PEAK FLOW RATE(CFS) =     110.47
 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.) =   28.44
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.305
 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        3.50      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        0.10      0.30     0.400    56
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.20      0.30     1.000    65
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        1.90      0.30     1.000    65
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.924
 SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =    6.29
 EFFECTIVE AREA(ACRES) =    117.20   AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.94
 TOTAL AREA(ACRES) =      117.2       PEAK FLOW RATE(CFS) =     110.47
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```



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****************************************************************************
 FLOW PROCESS FROM NODE    371.00 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) =   345.00  DOWNSTREAM(FEET) =   310.00
 FLOW LENGTH(FEET) =  1065.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.48
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     110.47
 PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =   29.40
 LONGEST FLOWPATH FROM NODE    390.00 TO NODE    330.00 =   12874.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   29.40
 RAINFALL INTENSITY(INCH/HR) =   1.28
 AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.94
 EFFECTIVE STREAM AREA(ACRES) =     117.20
 TOTAL STREAM AREA(ACRES) =     117.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     110.47

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      292.30   18.69    1.683  0.30( 0.11) 0.37     203.7     310.00
     1      276.01   22.58    1.505  0.30( 0.11) 0.37     217.1     300.00
     2      569.01   22.77    1.497  0.30( 0.11) 0.35     424.2     320.00
     3      110.47   29.40    1.277  0.30( 0.28) 0.94     117.2     390.00

 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      920.59   18.69    1.683  0.30( 0.13) 0.43     626.5     310.00
     2      947.73   22.58    1.505  0.30( 0.13) 0.43     727.7     300.00
     3      947.93   22.77    1.497  0.30( 0.13) 0.43     732.1     320.00
     4      820.40   29.40    1.277  0.30( 0.13) 0.45     758.5     390.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     947.93    Tc(MIN.) =    22.77
 EFFECTIVE AREA(ACRES) =     732.06   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =      758.5
 LONGEST FLOWPATH FROM NODE    390.00 TO NODE    330.00 =   12874.00 FEET.
```

```
****************************************************************************
  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) =   310.00  DOWNSTREAM(FEET) =   280.00
  FLOW LENGTH(FEET) =   374.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  69.0 INCH PIPE IS  52.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  44.45
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     947.93
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   22.91
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    331.00 =   13248.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.91
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.492
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B       17.50      0.30      0.200    56
  APARTMENTS                 B        1.50      0.30      0.200    56
  APARTMENTS                 B        0.70      0.30      0.200    56
  NATURAL POOR COVER
  "BARREN"                   B        0.10      0.30      1.000    86
  COMMERCIAL                 B       44.60      0.30      0.100    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 =  0.132
  SUBAREA AREA(ACRES) =   65.10      SUBAREA RUNOFF(CFS) =   85.08
  EFFECTIVE AREA(ACRES) =    797.16   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =      823.6       PEAK FLOW RATE(CFS) =     982.78

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      967.82   18.83    1.675  0.30( 0.12) 0.40     691.6     310.00
      2      983.15   22.72    1.500  0.30( 0.12) 0.41     792.8     300.00
      3      982.78   22.91    1.492  0.30( 0.12) 0.41     797.2     320.00
      4      849.60   29.55    1.273  0.30( 0.13) 0.42     823.6     390.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     983.15  Tc(MIN.) =   22.72
  AREA-AVERAGED Fm(INCH/HR) =  0.12  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.41  EFFECTIVE AREA(ACRES) =     792.83

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.72
```



```
  *  10 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
  COMMERCIAL                 B        2.00      0.30      0.100    56
  COMMERCIAL                 B        4.10      0.30      0.100    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 =  0.115
  SUBAREA AREA(ACRES) =    6.20      SUBAREA RUNOFF(CFS) =    8.18
  EFFECTIVE AREA(ACRES) =    799.03   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      829.8       PEAK FLOW RATE(CFS) =     991.33

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  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) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =    618.00  DOWNSTREAM(FEET) =    590.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.048
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.595
  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
  "8-10 DWELLINGS/ACRE"      B        1.20      0.30      0.400    56    6.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      3.75
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      3.75

****************************************************************************
  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) =  590.00  DOWNSTREAM ELEVATION(FEET) =  588.00
  STREET LENGTH(FEET) =   274.00   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) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   17.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
  STREET FLOW TRAVEL TIME(MIN.) =   1.83   Tc(MIN.) =    7.87
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.120
  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        3.30      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.40      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.486
  SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =   20.61
  EFFECTIVE AREA(ACRES) =      8.90    AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        8.9        PEAK FLOW RATE(CFS) =      23.85

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.54   HALFSTREET FLOOD WIDTH(FEET) =  21.21
  FLOW VELOCITY(FEET/SEC.) =  2.83   DEPTH*VELOCITY(FT*FT/SEC.) =   1.53
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     588.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   588.00  DOWNSTREAM(FEET) =   581.00
  FLOW LENGTH(FEET) =   805.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.76
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.85
  PIPE TRAVEL TIME(MIN.) =   1.73    Tc(MIN.) =    9.60
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1393.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.60
```



```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.671
  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
  ".4 DWELLING/ACRE"         B        2.00      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        8.80      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.10      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.90      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.577
  SUBAREA AREA(ACRES) =   15.90      SUBAREA RUNOFF(CFS) =   35.74
  EFFECTIVE AREA(ACRES) =     24.80   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       24.8       PEAK FLOW RATE(CFS) =      56.00

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 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.) =    9.60
  RAINFALL INTENSITY(INCH/HR) =   2.67
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =      24.80
  TOTAL STREAM AREA(ACRES) =      24.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      56.00

****************************************************************************
  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) =    725.00  DOWNSTREAM(FEET) =    630.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.196
  *  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        0.10      0.30     1.000    72    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.30      0.30     1.000    66    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      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) =      3.34
 TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      3.34

****************************************************************************
 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
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.639
 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        0.10      0.30     1.000    72
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        1.70      0.30     1.000    66
 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) =       5.34
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.14
 AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   0.53
 Tc(MIN.) =    9.73
 SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    4.00
 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) =       7.16

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.60   FLOW VELOCITY(FEET/SEC.) =   6.63
 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) =    582.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   520.00   CHANNEL SLOPE =  0.0288
 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) =  2.305
 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        3.70      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
```



```
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        1.20      0.30     0.600    56
 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 =  0.906
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.03
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.95
 AVERAGE FLOW DEPTH(FEET) =   1.05   TRAVEL TIME(MIN.) =   2.19
 Tc(MIN.) =   11.92
 SUBAREA AREA(ACRES) =     6.40       SUBAREA RUNOFF(CFS) =   11.71
 EFFECTIVE AREA(ACRES) =      9.80     AREA-AVERAGED Fm(INCH/HR) =   0.28
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.94
 TOTAL AREA(ACRES) =        9.8         PEAK FLOW RATE(CFS) =      17.85

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.18   FLOW VELOCITY(FEET/SEC.) =   4.29
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.00 =    1045.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    433.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   582.00  DOWNSTREAM(FEET) =   581.00
 FLOW LENGTH(FEET) =    10.00   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.) =  18.39
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      17.85
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   11.93
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    403.00 =    1055.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 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.) =   11.93
 RAINFALL INTENSITY(INCH/HR) =   2.30
 AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.94
 EFFECTIVE STREAM AREA(ACRES) =       9.80
 TOTAL STREAM AREA(ACRES) =       9.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      17.85

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       56.00    9.60    2.671  0.30( 0.16) 0.54      24.8     400.00
     2       17.85   11.93    2.304  0.30( 0.28) 0.94       9.8     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	72.98	9.60	2.671	0.30(0.19)	0.64	32.7	400.00
2	65.64	11.93	2.304	0.30(0.20)	0.65	34.6	430.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 72.98 Tc(MIN.) = 9.60
EFFECTIVE AREA(ACRES) = 32.69 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64
TOTAL AREA(ACRES) = 34.6
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 1393.00 FEET.

****
FLOW PROCESS FROM NODE 403.00 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) = 581.00 DOWNSTREAM(FEET) = 570.00
FLOW LENGTH(FEET) = 1056.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.92
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 72.98
PIPE TRAVEL TIME(MIN.) = 1.61 Tc(MIN.) = 11.21
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 404.00 = 2449.00 FEET.

****
FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 11.21
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.402
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.10	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.90	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.50	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.00	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.842
SUBAREA AREA(ACRES) = 7.70 SUBAREA RUNOFF(CFS) = 14.89
EFFECTIVE AREA(ACRES) = 40.39 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.68
TOTAL AREA(ACRES) = 42.3 PEAK FLOW RATE(CFS) = 79.93

****
FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 11.21
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.402
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	8.80	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.20	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.10	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.492
SUBAREA AREA(ACRES) = 14.10 SUBAREA RUNOFF(CFS) = 28.60
EFFECTIVE AREA(ACRES) = 54.49 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 56.4 PEAK FLOW RATE(CFS) = 108.54

****
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) = 570.00 DOWNSTREAM(FEET) = 565.00
FLOW LENGTH(FEET) = 1526.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.85
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 108.54
PIPE TRAVEL TIME(MIN.) = 3.24 Tc(MIN.) = 14.45
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 405.00 = 3975.00 FEET.

****
FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 14.45
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.958
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
PUBLIC PARK	B	1.80	0.30	0.850	56
PUBLIC PARK	B	0.40	0.30	0.850	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.80	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.80	0.30	0.900	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.10	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.698
  SUBAREA AREA(ACRES) =   13.00      SUBAREA RUNOFF(CFS) =   20.46
  EFFECTIVE AREA(ACRES) =     67.49   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =       69.4       PEAK FLOW RATE(CFS) =     108.54
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.45
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.958
  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       11.20      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        7.80      0.30     0.400    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 =  0.455
  SUBAREA AREA(ACRES) =   20.40      SUBAREA RUNOFF(CFS) =   33.44
  EFFECTIVE AREA(ACRES) =     87.89   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       89.8       PEAK FLOW RATE(CFS) =     140.68

****************************************************************************
  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) =   565.00  DOWNSTREAM(FEET) =   495.00
  FLOW LENGTH(FEET) =  2168.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.34
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     140.68
  PIPE TRAVEL TIME(MIN.) =   1.87    Tc(MIN.) =   16.32
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    406.00 =    6143.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.32
  *  10 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
  COMMERCIAL                 B        5.50      0.30     0.100    56
  COMMERCIAL                 B        1.90      0.30     0.100    56
  PUBLIC PARK                B        2.50      0.30     0.850    56
```



```
  PUBLIC PARK                B        0.90      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       36.40      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       13.60      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.224
  SUBAREA AREA(ACRES) =   60.80      SUBAREA RUNOFF(CFS) =   95.44
  EFFECTIVE AREA(ACRES) =    148.69   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      150.6       PEAK FLOW RATE(CFS) =     224.53

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.32
  *  10 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
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.70      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  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 =  0.868
  SUBAREA AREA(ACRES) =    7.40      SUBAREA RUNOFF(CFS) =   10.33
  EFFECTIVE AREA(ACRES) =    156.09   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =      158.0       PEAK FLOW RATE(CFS) =     234.86

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.32
  *  10 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
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        9.30      0.30     0.400    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 =  0.400
  SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =   15.53
```

```
  EFFECTIVE AREA(ACRES) =    166.29   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      168.2       PEAK FLOW RATE(CFS) =     250.39

****************************************************************************
  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) =   495.00  DOWNSTREAM(FEET) =   395.00
  FLOW LENGTH(FEET) =  2905.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  38.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.94
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     250.39
  PIPE TRAVEL TIME(MIN.) =   2.11    Tc(MIN.) =   18.43
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    407.00 =    9048.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.697
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.30      0.30     0.200    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  COMMERCIAL                 B        9.10      0.30     0.100    56
  COMMERCIAL                 B        6.70      0.30     0.100    56
  PUBLIC PARK                B        0.50      0.30     0.850    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 =  0.219
  SUBAREA AREA(ACRES) =   19.80      SUBAREA RUNOFF(CFS) =   29.07
  EFFECTIVE AREA(ACRES) =    186.09   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      188.0       PEAK FLOW RATE(CFS) =     262.33

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.697
  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        0.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.40      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       10.60      0.30     0.200    56
```



```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.60      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.90      0.30     0.900    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 =  0.308
  SUBAREA AREA(ACRES) =   16.80      SUBAREA RUNOFF(CFS) =   24.26
  EFFECTIVE AREA(ACRES) =    202.89   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      204.8       PEAK FLOW RATE(CFS) =     286.59

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.697
  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       14.30      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       15.30      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.50      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        5.10      0.30     0.500    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 =  0.579
  SUBAREA AREA(ACRES) =   37.50      SUBAREA RUNOFF(CFS) =   51.41
  EFFECTIVE AREA(ACRES) =    240.39   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      242.3       PEAK FLOW RATE(CFS) =     338.01

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.697
  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
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        8.40      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.80      0.30     0.400    56
```

```
  SCHOOL                     B        0.60      0.30     0.600    56
  SCHOOL                     B        1.50      0.30     0.600    56
  SCHOOL                     B        3.50      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =   20.30      SUBAREA RUNOFF(CFS) =   28.51
  EFFECTIVE AREA(ACRES) =    260.69   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      262.6       PEAK FLOW RATE(CFS) =     366.52

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    430.00 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) =   372.00
  FLOW LENGTH(FEET) =   661.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.71
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     366.52
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   18.86
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    411.00 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) =    535.00  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.368
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.512
  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        0.50      0.30     0.900    56    7.53
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        0.20      0.30     0.600    56    6.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.814
```



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  SUBAREA RUNOFF(CFS) =      2.06
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      2.06

****************************************************************************
  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) =   495.00  DOWNSTREAM(FEET) =   490.00
  FLOW LENGTH(FEET) =   267.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.56
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.06
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =    7.17
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    412.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.17
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.304
  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        0.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        B        0.10      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B        0.10      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B        0.30      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.788
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    4.69
  EFFECTIVE AREA(ACRES) =      2.40   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        2.4       PEAK FLOW RATE(CFS) =       6.62

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    413.00 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) =   480.00
  FLOW LENGTH(FEET) =   520.00   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.) =   7.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       6.62
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =    8.29
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    413.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    413.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.013
  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        0.40      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.810
  SUBAREA AREA(ACRES) =    3.10      SUBAREA RUNOFF(CFS) =    7.73
  EFFECTIVE AREA(ACRES) =      5.50   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        5.5       PEAK FLOW RATE(CFS) =      13.72

****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    414.00 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) =   470.00
  FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.16
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.72
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    8.75
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    414.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.75
  *  10 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        1.50      0.30     0.100    56
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.80      0.30     0.900    56
```



```
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.00      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.20      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 =  0.654
  SUBAREA AREA(ACRES) =    5.70      SUBAREA RUNOFF(CFS) =   13.83
  EFFECTIVE AREA(ACRES) =     11.20   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       11.2       PEAK FLOW RATE(CFS) =      26.96

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.75
  *  10 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
  APARTMENTS                 B        0.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.25
  EFFECTIVE AREA(ACRES) =     11.30   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       11.3       PEAK FLOW RATE(CFS) =      27.21

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 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) =   470.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =   528.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.21
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.21
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =    9.33
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    415.00 =    1953.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    415.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.33
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.742
  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
  COMMERCIAL                 B        0.60      0.30     0.100    56
```

```
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        6.30      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.70      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.448
  SUBAREA AREA(ACRES) =   11.50      SUBAREA RUNOFF(CFS) =   26.99
  EFFECTIVE AREA(ACRES) =     22.80   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       22.8       PEAK FLOW RATE(CFS) =      52.68

****************************************************************************
  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) =   445.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =   650.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.77
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.68
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =    9.94
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    416.00 =    2603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.584
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        1.60      0.30     0.200    56
  APARTMENTS                 B       10.90      0.30     0.200    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.10      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        7.00      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.189
  SUBAREA AREA(ACRES) =   23.20      SUBAREA RUNOFF(CFS) =   52.77
  EFFECTIVE AREA(ACRES) =     46.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       46.0       PEAK FLOW RATE(CFS) =     102.19

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.584
```



```
  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        0.40      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.90      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        9.30      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.30      0.30     0.400    56
  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 =  0.500
  SUBAREA AREA(ACRES) =   15.00      SUBAREA RUNOFF(CFS) =   32.86
  EFFECTIVE AREA(ACRES) =     61.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       61.0       PEAK FLOW RATE(CFS) =     135.05

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 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.) =    9.94
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.41
  EFFECTIVE STREAM AREA(ACRES) =      61.00
  TOTAL STREAM AREA(ACRES) =      61.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     135.05

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    421.00 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) =    535.00  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.368
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.512
  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        0.70      0.30     0.900    56    7.53
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.20      0.30     0.600    56    6.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.833
  SUBAREA RUNOFF(CFS) =      2.64
```

```
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.64

****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    422.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   487.00
  FLOW LENGTH(FEET) =   308.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.64
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =    7.13
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    422.00 =     636.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    422.00 TO NODE    422.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.13
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.313
  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        1.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.50      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.817
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    4.97
  EFFECTIVE AREA(ACRES) =      2.70   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =        2.7       PEAK FLOW RATE(CFS) =       7.45

****************************************************************************
  FLOW PROCESS FROM NODE    422.00 TO NODE    423.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =   373.00   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.) =   8.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.45
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =    7.85
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    423.00 =    1009.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    423.00 TO NODE    423.00 IS CODE =  81
----------------------------------------------------------------------------
```



```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.85
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.127
  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        0.80      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.40      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.70      0.30     0.600    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 =  0.750
  SUBAREA AREA(ACRES) =    4.40      SUBAREA RUNOFF(CFS) =   11.49
  EFFECTIVE AREA(ACRES) =      7.10   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.78
  TOTAL AREA(ACRES) =        7.1       PEAK FLOW RATE(CFS) =      18.49

****************************************************************************
  FLOW PROCESS FROM NODE    423.00 TO NODE    424.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   454.00
  FLOW LENGTH(FEET) =   995.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.76
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.49
  PIPE TRAVEL TIME(MIN.) =   1.54    Tc(MIN.) =    9.39
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    424.00 =    2004.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.727
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.80      0.30     0.200    56
  APARTMENTS                 B        0.40      0.30     0.200    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    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 =  0.626
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    7.54
  EFFECTIVE AREA(ACRES) =     10.40   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       10.4       PEAK FLOW RATE(CFS) =      23.47

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.727
  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        3.30      0.30     0.600    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 =  0.600
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =   12.38
  EFFECTIVE AREA(ACRES) =     15.80   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       15.8       PEAK FLOW RATE(CFS) =      35.85

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 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) =   454.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =  1555.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.91
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.85
  PIPE TRAVEL TIME(MIN.) =   2.01    Tc(MIN.) =   11.40
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    416.00 =    3559.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.40
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.377
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        3.70      0.30     0.200    56
  APARTMENTS                 B        6.80      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.70      0.30     0.200    56
```



```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.60      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.20      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        9.90      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.387
  SUBAREA AREA(ACRES) =   25.90      SUBAREA RUNOFF(CFS) =   52.69
  EFFECTIVE AREA(ACRES) =     41.70   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       41.7       PEAK FLOW RATE(CFS) =      83.56

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.40
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.377
  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        1.30      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) =    1.30      SUBAREA RUNOFF(CFS) =    2.61
  EFFECTIVE AREA(ACRES) =     43.00   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       43.0       PEAK FLOW RATE(CFS) =      86.17

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 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.) =   11.40
  RAINFALL INTENSITY(INCH/HR) =   2.38
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      43.00
  TOTAL STREAM AREA(ACRES) =      43.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      86.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      135.05    9.94    2.584  0.30( 0.12) 0.41      61.0     410.00
      2       86.17   11.40    2.377  0.30( 0.15) 0.50      43.0     420.00

  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      217.19    9.94    2.584  0.30( 0.13) 0.45      98.5     410.00
     2      209.84   11.40    2.377  0.30( 0.13) 0.45     104.0     420.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     217.19    Tc(MIN.) =     9.94
 EFFECTIVE AREA(ACRES) =      98.50   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      104.0
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    416.00 =    3559.00 FEET.

****************************************************************************
 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) =   415.00  DOWNSTREAM(FEET) =   395.00
 FLOW LENGTH(FEET) =  1084.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  51.0 INCH PIPE IS  41.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.48
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     217.19
 PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =   10.97
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    417.00 =    4643.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   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
 COMMERCIAL                 B        1.70      0.30     0.100    56
 COMMERCIAL                 B        2.90      0.30     0.100    56
 PUBLIC PARK                B        3.60      0.30     0.850    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        4.50      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        4.50      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 =  0.313
 SUBAREA AREA(ACRES) =   17.30      SUBAREA RUNOFF(CFS) =   36.45
 EFFECTIVE AREA(ACRES) =    115.80   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =      121.3       PEAK FLOW RATE(CFS) =     240.42

****************************************************************************
 FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 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
 "8-10 DWELLINGS/ACRE"      B        0.80      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 =  0.400
 SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    2.08
 EFFECTIVE AREA(ACRES) =    116.80   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =      122.3       PEAK FLOW RATE(CFS) =     242.51

****************************************************************************
 FLOW PROCESS FROM NODE    417.00 TO NODE    430.00 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) =   372.00
 FLOW LENGTH(FEET) =  1572.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  57.0 INCH PIPE IS  43.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.71
 ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     242.51
 PIPE TRAVEL TIME(MIN.) =   1.57    Tc(MIN.) =   12.54
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    430.00 =    6215.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.54
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.220
 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        0.20      0.30     0.100    56
 COMMERCIAL                 B        0.40      0.30     0.100    56
 PUBLIC PARK                B        5.70      0.30     0.850    56
 PUBLIC PARK                B        4.50      0.30     0.850    56
 PUBLIC PARK                B        9.40      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.803
 SUBAREA AREA(ACRES) =   20.90      SUBAREA RUNOFF(CFS) =   37.22
 EFFECTIVE AREA(ACRES) =    137.70   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
 TOTAL AREA(ACRES) =      143.2       PEAK FLOW RATE(CFS) =     257.15

****************************************************************************
 FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   12.54
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.220
  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
  PUBLIC PARK                 B        8.90      0.30     0.850    56
  PUBLIC PARK                 B        1.20      0.30     0.850    56
  PUBLIC PARK                 B        3.70      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) =   14.50      SUBAREA RUNOFF(CFS) =   25.64
  EFFECTIVE AREA(ACRES) =    152.20   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      157.7       PEAK FLOW RATE(CFS) =     282.79

********************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 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      282.79   12.54    2.220  0.30( 0.16) 0.52     152.2     410.00
      2      264.51   14.01    2.019  0.30( 0.16) 0.52     157.7     420.00
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    430.00 =    6215.00 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      366.52   18.86    1.674  0.30( 0.13) 0.45     260.7     400.00
      2      339.93   21.35    1.556  0.30( 0.14) 0.45     262.6     430.00
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      612.99   12.54    2.220  0.30( 0.14) 0.48     325.5     410.00
      2      597.78   14.01    2.019  0.30( 0.14) 0.48     351.3     420.00
      3      582.04   18.86    1.674  0.30( 0.14) 0.48     418.4     400.00
      4      538.73   21.35    1.556  0.30( 0.14) 0.48     420.3     430.00
    TOTAL AREA(ACRES) =       420.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      612.99  Tc(MIN.) =   12.540
  EFFECTIVE AREA(ACRES) =    325.53  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      420.3
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    431.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```



```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   372.00  DOWNSTREAM(FEET) =   300.00
  FLOW LENGTH(FEET) =  1358.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  48.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  34.05
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     612.99
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =   13.20
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    431.00 =   11067.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   13.20
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.129
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                  B        7.40      0.30     0.200    56
  APARTMENTS                  B       15.00      0.30     0.200    56
  APARTMENTS                  B        5.80      0.30     0.200    56
  APARTMENTS                  B        2.50      0.30     0.200    56
  COMMERCIAL                  B        9.10      0.30     0.100    56
  COMMERCIAL                  B        1.50      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.174
  SUBAREA AREA(ACRES) =   41.30      SUBAREA RUNOFF(CFS) =   77.19
  EFFECTIVE AREA(ACRES) =    366.83   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      461.6       PEAK FLOW RATE(CFS) =     658.59

********************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   13.20
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.129
  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        0.40      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) =    0.90      SUBAREA RUNOFF(CFS) =    1.70
  EFFECTIVE AREA(ACRES) =    367.73   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      462.5       PEAK FLOW RATE(CFS) =     660.29

********************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    331.00 IS CODE =  11
--------------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
================================================================================
```

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	660.29	13.20	2.129	0.30(0.13)	0.45	367.7	410.00
2	635.21	14.67	1.928	0.30(0.13)	0.45	393.5	420.00
3	623.18	19.53	1.638	0.30(0.13)	0.45	460.6	400.00
4	579.70	22.04	1.528	0.30(0.13)	0.45	462.5	430.00

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 331.00 = 11067.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	976.97	18.83	1.675	0.30(0.12)	0.40	697.8	310.00
2	991.33	22.72	1.500	0.30(0.12)	0.40	799.0	300.00
3	990.91	22.91	1.492	0.30(0.12)	0.40	803.4	320.00
4	856.52	29.55	1.273	0.30(0.13)	0.42	829.8	390.00

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1545.06	13.20	2.129	0.30(0.13)	0.42	857.0	410.00
2	1519.93	14.67	1.928	0.30(0.13)	0.42	937.2	420.00
3	1601.87	18.83	1.675	0.30(0.13)	0.42	1148.8	310.00
4	1602.72	19.53	1.638	0.30(0.13)	0.42	1176.5	400.00
5	1568.53	22.04	1.528	0.30(0.13)	0.42	1243.9	430.00
6	1559.38	22.72	1.500	0.30(0.13)	0.42	1261.5	300.00
7	1555.67	22.91	1.492	0.30(0.13)	0.42	1265.9	320.00
8	1330.34	29.55	1.273	0.30(0.13)	0.43	1292.3	390.00

TOTAL AREA(ACRES) = 1292.3

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 1602.72 Tc(MIN.) = 19.528
EFFECTIVE AREA(ACRES) = 1176.50 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 1292.3
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 1292.3 TC(MIN.) = 19.53
EFFECTIVE AREA(ACRES) = 1176.50 AREA-AVERAGED Fm(INCH/HR)= 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.418
PEAK FLOW RATE(CFS) = 1602.72

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1545.06	13.20	2.129	0.30(0.13)	0.42	857.0	410.00
2	1519.93	14.67	1.928	0.30(0.13)	0.42	937.2	420.00
3	1601.87	18.83	1.675	0.30(0.13)	0.42	1148.8	310.00
4	1602.72	19.53	1.638	0.30(0.13)	0.42	1176.5	400.00
5	1568.53	22.04	1.528	0.30(0.13)	0.42	1243.9	430.00
6	1559.38	22.72	1.500	0.30(0.13)	0.42	1261.5	300.00
7	1555.67	22.91	1.492	0.30(0.13)	0.42	1265.9	320.00
8	1330.34	29.55	1.273	0.30(0.13)	0.43	1292.3	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 1237

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED C                          *
* PHASED NO PA45 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL          *
* 25-YR EV FEB 2023 ROKAMOTO                                             *
 ***********************************************************************

  FILE NAME: 3C25EVRL.DAT
  TIME/DATE OF STUDY: 07:54 02/15/2023
==============================================================================
  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    0.200/0.200/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.200/0.200/ ---    0.33    1.00 0.3120 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) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    644.00  DOWNSTREAM(FEET) =    641.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.438
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.751
  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
  "11+ DWELLINGS/ACRE"       B        1.60      0.30     0.200    56    8.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.32
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      5.32

******************************************************************************
  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) =  641.00  DOWNSTREAM ELEVATION(FEET) =  637.00
  STREET LENGTH(FEET) =   470.00   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) =   15.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.51
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.08
  STREET FLOW TRAVEL TIME(MIN.) =   3.12   Tc(MIN.) =   11.56
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.976
  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        4.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.198
  SUBAREA AREA(ACRES) =    4.40      SUBAREA RUNOFF(CFS) =   11.55
  EFFECTIVE AREA(ACRES) =      6.00    AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.0        PEAK FLOW RATE(CFS) =      15.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.38
  FLOW VELOCITY(FEET/SEC.) =  2.72   DEPTH*VELOCITY(FT*FT/SEC.) =   1.29
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     800.00 FEET.

****************************************************************************
  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) =   637.00  DOWNSTREAM(FEET) =   634.00
  FLOW LENGTH(FEET) =   563.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.89
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.75
  PIPE TRAVEL TIME(MIN.) =   1.59    Tc(MIN.) =   13.15
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =    1363.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.733
  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        5.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.40      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) =    8.00      SUBAREA RUNOFF(CFS) =   19.25
  EFFECTIVE AREA(ACRES) =     14.00   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       14.0       PEAK FLOW RATE(CFS) =      33.69

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 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) =   630.00
  FLOW LENGTH(FEET) =  1072.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.16
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      33.69
  PIPE TRAVEL TIME(MIN.) =   2.90    Tc(MIN.) =   16.05
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =    2435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.05
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.361
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL               B        2.90      0.30     0.100    56
  COMMERCIAL               B        4.50      0.30     0.100    56
  PUBLIC PARK              B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"     B        5.70      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"     B        2.40      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"    B        0.50      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.164
  SUBAREA AREA(ACRES) =   16.10      SUBAREA RUNOFF(CFS) =   33.50
  EFFECTIVE AREA(ACRES) =     30.10   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       30.1       PEAK FLOW RATE(CFS) =      62.50

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.05
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.361
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  SCHOOL                     B        5.70      0.30     0.600    56
  SCHOOL                     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) =   12.40      SUBAREA RUNOFF(CFS) =   24.34
  EFFECTIVE AREA(ACRES) =     42.50   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       42.5       PEAK FLOW RATE(CFS) =      86.85

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 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) =   630.00  DOWNSTREAM(FEET) =   610.00
  FLOW LENGTH(FEET) =  1290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.29
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      86.85
  PIPE TRAVEL TIME(MIN.) =   1.62    Tc(MIN.) =   17.67
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =    3725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.223
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.00      0.30     0.100    56
  COMMERCIAL                 B        0.90      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  SCHOOL                     B        0.10      0.30     0.600    56
  SCHOOL                     B        0.50      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.216
  SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    6.22
  EFFECTIVE AREA(ACRES) =     45.70   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       45.7       PEAK FLOW RATE(CFS) =      87.78

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  3668.00
  ELEVATION DATA: UPSTREAM(FEET) =    663.00  DOWNSTREAM(FEET) =    610.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   18.909
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.117
  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        1.70      0.30     0.100    56   18.91
  COMMERCIAL                 B        4.40      0.30     0.100    56   18.91
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.60      0.30     0.200    56   20.15
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.30      0.30     0.200    56   20.15
  RESIDENTIAL
```



```
  "3-4 DWELLINGS/ACRE"       B        7.10      0.30     0.600    56   25.63
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.80      0.30     0.600    56   25.63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.387
  SUBAREA AREA(ACRES) =   17.90   INITIAL SUBAREA RUNOFF(CFS) =   32.24

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   17.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.223
  SUBAREA AREA(ACRES) =   17.90      SUBAREA RUNOFF(CFS) =   33.94
  EFFECTIVE AREA(ACRES) =     63.60   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =       63.6       PEAK FLOW RATE(CFS) =     121.72

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    317.00 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) =   535.00
  FLOW LENGTH(FEET) =  1537.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.28
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     121.72
  PIPE TRAVEL TIME(MIN.) =   1.15    Tc(MIN.) =   18.82
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    317.00 =    5262.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.82
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.125
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        3.30      0.30     0.100    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    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 =  0.139
  SUBAREA AREA(ACRES) =    4.00      SUBAREA RUNOFF(CFS) =    7.50
  EFFECTIVE AREA(ACRES) =     67.60   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       67.6       PEAK FLOW RATE(CFS) =     123.60

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 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.) =   18.82
  RAINFALL INTENSITY(INCH/HR) =   2.12
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.31
  EFFECTIVE STREAM AREA(ACRES) =      67.60
  TOTAL STREAM AREA(ACRES) =      67.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     123.60

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 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) =    629.00  DOWNSTREAM(FEET) =    625.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.474
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.082
  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    7.47
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.10      0.30     0.200    56    7.97
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.193
  SUBAREA RUNOFF(CFS) =      5.07
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      5.07

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  625.00  DOWNSTREAM ELEVATION(FEET) =  623.00
  STREET LENGTH(FEET) =   300.00   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) =       9.34
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   14.73
```



```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
  STREET FLOW TRAVEL TIME(MIN.) =   2.28   Tc(MIN.) =    9.75
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.298
  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        0.20      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.70      0.30     0.200    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 =  0.141
  SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    8.50
  EFFECTIVE AREA(ACRES) =      4.30    AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        4.3        PEAK FLOW RATE(CFS) =      12.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.68
  FLOW VELOCITY(FEET/SEC.) =  2.35   DEPTH*VELOCITY(FT*FT/SEC.) =   1.08
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    312.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    313.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   623.00  DOWNSTREAM(FEET) =   620.00
  FLOW LENGTH(FEET) =   369.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.40
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.58
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =   10.72
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    313.00 =     999.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.72
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.105
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.90      0.30     0.100    56
  COMMERCIAL                 B        2.50      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.80      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.70      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.125
```

```
  SUBAREA AREA(ACRES) =    5.90      SUBAREA RUNOFF(CFS) =   16.29
  EFFECTIVE AREA(ACRES) =     10.20   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =       10.2       PEAK FLOW RATE(CFS) =      28.12

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    314.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   620.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =   338.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.96
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.12
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   11.28
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    314.00 =    1337.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    314.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.28
  *  25 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
  COMMERCIAL                 B        0.20      0.30     0.100    56
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        6.10      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        6.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.208
  SUBAREA AREA(ACRES) =   12.70      SUBAREA RUNOFF(CFS) =   33.79
  EFFECTIVE AREA(ACRES) =     22.90   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       22.9       PEAK FLOW RATE(CFS) =      61.12

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    315.00 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) =   600.00
  FLOW LENGTH(FEET) =   578.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.55
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.12
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =   11.94
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    315.00 =    1915.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    315.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.94
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.917
  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
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.00      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.10      0.30     0.200    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.70      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        6.00      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.347
  SUBAREA AREA(ACRES) =   17.80      SUBAREA RUNOFF(CFS) =   45.07
  EFFECTIVE AREA(ACRES) =     40.70   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.25
  TOTAL AREA(ACRES) =       40.7       PEAK FLOW RATE(CFS) =     104.11

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    316.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   600.00  DOWNSTREAM(FEET) =   569.00
  FLOW LENGTH(FEET) =  2176.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.42
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     104.11
  PIPE TRAVEL TIME(MIN.) =   2.70    Tc(MIN.) =   14.64
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    316.00 =    4091.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    316.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.64
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.505
  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        0.40      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
```

```
  "5-7 DWELLINGS/ACRE"       B        6.80      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B       19.10      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) =   26.60      SUBAREA RUNOFF(CFS) =   56.38
  EFFECTIVE AREA(ACRES) =     67.30   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =       67.3       PEAK FLOW RATE(CFS) =     145.39

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    317.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   569.00  DOWNSTREAM(FEET) =   535.00
  FLOW LENGTH(FEET) =   759.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.54
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     145.39
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   15.21
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    317.00 =    4850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.21
  *  25 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
  COMMERCIAL                 B        0.40      0.30     0.100    56
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        8.90      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        7.40      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.505
  SUBAREA AREA(ACRES) =   17.50      SUBAREA RUNOFF(CFS) =   35.94
  EFFECTIVE AREA(ACRES) =     84.80   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       84.8       PEAK FLOW RATE(CFS) =     176.98

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 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.) =   15.21
  RAINFALL INTENSITY(INCH/HR) =   2.43
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.38
  EFFECTIVE STREAM AREA(ACRES) =      84.80
  TOTAL STREAM AREA(ACRES) =      84.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     176.98

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      123.60   18.82    2.125  0.30( 0.09) 0.31      67.6     300.00
      2      176.98   15.21    2.433  0.30( 0.11) 0.38      84.8     310.00

  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      292.02   15.21    2.433  0.30( 0.11) 0.35     139.4     310.00
      2      277.04   18.82    2.125  0.30( 0.11) 0.35     152.4     300.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     292.02    Tc(MIN.) =    15.21
  EFFECTIVE AREA(ACRES) =     139.43   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      152.4
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    317.00 =    5262.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    307.00 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) =   374.00
  FLOW LENGTH(FEET) =  3798.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.25
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     292.02
  PIPE TRAVEL TIME(MIN.) =   2.41    Tc(MIN.) =   17.62
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    307.00 =    9060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.62
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.227
  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        1.40      0.30     0.100    56
```

```
  COMMERCIAL                  B        4.80      0.30     0.100    56
  COMMERCIAL                  B        5.00      0.30     0.100    56
  COMMERCIAL                  B        3.70      0.30     0.100    56
  PUBLIC PARK                 B        5.00      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.288
  SUBAREA AREA(ACRES) =   20.00      SUBAREA RUNOFF(CFS) =   38.54
  EFFECTIVE AREA(ACRES) =    159.43   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      172.4       PEAK FLOW RATE(CFS) =     304.72

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.62
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.227
  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        4.00      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       12.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.50      0.30     0.900    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 =  0.364
  SUBAREA AREA(ACRES) =   21.90      SUBAREA RUNOFF(CFS) =   41.75
  EFFECTIVE AREA(ACRES) =    181.33   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      194.3       PEAK FLOW RATE(CFS) =     346.47

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.62
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.227
  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        4.50      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.40      0.30     0.500    56
  SCHOOL                     B        2.20      0.30     0.600    56
  SCHOOL                     B        6.80      0.30     0.600    56
  SCHOOL                     B        7.90      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```



```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.574
  SUBAREA AREA(ACRES) =   22.80      SUBAREA RUNOFF(CFS) =   42.17
  EFFECTIVE AREA(ACRES) =    204.13   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      217.1       PEAK FLOW RATE(CFS) =     388.65

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 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) =   374.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =   847.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  35.04
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     388.65
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   18.02
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    330.00 =    9907.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   18.02
  RAINFALL INTENSITY(INCH/HR) =   2.19
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.37
  EFFECTIVE STREAM AREA(ACRES) =     204.13
  TOTAL STREAM AREA(ACRES) =     217.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     388.65

****************************************************************************
  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) =    636.00  DOWNSTREAM(FEET) =    633.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.438
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.751
  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
  "11+ DWELLINGS/ACRE"       B        2.80      0.30     0.200    56    8.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      9.30
  TOTAL AREA(ACRES) =      2.80   PEAK FLOW RATE(CFS) =      9.30
```

```
****************************************************************************
  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) =  633.00  DOWNSTREAM ELEVATION(FEET) =  628.00
  STREET LENGTH(FEET) =   360.00   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) =      19.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   17.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.62
  STREET FLOW TRAVEL TIME(MIN.) =   1.75   Tc(MIN.) =   10.18
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.186
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        6.30      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  SCHOOL                     B        0.70      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.237
  SUBAREA AREA(ACRES) =    7.30      SUBAREA RUNOFF(CFS) =   20.47
  EFFECTIVE AREA(ACRES) =     10.10    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.23
  TOTAL AREA(ACRES) =       10.1        PEAK FLOW RATE(CFS) =      28.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  19.96
  FLOW VELOCITY(FEET/SEC.) =  3.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.96
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    322.00 =     690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    323.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   628.00  DOWNSTREAM(FEET) =   624.00
  FLOW LENGTH(FEET) =   750.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.5 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.60
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.34
  PIPE TRAVEL TIME(MIN.) =   1.89    Tc(MIN.) =   12.08
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    323.00 =    1440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.08
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.897
  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        2.00      0.30     0.850    56
  PUBLIC PARK                B        2.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.90      0.30     0.200    56
  SCHOOL                     B        3.10      0.30     0.600    56
  SCHOOL                     B        0.30      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) =   14.00      SUBAREA RUNOFF(CFS) =   34.66
  EFFECTIVE AREA(ACRES) =     24.10   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       24.1       PEAK FLOW RATE(CFS) =      60.38

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.08
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.897
  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
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.26
  EFFECTIVE AREA(ACRES) =     24.20   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       24.2       PEAK FLOW RATE(CFS) =      60.63

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    324.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   624.00  DOWNSTREAM(FEET) =   614.00
  FLOW LENGTH(FEET) =   887.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.8 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.76
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.63
  PIPE TRAVEL TIME(MIN.) =   1.37    Tc(MIN.) =   13.45
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    324.00 =    2327.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.45
  *  25 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        1.10      0.30     0.100    56
  COMMERCIAL                B        1.10      0.30     0.100    56
  PUBLIC PARK               B        3.10      0.30     0.850    56
  PUBLIC PARK               B        2.60      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"      B        4.80      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 =  0.416
  SUBAREA AREA(ACRES) =   16.10      SUBAREA RUNOFF(CFS) =   37.13
  EFFECTIVE AREA(ACRES) =     40.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       40.3       PEAK FLOW RATE(CFS) =      93.19

****************************************************************************
  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) =   614.00  DOWNSTREAM(FEET) =   571.00
  FLOW LENGTH(FEET) =  1805.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.73
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      93.19
  PIPE TRAVEL TIME(MIN.) =   1.91    Tc(MIN.) =   15.36
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    325.00 =    4132.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    325.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.36
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.420
  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
  "11+ DWELLINGS/ACRE"      B        5.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.20      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        1.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"      B       13.90      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"      B       18.60      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =   42.00      SUBAREA RUNOFF(CFS) =   86.31
  EFFECTIVE AREA(ACRES) =     82.30   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       82.3       PEAK FLOW RATE(CFS) =     169.80

****************************************************************************
  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) =   571.00  DOWNSTREAM(FEET) =   497.00
  FLOW LENGTH(FEET) =  1090.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.52
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     169.80
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =   16.02
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    326.00 =    5222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.02
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.364
  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        6.10      0.30     0.100    56
  COMMERCIAL                B       12.90      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"      B        0.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B       12.80      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) =   34.00      SUBAREA RUNOFF(CFS) =   68.44
  EFFECTIVE AREA(ACRES) =    116.30   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      116.3       PEAK FLOW RATE(CFS) =     234.07
```

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****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.02
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.364
  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       23.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.890
  SUBAREA AREA(ACRES) =   23.80      SUBAREA RUNOFF(CFS) =   44.91
  EFFECTIVE AREA(ACRES) =    140.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      140.1       PEAK FLOW RATE(CFS) =     278.98

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    327.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =  1732.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  38.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.87
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     278.98
  PIPE TRAVEL TIME(MIN.) =   1.26    Tc(MIN.) =   17.29
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    327.00 =    6954.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.29
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.256
  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
  COMMERCIAL                 B        4.80      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  PUBLIC PARK                B        6.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.00      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       43.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.250
```



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  SUBAREA AREA(ACRES) =   64.30      SUBAREA RUNOFF(CFS) =  126.20
  EFFECTIVE AREA(ACRES) =    204.40   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      204.4       PEAK FLOW RATE(CFS) =     391.59

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.29
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.256
  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       38.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.30      0.30     0.900    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 =  0.293
  SUBAREA AREA(ACRES) =   44.60      SUBAREA RUNOFF(CFS) =   87.02
  EFFECTIVE AREA(ACRES) =    249.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      249.0       PEAK FLOW RATE(CFS) =     478.61

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    328.00 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) =   338.00
  FLOW LENGTH(FEET) =  2664.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  47.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.73
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     478.61
  PIPE TRAVEL TIME(MIN.) =   1.55    Tc(MIN.) =   18.83
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    328.00 =    9618.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.83
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.124
  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
  APARTMENTS                 B       14.80      0.30     0.200    56
  APARTMENTS                 B        1.90      0.30     0.200    56
  APARTMENTS                 B        9.90      0.30     0.200    56
  COMMERCIAL                 B        1.80      0.30     0.100    56
```

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  COMMERCIAL                  B        8.40      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.173
  SUBAREA AREA(ACRES) =   37.30      SUBAREA RUNOFF(CFS) =   69.56
  EFFECTIVE AREA(ACRES) =    286.30   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      286.3       PEAK FLOW RATE(CFS) =     518.59

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.83
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.124
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        7.60      0.30     0.100    56
  COMMERCIAL                  B       14.00      0.30     0.100    56
  PUBLIC PARK                 B        1.40      0.30     0.850    56
  PUBLIC PARK                 B        0.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        0.20      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        0.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.156
  SUBAREA AREA(ACRES) =   23.80      SUBAREA RUNOFF(CFS) =   44.49
  EFFECTIVE AREA(ACRES) =    310.10   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      310.1       PEAK FLOW RATE(CFS) =     563.08

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.83
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.124
  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       12.20      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B       17.60      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.30      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        9.30      0.30     0.900    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 =  0.383
  SUBAREA AREA(ACRES) =   40.50      SUBAREA RUNOFF(CFS) =   73.22
```



```
  EFFECTIVE AREA(ACRES) =    350.60   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =      350.6       PEAK FLOW RATE(CFS) =     636.31

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.83
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.124
  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        5.30      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B       28.30      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        3.80      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        4.10      0.30     0.400    56
  SCHOOL                      B        0.30      0.30     0.600    56
  SCHOOL                      B        0.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.483
  SUBAREA AREA(ACRES) =   42.10      SUBAREA RUNOFF(CFS) =   74.98
  EFFECTIVE AREA(ACRES) =    392.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      392.7       PEAK FLOW RATE(CFS) =     711.29

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    329.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   338.00  DOWNSTREAM(FEET) =   320.00
  FLOW LENGTH(FEET) =  1154.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  84.0 INCH PIPE IS  64.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.36
  ESTIMATED PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     711.29
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   19.69
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    329.00 =   10772.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.69
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.050
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B       11.60      0.30     0.100    56
  COMMERCIAL                  B        6.70      0.30     0.100    56
```

```
  COMMERCIAL                  B       12.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.20      0.30     0.900    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 =  0.110
  SUBAREA AREA(ACRES) =   31.50      SUBAREA RUNOFF(CFS) =   57.19
  EFFECTIVE AREA(ACRES) =    424.20   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      424.2       PEAK FLOW RATE(CFS) =     742.52

****************************************************************************
  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) =   320.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =  1981.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN 108.0 INCH PIPE IS  78.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.93
  ESTIMATED PIPE DIAMETER(INCH) = 108.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     742.52
  PIPE TRAVEL TIME(MIN.) =   2.21    Tc(MIN.) =   21.90
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    330.00 =   12753.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   21.90
  RAINFALL INTENSITY(INCH/HR) =   1.92
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.35
  EFFECTIVE STREAM AREA(ACRES) =     424.20
  TOTAL STREAM AREA(ACRES) =     424.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     742.52

****************************************************************************
  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) =   701.00   CHANNEL SLOPE =  0.0357
  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) =  2.264
  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,BROADLEAF"      B        0.20      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        5.90      0.30     1.000    72
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B       12.70      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.80      0.30     1.000    66
  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) =     118.47
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.46
  AVERAGE FLOW DEPTH(FEET) =   2.30   TRAVEL TIME(MIN.) =   1.57
  Tc(MIN.) =   17.18
  SUBAREA AREA(ACRES) =    35.10       SUBAREA RUNOFF(CFS) =   62.06
  EFFECTIVE AREA(ACRES) =     81.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       81.4         PEAK FLOW RATE(CFS) =     143.92

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.48   FLOW VELOCITY(FEET/SEC.) =   7.82
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    395.00 =    3560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    395.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.18
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  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        1.00      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.70      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.50      0.30     1.000    65
  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 =  0.914
  SUBAREA AREA(ACRES) =    4.30      SUBAREA RUNOFF(CFS) =    7.70
  EFFECTIVE AREA(ACRES) =     85.70   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       85.7       PEAK FLOW RATE(CFS) =     151.62

****************************************************************************
  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) =   437.00
  FLOW LENGTH(FEET) =  6286.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.29
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     151.62
  PIPE TRAVEL TIME(MIN.) =   6.06    Tc(MIN.) =   23.24
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    370.00 =    9846.00 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) =    437.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1963.00   CHANNEL SLOPE =  0.0469
  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) =  1.679
  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        0.50      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.60      0.30     1.000    63
  COMMERCIAL                 B        1.50      0.30     0.100    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  COMMERCIAL                 B        1.60      0.30     0.100    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 =  0.265
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     155.94
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.85
  AVERAGE FLOW DEPTH(FEET) =   2.42   TRAVEL TIME(MIN.) =   3.70
  Tc(MIN.) =   26.94
  SUBAREA AREA(ACRES) =     6.00       SUBAREA RUNOFF(CFS) =    8.64
  EFFECTIVE AREA(ACRES) =     91.70     AREA-AVERAGED Fm(INCH/HR) =   0.28
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.95
  TOTAL AREA(ACRES) =       91.7         PEAK FLOW RATE(CFS) =     151.62
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.40   FLOW VELOCITY(FEET/SEC.) =   8.77
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    371.00 =   11809.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   26.94
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.679
  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        1.40      0.30     1.000    69
  NATURAL FAIR COVER
  "GRASS"                    B        2.80      0.30     1.000    69
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.40      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.40      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) =    8.40      SUBAREA RUNOFF(CFS) =   10.43
  EFFECTIVE AREA(ACRES) =    100.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
```

```
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.95
 TOTAL AREA(ACRES) =      100.1       PEAK FLOW RATE(CFS) =     151.62
 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.) =   26.94
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.679
 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        0.80      0.30     1.000    66
 PUBLIC PARK                B        0.10      0.30     0.850    56
 PUBLIC PARK                B        3.80      0.30     0.850    56
 PUBLIC PARK                B        2.50      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.40      0.30     0.900    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 =  0.877
 SUBAREA AREA(ACRES) =   10.30      SUBAREA RUNOFF(CFS) =   13.13
 EFFECTIVE AREA(ACRES) =    110.40   AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.95
 TOTAL AREA(ACRES) =      110.4       PEAK FLOW RATE(CFS) =     151.62
 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.) =   26.94
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.679
 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        3.50      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        0.10      0.30     0.400    56
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        0.20      0.30     1.000    65
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           B        1.90      0.30     1.000    65
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.924
 SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =    8.58
 EFFECTIVE AREA(ACRES) =    117.20   AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.94
 TOTAL AREA(ACRES) =      117.2       PEAK FLOW RATE(CFS) =     151.62
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```



```
****************************************************************************
 FLOW PROCESS FROM NODE    371.00 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) =   345.00  DOWNSTREAM(FEET) =   310.00
 FLOW LENGTH(FEET) =  1065.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.28
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     151.62
 PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =   27.82
 LONGEST FLOWPATH FROM NODE    390.00 TO NODE    330.00 =   12874.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   27.82
 RAINFALL INTENSITY(INCH/HR) =   1.64
 AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.94
 EFFECTIVE STREAM AREA(ACRES) =     117.20
 TOTAL STREAM AREA(ACRES) =     117.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     151.62

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      388.65   18.02    2.193  0.30( 0.11) 0.37     204.1     310.00
     1      360.50   21.72    1.934  0.30( 0.11) 0.37     217.1     300.00
     2      742.52   21.90    1.925  0.30( 0.11) 0.35     424.2     320.00
     3      151.62   27.82    1.641  0.30( 0.28) 0.94     117.2     390.00

 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     1227.80   18.02    2.193  0.30( 0.13) 0.43     629.1     310.00
     2     1244.61   21.72    1.934  0.30( 0.13) 0.43     729.3     300.00
     3     1245.43   21.90    1.925  0.30( 0.13) 0.43     733.6     320.00
     4     1081.09   27.82    1.641  0.30( 0.13) 0.45     758.5     390.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    1245.43    Tc(MIN.) =    21.90
 EFFECTIVE AREA(ACRES) =     733.59   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =      758.5
 LONGEST FLOWPATH FROM NODE    390.00 TO NODE    330.00 =   12874.00 FEET.
```

```
****************************************************************************
  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) =   310.00  DOWNSTREAM(FEET) =   280.00
  FLOW LENGTH(FEET) =   374.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  75.0 INCH PIPE IS  60.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  47.14
  ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    1245.43
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   22.04
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    331.00 =   13248.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.04
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.918
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B       17.50      0.30     0.200    56
  APARTMENTS                 B        1.50      0.30     0.200    56
  APARTMENTS                 B        0.70      0.30     0.200    56
  NATURAL POOR COVER
  "BARREN"                   B        0.10      0.30     1.000    86
  COMMERCIAL                 B       44.60      0.30     0.100    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 =  0.132
  SUBAREA AREA(ACRES) =   65.10      SUBAREA RUNOFF(CFS) =  110.05
  EFFECTIVE AREA(ACRES) =    798.69   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =      823.6       PEAK FLOW RATE(CFS) =    1290.77

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.04
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.918
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        2.00      0.30     0.100    56
  COMMERCIAL                 B        4.10      0.30     0.100    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 =  0.115
  SUBAREA AREA(ACRES) =    6.20      SUBAREA RUNOFF(CFS) =   10.51
  EFFECTIVE AREA(ACRES) =    804.89   AREA-AVERAGED Fm(INCH/HR) =  0.12
```



```
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      829.8       PEAK FLOW RATE(CFS) =    1301.28

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  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) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =    618.00  DOWNSTREAM(FEET) =    590.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.048
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.573
  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
  "8-10 DWELLINGS/ACRE"      B        1.20      0.30     0.400    56    6.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      4.81
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      4.81

****************************************************************************
  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) =  590.00  DOWNSTREAM ELEVATION(FEET) =  588.00
  STREET LENGTH(FEET) =   274.00   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) =      18.15
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   19.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.33
  STREET FLOW TRAVEL TIME(MIN.) =   1.72   Tc(MIN.) =    7.77
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.980
  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        3.30      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.40      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.486
  SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =   26.57
  EFFECTIVE AREA(ACRES) =      8.90    AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        8.9        PEAK FLOW RATE(CFS) =      30.74

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.58   HALFSTREET FLOOD WIDTH(FEET) =  23.48
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   1.75
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     588.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   588.00  DOWNSTREAM(FEET) =   581.00
  FLOW LENGTH(FEET) =   805.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.29
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.74
  PIPE TRAVEL TIME(MIN.) =   1.62    Tc(MIN.) =    9.39
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1393.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.39
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.424
  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
  ".4 DWELLING/ACRE"         B        2.00      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        8.80      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.10      0.30     0.400    56
```



```
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.90      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.577
  SUBAREA AREA(ACRES) =   15.90      SUBAREA RUNOFF(CFS) =   46.52
  EFFECTIVE AREA(ACRES) =     24.80   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       24.8       PEAK FLOW RATE(CFS) =      72.80

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 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.) =    9.39
  RAINFALL INTENSITY(INCH/HR) =   3.42
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =      24.80
  TOTAL STREAM AREA(ACRES) =      24.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      72.80

****************************************************************************
  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) =    725.00  DOWNSTREAM(FEET) =    630.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.196
  *  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        0.10      0.30     1.000    72    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.30      0.30     1.000    66    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      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) =      4.31
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      4.31

****************************************************************************
  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) =  3.319
  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        0.10      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.70      0.30     1.000    66
  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) =       6.89
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.55
  AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   0.50
  Tc(MIN.) =    9.69
  SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    5.16
  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) =       9.24

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.66   FLOW VELOCITY(FEET/SEC.) =   7.05
  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) =    582.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   520.00   CHANNEL SLOPE =  0.0288
  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) =  2.948
  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        3.70      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.20      0.30     0.600    56
  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 =  0.906
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.22
  AVERAGE FLOW DEPTH(FEET) =   1.16   TRAVEL TIME(MIN.) =   2.05
  Tc(MIN.) =   11.75
  SUBAREA AREA(ACRES) =     6.40       SUBAREA RUNOFF(CFS) =   15.41
  EFFECTIVE AREA(ACRES) =      9.80     AREA-AVERAGED Fm(INCH/HR) =   0.28
```



```
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.94
  TOTAL AREA(ACRES) =        9.8         PEAK FLOW RATE(CFS) =      23.51

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.31   FLOW VELOCITY(FEET/SEC.) =   4.58
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.00 =    1045.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    433.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   582.00  DOWNSTREAM(FEET) =   581.00
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.51
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   11.75
  LONGEST FLOWPATH FROM NODE    430.00 TO NODE    403.00 =    1055.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 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.) =   11.75
  RAINFALL INTENSITY(INCH/HR) =   2.95
  AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.94
  EFFECTIVE STREAM AREA(ACRES) =       9.80
  TOTAL STREAM AREA(ACRES) =       9.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.51

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       72.80    9.39    3.424  0.30( 0.16) 0.54      24.8     400.00
      2       23.51   11.75    2.946  0.30( 0.28) 0.94       9.8     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       94.95    9.39    3.424  0.30( 0.19) 0.64      32.6     400.00
      2       85.66   11.75    2.946  0.30( 0.20) 0.65      34.6     430.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      94.95    Tc(MIN.) =     9.39
  EFFECTIVE AREA(ACRES) =      32.63   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.64
```

```
  TOTAL AREA(ACRES) =       34.6
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1393.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 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) =   581.00  DOWNSTREAM(FEET) =   570.00
  FLOW LENGTH(FEET) =  1056.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  33.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.54
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      94.95
  PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =   10.91
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =    2449.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.91
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.074
  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        0.10      0.30     0.100    56
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      0.30     1.000    66
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        4.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        1.00      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.842
  SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =   19.56
  EFFECTIVE AREA(ACRES) =     40.33   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.68
  TOTAL AREA(ACRES) =       42.3       PEAK FLOW RATE(CFS) =     104.23

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.91
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.074
  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        8.80      0.30     0.500    56
  RESIDENTIAL
```



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  "5-7 DWELLINGS/ACRE"       B        4.20      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        1.10      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.492
  SUBAREA AREA(ACRES) =   14.10      SUBAREA RUNOFF(CFS) =   37.14
  EFFECTIVE AREA(ACRES) =     54.43   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =       56.4       PEAK FLOW RATE(CFS) =     141.37

****************************************************************************
  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) =   570.00  DOWNSTREAM(FEET) =   565.00
  FLOW LENGTH(FEET) =  1526.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  49.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.21
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     141.37
  PIPE TRAVEL TIME(MIN.) =   3.10    Tc(MIN.) =   14.01
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    405.00 =    3975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.01
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.602
  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        1.80      0.30     0.850    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.80      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.80      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        6.10      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.698
  SUBAREA AREA(ACRES) =   13.00      SUBAREA RUNOFF(CFS) =   27.99
  EFFECTIVE AREA(ACRES) =     67.43   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =       69.4       PEAK FLOW RATE(CFS) =     146.21

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.01
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.602
```

```
  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       11.20      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        7.80      0.30     0.400    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 =  0.455
  SUBAREA AREA(ACRES) =   20.40      SUBAREA RUNOFF(CFS) =   45.26
  EFFECTIVE AREA(ACRES) =     87.83   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       89.8       PEAK FLOW RATE(CFS) =     191.47

****************************************************************************
  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) =   565.00  DOWNSTREAM(FEET) =   495.00
  FLOW LENGTH(FEET) =  2168.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.20
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     191.47
  PIPE TRAVEL TIME(MIN.) =   1.70    Tc(MIN.) =   15.72
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    406.00 =    6143.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.72
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.390
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        5.50      0.30     0.100    56
  COMMERCIAL                 B        1.90      0.30     0.100    56
  PUBLIC PARK                B        2.50      0.30     0.850    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       36.40      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       13.60      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.224
  SUBAREA AREA(ACRES) =   60.80      SUBAREA RUNOFF(CFS) =  127.09
  EFFECTIVE AREA(ACRES) =    148.63   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      150.6       PEAK FLOW RATE(CFS) =     301.81

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.72
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.390
  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        4.70      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  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 =  0.868
  SUBAREA AREA(ACRES) =    7.40      SUBAREA RUNOFF(CFS) =   14.18
  EFFECTIVE AREA(ACRES) =    156.03   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =      158.0       PEAK FLOW RATE(CFS) =     315.99

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.72
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.390
  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        9.30      0.30     0.400    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 =  0.400
  SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =   20.84
  EFFECTIVE AREA(ACRES) =    166.23   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =      168.2       PEAK FLOW RATE(CFS) =     336.83

****************************************************************************
  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) =   495.00  DOWNSTREAM(FEET) =   395.00
  FLOW LENGTH(FEET) =  2905.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  43.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.80
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     336.83
 PIPE TRAVEL TIME(MIN.) =   1.95    Tc(MIN.) =   17.67
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    407.00 =    9048.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.67
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.223
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 APARTMENTS                 B        0.30      0.30     0.200    56
 COMMERCIAL                 B        0.60      0.30     0.100    56
 COMMERCIAL                 B        9.10      0.30     0.100    56
 COMMERCIAL                 B        6.70      0.30     0.100    56
 PUBLIC PARK                B        0.50      0.30     0.850    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 =  0.219
 SUBAREA AREA(ACRES) =   19.80      SUBAREA RUNOFF(CFS) =   38.44
 EFFECTIVE AREA(ACRES) =    186.03   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
 TOTAL AREA(ACRES) =      188.0       PEAK FLOW RATE(CFS) =     350.33

****************************************************************************
 FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.67
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.223
 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        0.60      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        2.40      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B       10.60      0.30     0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       B        0.60      0.30     0.200    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.90      0.30     0.900    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 =  0.308
 SUBAREA AREA(ACRES) =   16.80      SUBAREA RUNOFF(CFS) =   32.21
 EFFECTIVE AREA(ACRES) =    202.83   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =      204.8       PEAK FLOW RATE(CFS) =     382.54

****************************************************************************
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```
 FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.67
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.223
 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       14.30      0.30     0.600    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B       15.30      0.30     0.600    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        1.50      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        5.10      0.30     0.500    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 =  0.579
 SUBAREA AREA(ACRES) =   37.50      SUBAREA RUNOFF(CFS) =   69.17
 EFFECTIVE AREA(ACRES) =    240.33   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      242.3       PEAK FLOW RATE(CFS) =     451.71

****************************************************************************
 FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.67
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.223
 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
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        8.40      0.30     0.400    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        2.80      0.30     0.400    56
 SCHOOL                     B        0.60      0.30     0.600    56
 SCHOOL                     B        1.50      0.30     0.600    56
 SCHOOL                     B        3.50      0.30     0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
 SUBAREA AREA(ACRES) =   20.30      SUBAREA RUNOFF(CFS) =   38.12
 EFFECTIVE AREA(ACRES) =    260.63   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      262.6       PEAK FLOW RATE(CFS) =     489.83

****************************************************************************
 FLOW PROCESS FROM NODE    407.00 TO NODE    430.00 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) =   372.00
  FLOW LENGTH(FEET) =   661.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  48.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.55
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     489.83
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   18.07
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    411.00 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) =    535.00  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.368
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.463
  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        0.50      0.30     0.900    56    7.53
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.20      0.30     0.600    56    6.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.814
  SUBAREA RUNOFF(CFS) =      2.66
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      2.66

****************************************************************************
  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) =   495.00  DOWNSTREAM(FEET) =   490.00
  FLOW LENGTH(FEET) =   267.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.98
```



```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.66
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =    7.11
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    412.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.11
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.207
  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        0.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.788
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    6.07
  EFFECTIVE AREA(ACRES) =      2.40   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        2.4       PEAK FLOW RATE(CFS) =       8.57

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    413.00 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) =   480.00
  FLOW LENGTH(FEET) =   520.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.57
  PIPE TRAVEL TIME(MIN.) =   1.05    Tc(MIN.) =    8.16
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    413.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    413.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.16
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.845
  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        0.40      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.810
  SUBAREA AREA(ACRES) =    3.10      SUBAREA RUNOFF(CFS) =   10.05
  EFFECTIVE AREA(ACRES) =      5.50   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        5.5       PEAK FLOW RATE(CFS) =      17.84

****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    414.00 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) =   470.00
  FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.84
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    8.61
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    414.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.61
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.691
  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        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.80      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.00      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.20      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 =  0.654
  SUBAREA AREA(ACRES) =    5.70      SUBAREA RUNOFF(CFS) =   17.93
  EFFECTIVE AREA(ACRES) =     11.20   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       11.2       PEAK FLOW RATE(CFS) =      35.01

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.61
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.691
  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
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.33
  EFFECTIVE AREA(ACRES) =     11.30   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       11.3       PEAK FLOW RATE(CFS) =      35.33

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 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) =   470.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =   528.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.34
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.33
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =    9.15
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    415.00 =    1953.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    415.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.506
  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
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        6.30      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.70      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.448
  SUBAREA AREA(ACRES) =   11.50      SUBAREA RUNOFF(CFS) =   34.90
  EFFECTIVE AREA(ACRES) =     22.80   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       22.8       PEAK FLOW RATE(CFS) =      68.35

****************************************************************************
  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) =   445.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =   650.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.99
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.35
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =    9.72
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    416.00 =    2603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.72
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.310
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        1.60      0.30     0.200    56
  APARTMENTS                 B       10.90      0.30     0.200    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.10      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        7.00      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.189
  SUBAREA AREA(ACRES) =   23.20      SUBAREA RUNOFF(CFS) =   67.93
  EFFECTIVE AREA(ACRES) =     46.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       46.0       PEAK FLOW RATE(CFS) =     132.25

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.72
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.310
  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        0.40      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.90      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        9.30      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.30      0.30     0.400    56
  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 =  0.500
```



```
  SUBAREA AREA(ACRES) =   15.00      SUBAREA RUNOFF(CFS) =   42.66
  EFFECTIVE AREA(ACRES) =     61.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       61.0       PEAK FLOW RATE(CFS) =     174.91

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 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.) =    9.72
  RAINFALL INTENSITY(INCH/HR) =   3.31
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.41
  EFFECTIVE STREAM AREA(ACRES) =      61.00
  TOTAL STREAM AREA(ACRES) =      61.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     174.91

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    421.00 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) =    535.00  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.368
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.463
  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        0.70      0.30     0.900    56    7.53
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.20      0.30     0.600    56    6.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.833
  SUBAREA RUNOFF(CFS) =      3.41
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      3.41

****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    422.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   487.00
  FLOW LENGTH(FEET) =   308.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.22
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.41
```

```
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =    7.08
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    422.00 =     636.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    422.00 TO NODE    422.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.08
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.218
  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
  "3-4 DWELLINGS/ACRE"       B        0.50      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.817
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    6.44
  EFFECTIVE AREA(ACRES) =      2.70   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =        2.7       PEAK FLOW RATE(CFS) =       9.65

****************************************************************************
  FLOW PROCESS FROM NODE    422.00 TO NODE    423.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =   373.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.24
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.65
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    7.75
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    423.00 =    1009.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    423.00 TO NODE    423.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.75
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.987
  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        0.80      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.40      0.30     0.600    56
  RESIDENTIAL
```



```
  "3-4 DWELLINGS/ACRE"       B        1.70      0.30     0.600    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 =  0.750
  SUBAREA AREA(ACRES) =    4.40      SUBAREA RUNOFF(CFS) =   14.90
  EFFECTIVE AREA(ACRES) =      7.10   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.78
  TOTAL AREA(ACRES) =        7.1       PEAK FLOW RATE(CFS) =      23.99

****************************************************************************
  FLOW PROCESS FROM NODE    423.00 TO NODE    424.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   454.00
  FLOW LENGTH(FEET) =   995.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.55
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.99
  PIPE TRAVEL TIME(MIN.) =   1.44    Tc(MIN.) =    9.19
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    424.00 =    2004.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.19
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.493
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.80      0.30     0.200    56
  APARTMENTS                 B        0.40      0.30     0.200    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  PUBLIC PARK                B        0.40      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    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 =  0.626
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    9.82
  EFFECTIVE AREA(ACRES) =     10.40   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       10.4       PEAK FLOW RATE(CFS) =      30.65

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.19
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.493
  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        3.30      0.30      0.600    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 =  0.600
 SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =   16.10
 EFFECTIVE AREA(ACRES) =     15.80   AREA-AVERAGED Fm(INCH/HR) =  0.21
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.69
 TOTAL AREA(ACRES) =       15.8       PEAK FLOW RATE(CFS) =      46.75

****************************************************************************
 FLOW PROCESS FROM NODE    424.00 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) =   454.00  DOWNSTREAM(FEET) =   415.00
 FLOW LENGTH(FEET) =  1555.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.81
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      46.75
 PIPE TRAVEL TIME(MIN.) =   1.88    Tc(MIN.) =   11.07
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    416.00 =    3559.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.07
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.051
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 APARTMENTS                  B        3.70      0.30      0.200    56
 APARTMENTS                  B        6.80      0.30      0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        B        0.70      0.30      0.200    56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        B        2.60      0.30      0.200    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"        B        2.20      0.30      0.600    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"        B        9.90      0.30      0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.387
 SUBAREA AREA(ACRES) =   25.90      SUBAREA RUNOFF(CFS) =   68.42
 EFFECTIVE AREA(ACRES) =     41.70   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =       41.7       PEAK FLOW RATE(CFS) =     108.89

****************************************************************************
 FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
```



```
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.07
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.051
 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        1.30      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) =    1.30      SUBAREA RUNOFF(CFS) =    3.39
 EFFECTIVE AREA(ACRES) =     43.00   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =       43.0       PEAK FLOW RATE(CFS) =     112.29

****************************************************************************
 FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 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.) =   11.07
 RAINFALL INTENSITY(INCH/HR) =   3.05
 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =      43.00
 TOTAL STREAM AREA(ACRES) =      43.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     112.29

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      174.91    9.72    3.310  0.30( 0.12) 0.41      61.0     410.00
     2      112.29   11.07    3.051  0.30( 0.15) 0.50      43.0     420.00

 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      282.34    9.72    3.310  0.30( 0.13) 0.45      98.8     410.00
     2      273.00   11.07    3.051  0.30( 0.13) 0.45     104.0     420.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     282.34    Tc(MIN.) =     9.72
 EFFECTIVE AREA(ACRES) =      98.77   AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =      104.0
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    416.00 =    3559.00 FEET.

****************************************************************************
 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) =   415.00  DOWNSTREAM(FEET) =   395.00
  FLOW LENGTH(FEET) =  1084.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  45.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.82
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     282.34
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =   10.68
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    417.00 =    4643.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.68
  *  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
  COMMERCIAL                 B        1.70      0.30     0.100    56
  COMMERCIAL                 B        2.90      0.30     0.100    56
  PUBLIC PARK                B        3.60      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.50      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.50      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 =  0.313
  SUBAREA AREA(ACRES) =   17.30      SUBAREA RUNOFF(CFS) =   46.96
  EFFECTIVE AREA(ACRES) =    116.07   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      121.3       PEAK FLOW RATE(CFS) =     311.54

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.68
  *  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
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.80      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 =  0.400
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    2.69
  EFFECTIVE AREA(ACRES) =    117.07   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      122.3       PEAK FLOW RATE(CFS) =     314.23
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    430.00 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) =   372.00
  FLOW LENGTH(FEET) =  1572.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  47.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.85
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     314.23
  PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =   12.15
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    430.00 =    6215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.886
  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        0.20      0.30     0.100    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  PUBLIC PARK                B        5.70      0.30     0.850    56
  PUBLIC PARK                B        4.50      0.30     0.850    56
  PUBLIC PARK                B        9.40      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.803
  SUBAREA AREA(ACRES) =   20.90      SUBAREA RUNOFF(CFS) =   49.75
  EFFECTIVE AREA(ACRES) =    137.97   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      143.2       PEAK FLOW RATE(CFS) =     340.38

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.886
  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
  PUBLIC PARK                B        8.90      0.30     0.850    56
  PUBLIC PARK                B        1.20      0.30     0.850    56
  PUBLIC PARK                B        3.70      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) =   14.50      SUBAREA RUNOFF(CFS) =   34.34
  EFFECTIVE AREA(ACRES) =    152.47   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
```

```
  TOTAL AREA(ACRES) =      157.7       PEAK FLOW RATE(CFS) =     374.71

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 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      374.71   12.15    2.886  0.30( 0.16) 0.52     152.5     410.00
      2      358.30   13.50    2.680  0.30( 0.16) 0.52     157.7     420.00
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    430.00 =    6215.00 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      489.83   18.07    2.189  0.30( 0.13) 0.45     260.6     400.00
      2      444.90   20.52    1.997  0.30( 0.14) 0.45     262.6     430.00
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      815.84   12.15    2.886  0.30( 0.14) 0.48     327.7     410.00
      2      811.75   13.50    2.680  0.30( 0.14) 0.48     352.4     420.00
      3      778.47   18.07    2.189  0.30( 0.14) 0.48     418.3     400.00
      4      706.27   20.52    1.997  0.30( 0.14) 0.48     420.3     430.00
    TOTAL AREA(ACRES) =       420.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      815.84  Tc(MIN.) =   12.149
  EFFECTIVE AREA(ACRES) =    327.72  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      420.3
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    431.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   372.00  DOWNSTREAM(FEET) =   300.00
  FLOW LENGTH(FEET) =  1358.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  69.0 INCH PIPE IS  55.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  36.26
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     815.84
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =   12.77
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    431.00 =   11067.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   12.77
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.791
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                  B        7.40      0.30      0.200    56
  APARTMENTS                  B       15.00      0.30      0.200    56
  APARTMENTS                  B        5.80      0.30      0.200    56
  APARTMENTS                  B        2.50      0.30      0.200    56
  COMMERCIAL                  B        9.10      0.30      0.100    56
  COMMERCIAL                  B        1.50      0.30      0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.174
  SUBAREA AREA(ACRES) =   41.30      SUBAREA RUNOFF(CFS) =  101.79
  EFFECTIVE AREA(ACRES) =    369.02   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      461.6       PEAK FLOW RATE(CFS) =     882.32

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.77
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.791
  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        0.40      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) =    0.90      SUBAREA RUNOFF(CFS) =    2.24
  EFFECTIVE AREA(ACRES) =    369.92   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      462.5       PEAK FLOW RATE(CFS) =     884.56

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    331.00 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      884.56   12.77    2.791  0.30( 0.13) 0.45     369.9     410.00
      2      870.31   14.13    2.584  0.30( 0.13) 0.45     394.6     420.00
      3      829.47   18.69    2.135  0.30( 0.13) 0.45     460.5     400.00
      4      761.07   21.16    1.963  0.30( 0.13) 0.45     462.5     430.00
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    331.00 =   11067.00 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     1299.67   18.15    2.182  0.30( 0.12) 0.40     700.4     310.00
      2     1301.25   21.85    1.927  0.30( 0.12) 0.40     800.6     300.00
      3     1301.28   22.04    1.918  0.30( 0.12) 0.40     804.9     320.00
```

```
     4     1127.11   27.95    1.635  0.30( 0.13) 0.42     829.8     390.00
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    331.00 =   13248.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1     2069.21   12.77    2.791  0.30( 0.13) 0.42     862.7     410.00
      2     2079.16   14.13    2.584  0.30( 0.13) 0.42     939.6     420.00
      3     2133.99   18.15    2.182  0.30( 0.13) 0.42    1153.1     310.00
      4     2129.38   18.69    2.135  0.30( 0.13) 0.42    1175.6     400.00
      5     2062.03   21.16    1.963  0.30( 0.13) 0.42    1244.4     430.00
      6     2047.36   21.85    1.927  0.30( 0.13) 0.42    1263.1     300.00
      7     2043.43   22.04    1.918  0.30( 0.13) 0.42    1267.4     320.00
      8     1751.75   27.95    1.635  0.30( 0.13) 0.43    1292.3     390.00
    TOTAL AREA(ACRES) =      1292.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     2133.99  Tc(MIN.) =   18.152
  EFFECTIVE AREA(ACRES) =   1153.06  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =     1292.3
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    331.00 =   13248.00 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =     1292.3  TC(MIN.) =     18.15
  EFFECTIVE AREA(ACRES) =   1153.06  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.418
  PEAK FLOW RATE(CFS)   =    2133.99

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1     2069.21   12.77    2.791  0.30( 0.13) 0.42     862.7     410.00
      2     2079.16   14.13    2.584  0.30( 0.13) 0.42     939.6     420.00
      3     2133.99   18.15    2.182  0.30( 0.13) 0.42    1153.1     310.00
      4     2129.38   18.69    2.135  0.30( 0.13) 0.42    1175.6     400.00
      5     2062.03   21.16    1.963  0.30( 0.13) 0.42    1244.4     430.00
      6     2047.36   21.85    1.927  0.30( 0.13) 0.42    1263.1     300.00
      7     2043.43   22.04    1.918  0.30( 0.13) 0.42    1267.4     320.00
      8     1751.75   27.95    1.635  0.30( 0.13) 0.43    1292.3     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 1237

                         Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED C                          *
* PHASED NO PA45 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL          *
* 50-YR EV DEC 2022 ROKAMOTO                                             *
 ***********************************************************************

  FILE NAME: 3C50EVRL.DAT
  TIME/DATE OF STUDY: 12:29 12/02/2022
==============================================================================
  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    0.200/0.200/ ---    0.67    2.00 0.0312 0.167 0.0150
  3   13.0      8.0    0.200/0.200/ ---    0.33    1.00 0.3120 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) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =    644.00  DOWNSTREAM(FEET) =    641.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.438
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.103
  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
  "11+ DWELLINGS/ACRE"       B        1.60      0.30     0.200    56    8.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.82
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      5.82

******************************************************************************
  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) =  641.00  DOWNSTREAM ELEVATION(FEET) =  637.00
  STREET LENGTH(FEET) =   470.00   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) =      12.15
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =   11.51
  *  50 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
  COMMERCIAL               B        0.10      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"     B        4.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.198
  SUBAREA AREA(ACRES) =    4.40      SUBAREA RUNOFF(CFS) =   12.60
  EFFECTIVE AREA(ACRES) =      6.00    AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.0        PEAK FLOW RATE(CFS) =      17.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  18.01
  FLOW VELOCITY(FEET/SEC.) =  2.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.35
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     800.00 FEET.

****************************************************************************
  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) =   637.00  DOWNSTREAM(FEET) =   634.00
  FLOW LENGTH(FEET) =   563.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.99
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.19
  PIPE TRAVEL TIME(MIN.) =   1.57    Tc(MIN.) =   13.08
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =    1363.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.08
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.985
  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        5.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.40      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) =    8.00      SUBAREA RUNOFF(CFS) =   21.06
  EFFECTIVE AREA(ACRES) =     14.00   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       14.0       PEAK FLOW RATE(CFS) =      36.86

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 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) =   630.00
  FLOW LENGTH(FEET) =  1072.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.86
  PIPE TRAVEL TIME(MIN.) =   2.87    Tc(MIN.) =   15.95
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =    2435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.95
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.587
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL               B        2.90      0.30     0.100    56
  COMMERCIAL               B        4.50      0.30     0.100    56
  PUBLIC PARK              B        0.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"     B        5.70      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"     B        2.40      0.30     0.200    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"    B        0.50      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.164
  SUBAREA AREA(ACRES) =   16.10      SUBAREA RUNOFF(CFS) =   36.77
  EFFECTIVE AREA(ACRES) =     30.10   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       30.1       PEAK FLOW RATE(CFS) =      68.60

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.95
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.587
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  SCHOOL                   B        5.70      0.30     0.600    56
  SCHOOL                   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) =   12.40      SUBAREA RUNOFF(CFS) =   26.86
  EFFECTIVE AREA(ACRES) =     42.50   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       42.5       PEAK FLOW RATE(CFS) =      95.46

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 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) =   630.00  DOWNSTREAM(FEET) =   610.00
  FLOW LENGTH(FEET) =  1290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.40
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      95.46
  PIPE TRAVEL TIME(MIN.) =   1.60    Tc(MIN.) =   17.55
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =    3725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.55
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.445
  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        0.90      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.10      0.30     0.200    56
  SCHOOL                     B        0.10      0.30     0.600    56
  SCHOOL                     B        0.50      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.216
  SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    6.86
  EFFECTIVE AREA(ACRES) =     45.70   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =       45.7       PEAK FLOW RATE(CFS) =      96.92

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  3668.00
  ELEVATION DATA: UPSTREAM(FEET) =    663.00  DOWNSTREAM(FEET) =    610.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   18.909
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.326
  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        1.70      0.30     0.100    56   18.91
  COMMERCIAL                 B        4.40      0.30     0.100    56   18.91
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.60      0.30     0.200    56   20.15
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.30      0.30     0.200    56   20.15
  RESIDENTIAL
```



```
  "3-4 DWELLINGS/ACRE"       B        7.10      0.30     0.600    56   25.63
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.80      0.30     0.600    56   25.63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.387
  SUBAREA AREA(ACRES) =   17.90   INITIAL SUBAREA RUNOFF(CFS) =   35.60

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   17.55
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.445
  SUBAREA AREA(ACRES) =   17.90      SUBAREA RUNOFF(CFS) =   37.52
  EFFECTIVE AREA(ACRES) =     63.60   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =       63.6       PEAK FLOW RATE(CFS) =     134.44

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    317.00 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) =   535.00
  FLOW LENGTH(FEET) =  1537.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.52
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     134.44
  PIPE TRAVEL TIME(MIN.) =   1.14    Tc(MIN.) =   18.69
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    317.00 =    5262.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.69
  *  50 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        3.30      0.30     0.100    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    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 =  0.139
  SUBAREA AREA(ACRES) =    4.00      SUBAREA RUNOFF(CFS) =    8.29
  EFFECTIVE AREA(ACRES) =     67.60   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =       67.6       PEAK FLOW RATE(CFS) =     137.00

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 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.) =   18.69
  RAINFALL INTENSITY(INCH/HR) =   2.35
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.31
  EFFECTIVE STREAM AREA(ACRES) =      67.60
  TOTAL STREAM AREA(ACRES) =      67.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     137.00

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 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) =    629.00  DOWNSTREAM(FEET) =    625.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.474
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.482
  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    7.47
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.10      0.30     0.200    56    7.97
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.193
  SUBAREA RUNOFF(CFS) =      5.57
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      5.57

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  625.00  DOWNSTREAM ELEVATION(FEET) =  623.00
  STREET LENGTH(FEET) =   300.00   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) =      10.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.35
```



```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
  STREET FLOW TRAVEL TIME(MIN.) =   2.24   Tc(MIN.) =    9.72
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.601
  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        0.20      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.70      0.30     0.200    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 =  0.141
  SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    9.29
  EFFECTIVE AREA(ACRES) =      4.30    AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        4.3        PEAK FLOW RATE(CFS) =      13.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.30
  FLOW VELOCITY(FEET/SEC.) =  2.40   DEPTH*VELOCITY(FT*FT/SEC.) =   1.13
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    312.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    313.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   623.00  DOWNSTREAM(FEET) =   620.00
  FLOW LENGTH(FEET) =   369.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.69
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.75
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   10.64
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    313.00 =     999.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.64
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.386
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.90      0.30     0.100    56
  COMMERCIAL                 B        2.50      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.80      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.70      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.125
```

```
  SUBAREA AREA(ACRES) =    5.90      SUBAREA RUNOFF(CFS) =   17.78
  EFFECTIVE AREA(ACRES) =     10.20   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =       10.2       PEAK FLOW RATE(CFS) =      30.70

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    314.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   620.00  DOWNSTREAM(FEET) =   615.00
  FLOW LENGTH(FEET) =   338.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.10
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.70
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   11.19
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    314.00 =    1337.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    314.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.19
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.294
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.20      0.30     0.100    56
  COMMERCIAL                 B        0.10      0.30     0.100    56
  PUBLIC PARK                B        0.20      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        6.10      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        6.10      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.208
  SUBAREA AREA(ACRES) =   12.70      SUBAREA RUNOFF(CFS) =   36.94
  EFFECTIVE AREA(ACRES) =     22.90   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       22.9       PEAK FLOW RATE(CFS) =      66.80

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    315.00 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) =   600.00
  FLOW LENGTH(FEET) =   578.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.21
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      66.80
  PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   11.83
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    315.00 =    1915.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    315.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.83
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.190
  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
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        3.00      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.10      0.30     0.200    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        3.70      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        6.00      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.347
  SUBAREA AREA(ACRES) =   17.80      SUBAREA RUNOFF(CFS) =   49.44
  EFFECTIVE AREA(ACRES) =     40.70   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.25
  TOTAL AREA(ACRES) =       40.7       PEAK FLOW RATE(CFS) =     114.10

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    316.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   600.00  DOWNSTREAM(FEET) =   569.00
  FLOW LENGTH(FEET) =  2176.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.87
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     114.10
  PIPE TRAVEL TIME(MIN.) =   2.61    Tc(MIN.) =   14.44
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    316.00 =    4091.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    316.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.44
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.762
  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        0.40      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
```

```
  "5-7 DWELLINGS/ACRE"       B        6.80      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B       19.10      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) =   26.60      SUBAREA RUNOFF(CFS) =   62.52
  EFFECTIVE AREA(ACRES) =     67.30   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =       67.3       PEAK FLOW RATE(CFS) =     160.92

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    317.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   569.00  DOWNSTREAM(FEET) =   535.00
  FLOW LENGTH(FEET) =   759.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.77
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     160.92
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   15.00
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    317.00 =    4850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.00
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.670
  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
  COMMERCIAL                 B        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.70      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        8.90      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        7.40      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.505
  SUBAREA AREA(ACRES) =   17.50      SUBAREA RUNOFF(CFS) =   39.68
  EFFECTIVE AREA(ACRES) =     84.80   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       84.8       PEAK FLOW RATE(CFS) =     195.07

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    317.00 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.) =   15.00
  RAINFALL INTENSITY(INCH/HR) =   2.67
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.38
  EFFECTIVE STREAM AREA(ACRES) =      84.80
  TOTAL STREAM AREA(ACRES) =      84.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     195.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      137.00   18.69    2.345  0.30( 0.09) 0.31      67.6     300.00
      2      195.07   15.00    2.670  0.30( 0.11) 0.38      84.8     310.00

  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      320.88   15.00    2.670  0.30( 0.11) 0.35     139.0     310.00
      2      307.26   18.69    2.345  0.30( 0.11) 0.35     152.4     300.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     320.88    Tc(MIN.) =    15.00
  EFFECTIVE AREA(ACRES) =     139.04   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      152.4
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    317.00 =    5262.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    307.00 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) =   374.00
  FLOW LENGTH(FEET) =  3798.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  40.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.49
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     320.88
  PIPE TRAVEL TIME(MIN.) =   2.39    Tc(MIN.) =   17.39
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    307.00 =    9060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.39
  *  50 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
  APARTMENTS                 B        0.10      0.30     0.200    56
  COMMERCIAL                 B        1.40      0.30     0.100    56
```

```
  COMMERCIAL                  B        4.80      0.30     0.100    56
  COMMERCIAL                  B        5.00      0.30     0.100    56
  COMMERCIAL                  B        3.70      0.30     0.100    56
  PUBLIC PARK                 B        5.00      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.288
  SUBAREA AREA(ACRES) =   20.00      SUBAREA RUNOFF(CFS) =   42.72
  EFFECTIVE AREA(ACRES) =    159.04   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      172.4       PEAK FLOW RATE(CFS) =     337.27

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.39
  *  50 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
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.00      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       12.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.10      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.50      0.30     0.900    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 =  0.364
  SUBAREA AREA(ACRES) =   21.90      SUBAREA RUNOFF(CFS) =   46.33
  EFFECTIVE AREA(ACRES) =    180.94   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      194.3       PEAK FLOW RATE(CFS) =     383.60

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.39
  *  50 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
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.50      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.40      0.30     0.500    56
  SCHOOL                     B        2.20      0.30     0.600    56
  SCHOOL                     B        6.80      0.30     0.600    56
  SCHOOL                     B        7.90      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```



```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.574
  SUBAREA AREA(ACRES) =   22.80      SUBAREA RUNOFF(CFS) =   46.94
  EFFECTIVE AREA(ACRES) =    203.74   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      217.1       PEAK FLOW RATE(CFS) =     430.54

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 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) =   374.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =   847.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  40.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  35.38
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     430.54
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   17.79
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    330.00 =    9907.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   17.79
  RAINFALL INTENSITY(INCH/HR) =   2.42
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.37
  EFFECTIVE STREAM AREA(ACRES) =     203.74
  TOTAL STREAM AREA(ACRES) =     217.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     430.54

****************************************************************************
  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) =    636.00  DOWNSTREAM(FEET) =    633.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.438
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.103
  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
  "11+ DWELLINGS/ACRE"       B        2.80      0.30     0.200    56    8.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =     10.19
  TOTAL AREA(ACRES) =      2.80   PEAK FLOW RATE(CFS) =     10.19
```

```
****************************************************************************
  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) =  633.00  DOWNSTREAM ELEVATION(FEET) =  628.00
  STREET LENGTH(FEET) =   360.00   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) =      21.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.48
    HALFSTREET FLOOD WIDTH(FEET) =   17.85
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.51
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.69
  STREET FLOW TRAVEL TIME(MIN.) =   1.71   Tc(MIN.) =   10.15
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.466
  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        6.30      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.20      0.30     0.200    56
  SCHOOL                     B        0.70      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.237
  SUBAREA AREA(ACRES) =    7.30      SUBAREA RUNOFF(CFS) =   22.31
  EFFECTIVE AREA(ACRES) =     10.10    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.23
  TOTAL AREA(ACRES) =       10.1        PEAK FLOW RATE(CFS) =      30.89

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.66
  FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   2.05
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    322.00 =     690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    323.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   628.00  DOWNSTREAM(FEET) =   624.00
  FLOW LENGTH(FEET) =   750.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.2 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.92
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.89
  PIPE TRAVEL TIME(MIN.) =   1.81    Tc(MIN.) =   11.95
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    323.00 =    1440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.95
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.170
  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        2.00      0.30     0.850    56
  PUBLIC PARK                B        2.10      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.90      0.30     0.200    56
  SCHOOL                     B        3.10      0.30     0.600    56
  SCHOOL                     B        0.30      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) =   14.00      SUBAREA RUNOFF(CFS) =   38.10
  EFFECTIVE AREA(ACRES) =     24.10   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       24.1       PEAK FLOW RATE(CFS) =      66.29

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.95
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.170
  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
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.28
  EFFECTIVE AREA(ACRES) =     24.20   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       24.2       PEAK FLOW RATE(CFS) =      66.57

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    324.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   624.00  DOWNSTREAM(FEET) =   614.00
  FLOW LENGTH(FEET) =   887.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.2 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.83
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      66.57
  PIPE TRAVEL TIME(MIN.) =   1.36    Tc(MIN.) =   13.32
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    324.00 =    2327.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.32
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.946
  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        1.10      0.30     0.100    56
  PUBLIC PARK                B        3.10      0.30     0.850    56
  PUBLIC PARK                B        2.60      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.80      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 =  0.416
  SUBAREA AREA(ACRES) =   16.10      SUBAREA RUNOFF(CFS) =   40.88
  EFFECTIVE AREA(ACRES) =     40.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       40.3       PEAK FLOW RATE(CFS) =     102.57

****************************************************************************
  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) =   614.00  DOWNSTREAM(FEET) =   571.00
  FLOW LENGTH(FEET) =  1805.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.35
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     102.57
  PIPE TRAVEL TIME(MIN.) =   1.84    Tc(MIN.) =   15.16
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    325.00 =    4132.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    325.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.16
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.656
  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
  "11+ DWELLINGS/ACRE"       B        5.00      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B       13.90      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B       18.60      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =   42.00      SUBAREA RUNOFF(CFS) =   95.24
  EFFECTIVE AREA(ACRES) =     82.30   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       82.3       PEAK FLOW RATE(CFS) =     187.30

****************************************************************************
  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) =   571.00  DOWNSTREAM(FEET) =   497.00
  FLOW LENGTH(FEET) =  1090.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.91
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     187.30
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   15.81
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    326.00 =    5222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.81
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.599
  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        6.10      0.30     0.100    56
  COMMERCIAL                 B       12.90      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.30      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B       12.80      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) =   34.00      SUBAREA RUNOFF(CFS) =   75.64
  EFFECTIVE AREA(ACRES) =    116.30   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      116.3       PEAK FLOW RATE(CFS) =     258.70
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.81
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.599
  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       23.20      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.890
  SUBAREA AREA(ACRES) =   23.80      SUBAREA RUNOFF(CFS) =   49.95
  EFFECTIVE AREA(ACRES) =    140.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =      140.1       PEAK FLOW RATE(CFS) =     308.65

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    327.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =  1732.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  42.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.14
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     308.65
  PIPE TRAVEL TIME(MIN.) =   1.25    Tc(MIN.) =   17.06
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    327.00 =    6954.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.06
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.489
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        4.80      0.30     0.100    56
  COMMERCIAL                 B        4.80      0.30     0.100    56
  PUBLIC PARK                B        0.10      0.30     0.850    56
  PUBLIC PARK                B        6.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        5.00      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       43.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.250
```



```
  SUBAREA AREA(ACRES) =   64.30      SUBAREA RUNOFF(CFS) =  139.71
  EFFECTIVE AREA(ACRES) =    204.40   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      204.4       PEAK FLOW RATE(CFS) =     434.52

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.06
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.489
  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       38.70      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.30      0.30     0.900    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 =  0.293
  SUBAREA AREA(ACRES) =   44.60      SUBAREA RUNOFF(CFS) =   96.39
  EFFECTIVE AREA(ACRES) =    249.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      249.0       PEAK FLOW RATE(CFS) =     530.91

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    328.00 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) =   338.00
  FLOW LENGTH(FEET) =  2664.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  48.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.63
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     530.91
  PIPE TRAVEL TIME(MIN.) =   1.50    Tc(MIN.) =   18.55
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    328.00 =    9618.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 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
  APARTMENTS                 B        0.50      0.30     0.200    56
  APARTMENTS                 B       14.80      0.30     0.200    56
  APARTMENTS                 B        1.90      0.30     0.200    56
  APARTMENTS                 B        9.90      0.30     0.200    56
  COMMERCIAL                 B        1.80      0.30     0.100    56
```

```
  COMMERCIAL                  B        8.40      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.173
  SUBAREA AREA(ACRES) =   37.30      SUBAREA RUNOFF(CFS) =   77.39
  EFFECTIVE AREA(ACRES) =    286.30   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      286.3       PEAK FLOW RATE(CFS) =     578.75

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 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        7.60      0.30     0.100    56
  COMMERCIAL                  B       14.00      0.30     0.100    56
  PUBLIC PARK                 B        1.40      0.30     0.850    56
  PUBLIC PARK                 B        0.30      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        0.20      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B        0.30      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.156
  SUBAREA AREA(ACRES) =   23.80      SUBAREA RUNOFF(CFS) =   49.49
  EFFECTIVE AREA(ACRES) =    310.10   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      310.1       PEAK FLOW RATE(CFS) =     628.24

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 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
  "11+ DWELLINGS/ACRE"        B       12.20      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        B       17.60      0.30     0.200    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.30      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        9.30      0.30     0.900    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 =  0.383
  SUBAREA AREA(ACRES) =   40.50      SUBAREA RUNOFF(CFS) =   81.73
```



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  EFFECTIVE AREA(ACRES) =    350.60   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =      350.6       PEAK FLOW RATE(CFS) =     709.97

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 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
  "5-7 DWELLINGS/ACRE"        B        5.30      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        B       28.30      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        3.80      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       B        4.10      0.30     0.400    56
  SCHOOL                      B        0.30      0.30     0.600    56
  SCHOOL                      B        0.30      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.483
  SUBAREA AREA(ACRES) =   42.10      SUBAREA RUNOFF(CFS) =   83.83
  EFFECTIVE AREA(ACRES) =    392.70   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      392.7       PEAK FLOW RATE(CFS) =     793.80

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    329.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   338.00  DOWNSTREAM(FEET) =   320.00
  FLOW LENGTH(FEET) =  1154.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  87.0 INCH PIPE IS  68.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.92
  ESTIMATED PIPE DIAMETER(INCH) =  87.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     793.80
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   19.39
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    329.00 =   10772.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.39
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.283
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B       11.60      0.30     0.100    56
  COMMERCIAL                  B        6.70      0.30     0.100    56
```

```
  COMMERCIAL                  B       12.80      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        0.20      0.30     0.900    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 =  0.110
  SUBAREA AREA(ACRES) =   31.50      SUBAREA RUNOFF(CFS) =   63.80
  EFFECTIVE AREA(ACRES) =    424.20   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      424.2       PEAK FLOW RATE(CFS) =     831.50

****************************************************************************
  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) =   320.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =  1981.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN 108.0 INCH PIPE IS  87.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.08
  ESTIMATED PIPE DIAMETER(INCH) = 108.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     831.50
  PIPE TRAVEL TIME(MIN.) =   2.19    Tc(MIN.) =   21.58
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    330.00 =   12753.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   21.58
  RAINFALL INTENSITY(INCH/HR) =   2.13
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.35
  EFFECTIVE STREAM AREA(ACRES) =     424.20
  TOTAL STREAM AREA(ACRES) =     424.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     831.50

****************************************************************************
  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
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  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) =   701.00   CHANNEL SLOPE =  0.0357
  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) =  2.495
  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,BROADLEAF"      B        0.20      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B        5.90      0.30     1.000    72
  NATURAL FAIR COVER
  "CHAPARRAL,NARROWLEAF"     B       12.70      0.30     1.000    72
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        6.80      0.30     1.000    66
  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) =     131.75
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.63
  AVERAGE FLOW DEPTH(FEET) =   2.40   TRAVEL TIME(MIN.) =   1.53
  Tc(MIN.) =   16.99
  SUBAREA AREA(ACRES) =    35.10       SUBAREA RUNOFF(CFS) =   69.34
  EFFECTIVE AREA(ACRES) =     81.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       81.4         PEAK FLOW RATE(CFS) =     160.80

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.58   FLOW VELOCITY(FEET/SEC.) =   8.03
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    395.00 =    3560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    395.00 TO NODE    395.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.99
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.495
  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        1.00      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.70      0.30     0.900    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           B        0.50      0.30     1.000    65
  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 =  0.914
  SUBAREA AREA(ACRES) =    4.30      SUBAREA RUNOFF(CFS) =    8.59
  EFFECTIVE AREA(ACRES) =     85.70   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       85.7       PEAK FLOW RATE(CFS) =     169.40

****************************************************************************
  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) =   437.00
  FLOW LENGTH(FEET) =  6286.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  33.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.89
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     169.40
  PIPE TRAVEL TIME(MIN.) =   5.86    Tc(MIN.) =   22.85
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    370.00 =    9846.00 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) =    437.00  DOWNSTREAM(FEET) =    345.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1963.00   CHANNEL SLOPE =  0.0469
  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) =  1.870
  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        0.50      0.30     1.000    63
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      B        0.60      0.30     1.000    63
  COMMERCIAL                 B        1.50      0.30     0.100    56
  COMMERCIAL                 B        0.70      0.30     0.100    56
  COMMERCIAL                 B        1.60      0.30     0.100    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 =  0.265
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     174.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.09
  AVERAGE FLOW DEPTH(FEET) =   2.53   TRAVEL TIME(MIN.) =   3.60
  Tc(MIN.) =   26.45
  SUBAREA AREA(ACRES) =     6.00       SUBAREA RUNOFF(CFS) =    9.67
  EFFECTIVE AREA(ACRES) =     91.70     AREA-AVERAGED Fm(INCH/HR) =   0.28
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.95
  TOTAL AREA(ACRES) =       91.7         PEAK FLOW RATE(CFS) =     169.40
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.51   FLOW VELOCITY(FEET/SEC.) =   9.00
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    371.00 =   11809.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    371.00 TO NODE    371.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   26.45
  *  50 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
  NATURAL FAIR COVER
  "GRASS"                    B        1.40      0.30     1.000    69
  NATURAL FAIR COVER
  "GRASS"                    B        2.80      0.30     1.000    69
  NATURAL FAIR COVER
  "GRASS"                    B        0.10      0.30     1.000    69
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.40      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30     1.000    66
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        3.40      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) =    8.40      SUBAREA RUNOFF(CFS) =   11.87
  EFFECTIVE AREA(ACRES) =    100.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =      100.1       PEAK FLOW RATE(CFS) =     169.40
  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.) =   26.45
  *  50 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
  NATURAL FAIR COVER
  "OPEN BRUSH"              B        0.80      0.30     1.000    66
  PUBLIC PARK               B        0.10      0.30     0.850    56
  PUBLIC PARK               B        3.80      0.30     0.850    56
  PUBLIC PARK               B        2.50      0.30     0.850    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        2.40      0.30     0.900    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 =  0.877
  SUBAREA AREA(ACRES) =   10.30      SUBAREA RUNOFF(CFS) =   14.90
  EFFECTIVE AREA(ACRES) =    110.40   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =      110.4       PEAK FLOW RATE(CFS) =     169.40
  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.) =   26.45
  *  50 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
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        3.50      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        1.10      0.30     0.900    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"     B        0.10      0.30     0.400    56
  NATURAL FAIR COVER
  "WOODLAND,GRASS"          B        0.20      0.30     1.000    65
  NATURAL FAIR COVER
  "WOODLAND,GRASS"          B        1.90      0.30     1.000    65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.924
  SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =    9.75
  EFFECTIVE AREA(ACRES) =    117.20   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =      117.2       PEAK FLOW RATE(CFS) =     169.40
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    371.00 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) =   345.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =  1065.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  33.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.50
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     169.40
  PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =   27.31
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    330.00 =   12874.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 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.) =   27.31
  RAINFALL INTENSITY(INCH/HR) =   1.84
  AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.94
  EFFECTIVE STREAM AREA(ACRES) =     117.20
  TOTAL STREAM AREA(ACRES) =     117.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     169.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      430.54   17.79    2.425  0.30( 0.11) 0.37     203.7     310.00
      1      401.15   21.49    2.140  0.30( 0.11) 0.37     217.1     300.00
      2      831.50   21.58    2.134  0.30( 0.11) 0.35     424.2     320.00
      3      169.40   27.31    1.837  0.30( 0.28) 0.94     117.2     390.00

  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     1366.17   17.79    2.425  0.30( 0.13) 0.43     629.6     310.00
      2     1390.60   21.49    2.140  0.30( 0.13) 0.43     731.7     300.00
      3     1390.96   21.58    2.134  0.30( 0.13) 0.43     733.9     320.00
      4     1220.40   27.31    1.837  0.30( 0.13) 0.45     758.5     390.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1390.96    Tc(MIN.) =    21.58
  EFFECTIVE AREA(ACRES) =     733.91   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      758.5
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    330.00 =   12874.00 FEET.
```

```
****************************************************************************
  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) =   310.00  DOWNSTREAM(FEET) =   280.00
  FLOW LENGTH(FEET) =   374.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  78.0 INCH PIPE IS  63.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  48.39
  ESTIMATED PIPE DIAMETER(INCH) =  78.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    1390.96
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   21.71
  LONGEST FLOWPATH FROM NODE    390.00 TO NODE    331.00 =   13248.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.71
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.126
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B       17.50      0.30      0.200    56
  APARTMENTS                 B        1.50      0.30      0.200    56
  APARTMENTS                 B        0.70      0.30      0.200    56
  NATURAL POOR COVER
  "BARREN"                   B        0.10      0.30      1.000    86
  COMMERCIAL                 B       44.60      0.30      0.100    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 =  0.132
  SUBAREA AREA(ACRES) =   65.10      SUBAREA RUNOFF(CFS) =  122.25
  EFFECTIVE AREA(ACRES) =    799.01   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =      823.6       PEAK FLOW RATE(CFS) =    1440.96

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1     1433.61   17.91    2.414  0.30( 0.12) 0.40     694.7     310.00
      2     1441.03   21.62    2.132  0.30( 0.12) 0.41     796.8     300.00
      3     1440.96   21.71    2.126  0.30( 0.12) 0.41     799.0     320.00
      4     1263.58   27.44    1.832  0.30( 0.13) 0.42     823.6     390.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =    1441.03  Tc(MIN.) =   21.62
  AREA-AVERAGED Fm(INCH/HR) =  0.12  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.41  EFFECTIVE AREA(ACRES) =     796.75

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.62
```



```
  *  50 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        2.00      0.30      0.100    56
  COMMERCIAL                 B        4.10      0.30      0.100    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 =  0.115
  SUBAREA AREA(ACRES) =    6.20      SUBAREA RUNOFF(CFS) =   11.70
  EFFECTIVE AREA(ACRES) =    802.95   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =      829.8       PEAK FLOW RATE(CFS) =    1452.73

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  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) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =    618.00  DOWNSTREAM(FEET) =    590.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.048
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  5.042
  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
  "8-10 DWELLINGS/ACRE"      B        1.20      0.30      0.400    56    6.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      5.32
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      5.32

****************************************************************************
  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) =  590.00  DOWNSTREAM ELEVATION(FEET) =  588.00
  STREET LENGTH(FEET) =   274.00   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) =      20.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   19.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.40
  STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =    7.73
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.381
  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        3.30      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.40      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.486
  SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =   29.35
  EFFECTIVE AREA(ACRES) =      8.90    AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        8.9        PEAK FLOW RATE(CFS) =      33.95

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.60   HALFSTREET FLOOD WIDTH(FEET) =  24.41
  FLOW VELOCITY(FEET/SEC.) =  3.08   DEPTH*VELOCITY(FT*FT/SEC.) =   1.84
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     588.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   588.00  DOWNSTREAM(FEET) =   581.00
  FLOW LENGTH(FEET) =   805.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.40
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      33.95
  PIPE TRAVEL TIME(MIN.) =   1.60    Tc(MIN.) =    9.33
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1393.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.33
```



```
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.754
  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
  ".4 DWELLING/ACRE"         B        2.00      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        8.80      0.30     0.600    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.10      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        4.90      0.30     0.400    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.577
  SUBAREA AREA(ACRES) =   15.90      SUBAREA RUNOFF(CFS) =   51.24
  EFFECTIVE AREA(ACRES) =     24.80   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       24.8       PEAK FLOW RATE(CFS) =      80.17

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 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.) =    9.33
  RAINFALL INTENSITY(INCH/HR) =   3.75
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =      24.80
  TOTAL STREAM AREA(ACRES) =      24.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      80.17

****************************************************************************
  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) =    725.00  DOWNSTREAM(FEET) =    630.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.196
  *  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        0.10      0.30     1.000    72    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        1.30      0.30     1.000    66    9.20
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.10      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) =      4.73
 TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      4.73

****************************************************************************
 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) =  3.615
 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        0.10      0.30     1.000    72
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        1.70      0.30     1.000    66
 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) =       7.57
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.71
 AVERAGE FLOW DEPTH(FEET) =   0.61   TRAVEL TIME(MIN.) =   0.49
 Tc(MIN.) =    9.68
 SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    5.67
 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) =      10.14

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   7.23
 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) =    582.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   520.00   CHANNEL SLOPE =  0.0288
 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) =  3.215
 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        3.70      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
```



```
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        1.20      0.30     0.600    56
 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 =  0.906
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.63
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.35
 AVERAGE FLOW DEPTH(FEET) =   1.19   TRAVEL TIME(MIN.) =   1.99
 Tc(MIN.) =   11.68
 SUBAREA AREA(ACRES) =     6.40       SUBAREA RUNOFF(CFS) =   16.95
 EFFECTIVE AREA(ACRES) =      9.80     AREA-AVERAGED Fm(INCH/HR) =   0.28
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.94
 TOTAL AREA(ACRES) =        9.8         PEAK FLOW RATE(CFS) =      25.87

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.36   FLOW VELOCITY(FEET/SEC.) =   4.70
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    433.00 =    1045.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    433.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   582.00  DOWNSTREAM(FEET) =   581.00
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.90
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      25.87
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   11.68
 LONGEST FLOWPATH FROM NODE    430.00 TO NODE    403.00 =    1055.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 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.) =   11.68
 RAINFALL INTENSITY(INCH/HR) =   3.21
 AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.94
 EFFECTIVE STREAM AREA(ACRES) =       9.80
 TOTAL STREAM AREA(ACRES) =       9.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.87

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       80.17    9.33    3.754  0.30( 0.16) 0.54      24.8     400.00
     2       25.87   11.68    3.214  0.30( 0.28) 0.94       9.8     430.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
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 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      104.63    9.33    3.754  0.30( 0.19) 0.64      32.6     400.00
     2       93.99   11.68    3.214  0.30( 0.20) 0.65      34.6     430.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     104.63    Tc(MIN.) =     9.33
 EFFECTIVE AREA(ACRES) =      32.62   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.64
 TOTAL AREA(ACRES) =       34.6
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1393.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    403.00 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) =   581.00  DOWNSTREAM(FEET) =   570.00
 FLOW LENGTH(FEET) =  1056.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.99
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     104.63
 PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =   10.80
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    404.00 =    2449.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.80
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.359
 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        0.10      0.30     0.100    56
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.10      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        4.90      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.50      0.30     0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        1.00      0.30     0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.842
 SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =   21.53
 EFFECTIVE AREA(ACRES) =     40.32   AREA-AVERAGED Fm(INCH/HR) =  0.20
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.68
 TOTAL AREA(ACRES) =       42.3       PEAK FLOW RATE(CFS) =     114.57

****************************************************************************
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 FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.80
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.359
 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        8.80      0.30     0.500    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        4.20      0.30     0.500    56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      B        1.10      0.30     0.400    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.492
 SUBAREA AREA(ACRES) =   14.10      SUBAREA RUNOFF(CFS) =   40.76
 EFFECTIVE AREA(ACRES) =     54.42   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.63
 TOTAL AREA(ACRES) =       56.4       PEAK FLOW RATE(CFS) =     155.32

****************************************************************************
 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) =   570.00  DOWNSTREAM(FEET) =   565.00
 FLOW LENGTH(FEET) =  1526.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  63.0 INCH PIPE IS  49.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.48
 ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     155.32
 PIPE TRAVEL TIME(MIN.) =   3.00    Tc(MIN.) =   13.80
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    405.00 =    3975.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.80
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.867
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.10      0.30     0.100    56
 PUBLIC PARK                B        1.80      0.30     0.850    56
 PUBLIC PARK                B        0.40      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.80      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.80      0.30     0.900    56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       B        6.10      0.30     0.500    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.698
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  SUBAREA AREA(ACRES) =   13.00      SUBAREA RUNOFF(CFS) =   31.10
  EFFECTIVE AREA(ACRES) =     67.42   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =       69.4       PEAK FLOW RATE(CFS) =     162.32

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.80
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.867
  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       11.20      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        7.80      0.30     0.400    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 =  0.455
  SUBAREA AREA(ACRES) =   20.40      SUBAREA RUNOFF(CFS) =   50.14
  EFFECTIVE AREA(ACRES) =     87.82   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       89.8       PEAK FLOW RATE(CFS) =     212.45

****************************************************************************
  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) =   565.00  DOWNSTREAM(FEET) =   495.00
  FLOW LENGTH(FEET) =  2168.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.94
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     212.45
  PIPE TRAVEL TIME(MIN.) =   1.65    Tc(MIN.) =   15.44
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    406.00 =    6143.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.44
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.631
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        5.50      0.30     0.100    56
  COMMERCIAL                 B        1.90      0.30     0.100    56
  PUBLIC PARK                B        2.50      0.30     0.850    56
  PUBLIC PARK                B        0.90      0.30     0.850    56
  RESIDENTIAL
```



```
  "11+ DWELLINGS/ACRE"       B       36.40      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       13.60      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.224
  SUBAREA AREA(ACRES) =   60.80      SUBAREA RUNOFF(CFS) =  140.28
  EFFECTIVE AREA(ACRES) =    148.62   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      150.6       PEAK FLOW RATE(CFS) =     334.06

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.44
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.631
  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        4.70      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.10      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  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 =  0.868
  SUBAREA AREA(ACRES) =    7.40      SUBAREA RUNOFF(CFS) =   15.79
  EFFECTIVE AREA(ACRES) =    156.02   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =      158.0       PEAK FLOW RATE(CFS) =     349.85

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.44
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.631
  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        9.30      0.30     0.400    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 =  0.400
  SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =   23.05
  EFFECTIVE AREA(ACRES) =    166.22   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.46
```

```
  TOTAL AREA(ACRES) =      168.2       PEAK FLOW RATE(CFS) =     372.90

****************************************************************************
  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) =   495.00  DOWNSTREAM(FEET) =   395.00
  FLOW LENGTH(FEET) =  2905.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  43.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.63
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     372.90
  PIPE TRAVEL TIME(MIN.) =   1.89    Tc(MIN.) =   17.33
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    407.00 =    9048.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.33
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.465
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.30      0.30     0.200    56
  COMMERCIAL                 B        0.60      0.30     0.100    56
  COMMERCIAL                 B        9.10      0.30     0.100    56
  COMMERCIAL                 B        6.70      0.30     0.100    56
  PUBLIC PARK                B        0.50      0.30     0.850    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 =  0.219
  SUBAREA AREA(ACRES) =   19.80      SUBAREA RUNOFF(CFS) =   42.75
  EFFECTIVE AREA(ACRES) =    186.02   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =      188.0       PEAK FLOW RATE(CFS) =     390.78

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.33
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.465
  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        0.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.40      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B       10.60      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.60      0.30     0.200    56
```



```
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.90      0.30     0.900    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 =  0.308
  SUBAREA AREA(ACRES) =   16.80      SUBAREA RUNOFF(CFS) =   35.87
  EFFECTIVE AREA(ACRES) =    202.82   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      204.8       PEAK FLOW RATE(CFS) =     426.65

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.33
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.465
  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       14.30      0.30     0.600    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B       15.30      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        1.50      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        5.10      0.30     0.500    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 =  0.579
  SUBAREA AREA(ACRES) =   37.50      SUBAREA RUNOFF(CFS) =   77.32
  EFFECTIVE AREA(ACRES) =    240.32   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      242.3       PEAK FLOW RATE(CFS) =     503.97

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.33
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.465
  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
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        8.40      0.30     0.400    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        2.80      0.30     0.400    56
  SCHOOL                     B        0.60      0.30     0.600    56
  SCHOOL                     B        1.50      0.30     0.600    56
```

```
  SCHOOL                      B        3.50      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =   20.30      SUBAREA RUNOFF(CFS) =   42.54
  EFFECTIVE AREA(ACRES) =    260.62   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      262.6       PEAK FLOW RATE(CFS) =     546.51

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    430.00 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) =   372.00
  FLOW LENGTH(FEET) =   661.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  49.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.38
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     546.51
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   17.72
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    411.00 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) =    535.00  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.368
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.916
  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        0.50      0.30     0.900    56    7.53
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.20      0.30     0.600    56    6.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.814
  SUBAREA RUNOFF(CFS) =      2.94
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      2.94
```



```
****************************************************************************
  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) =   495.00  DOWNSTREAM(FEET) =   490.00
  FLOW LENGTH(FEET) =   267.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.94
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =    7.09
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    412.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    412.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.09
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.632
  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        0.90      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        0.30      0.30     0.900    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.10      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.10      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.788
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    6.73
  EFFECTIVE AREA(ACRES) =      2.40   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        2.4       PEAK FLOW RATE(CFS) =       9.49

****************************************************************************
  FLOW PROCESS FROM NODE    412.00 TO NODE    413.00 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) =   480.00
  FLOW LENGTH(FEET) =   520.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.49
  PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =    8.12
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    413.00 =    1115.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    413.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.12
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.228
  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        0.40      0.30     0.900    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.40      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        0.30      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.810
  SUBAREA AREA(ACRES) =    3.10      SUBAREA RUNOFF(CFS) =   11.12
  EFFECTIVE AREA(ACRES) =      5.50   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        5.5       PEAK FLOW RATE(CFS) =      19.74

****************************************************************************
  FLOW PROCESS FROM NODE    413.00 TO NODE    414.00 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) =   470.00
  FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.26
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.74
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    8.54
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    414.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.54
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.063
  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        0.10      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        2.80      0.30     0.900    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"         B        1.00      0.30     0.900    56
  RESIDENTIAL
```



```
  "5-7 DWELLINGS/ACRE"       B        0.20      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 =  0.654
  SUBAREA AREA(ACRES) =    5.70      SUBAREA RUNOFF(CFS) =   19.83
  EFFECTIVE AREA(ACRES) =     11.20   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       11.2       PEAK FLOW RATE(CFS) =      38.75

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.54
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.063
  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
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.36
  EFFECTIVE AREA(ACRES) =     11.30   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.72
  TOTAL AREA(ACRES) =       11.3       PEAK FLOW RATE(CFS) =      39.11

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 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) =   470.00  DOWNSTREAM(FEET) =   445.00
  FLOW LENGTH(FEET) =   528.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.65
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.11
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    9.07
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    415.00 =    1953.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    415.00 TO NODE    415.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.07
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.855
  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
  COMMERCIAL                 B        0.60      0.30     0.100    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        6.30      0.30     0.500    56
  RESIDENTIAL
```

```
  "5-7 DWELLINGS/ACRE"       B        3.70      0.30     0.500    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.448
  SUBAREA AREA(ACRES) =   11.50      SUBAREA RUNOFF(CFS) =   38.51
  EFFECTIVE AREA(ACRES) =     22.80   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       22.8       PEAK FLOW RATE(CFS) =      75.51

****************************************************************************
  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) =   445.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =   650.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.28
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      75.51
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =    9.63
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    416.00 =    2603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.63
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.635
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        1.60      0.30     0.200    56
  APARTMENTS                 B       10.90      0.30     0.200    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  COMMERCIAL                 B        1.30      0.30     0.100    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        1.10      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        7.00      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.189
  SUBAREA AREA(ACRES) =   23.20      SUBAREA RUNOFF(CFS) =   74.71
  EFFECTIVE AREA(ACRES) =     46.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       46.0       PEAK FLOW RATE(CFS) =     145.69

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.63
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.635
  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        0.40      0.30     0.600    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        4.90      0.30     0.500    56
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       B        9.30      0.30     0.500    56
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      B        0.30      0.30     0.400    56
  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 =  0.500
  SUBAREA AREA(ACRES) =   15.00      SUBAREA RUNOFF(CFS) =   47.04
  EFFECTIVE AREA(ACRES) =     61.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       61.0       PEAK FLOW RATE(CFS) =     192.73

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 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.) =    9.63
  RAINFALL INTENSITY(INCH/HR) =   3.63
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.41
  EFFECTIVE STREAM AREA(ACRES) =      61.00
  TOTAL STREAM AREA(ACRES) =      61.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     192.73

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    421.00 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) =    535.00  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.368
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.916
  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        0.70      0.30     0.900    56    7.53
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        0.20      0.30     0.600    56    6.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.833
  SUBAREA RUNOFF(CFS) =      3.78
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      3.78

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

```
 FLOW PROCESS FROM NODE    421.00 TO NODE    422.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   487.00
 FLOW LENGTH(FEET) =   308.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.43
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.78
 PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =    7.06
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    422.00 =     636.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    422.00 TO NODE    422.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.06
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.645
 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
 "3-4 DWELLINGS/ACRE"       B        0.50      0.30     0.600    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.817
 SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    7.13
 EFFECTIVE AREA(ACRES) =      2.70   AREA-AVERAGED Fm(INCH/HR) =  0.25
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.82
 TOTAL AREA(ACRES) =        2.7       PEAK FLOW RATE(CFS) =      10.69

****************************************************************************
 FLOW PROCESS FROM NODE    422.00 TO NODE    423.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   478.00
 FLOW LENGTH(FEET) =   373.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.45
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.69
 PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =    7.72
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    423.00 =    1009.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    423.00 TO NODE    423.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.72
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  4.386
```



```
 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        0.80      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        1.20      0.30     0.900    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.20      0.30     0.900    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        0.40      0.30     0.600    56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       B        1.70      0.30     0.600    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 =  0.750
 SUBAREA AREA(ACRES) =    4.40      SUBAREA RUNOFF(CFS) =   16.48
 EFFECTIVE AREA(ACRES) =      7.10   AREA-AVERAGED Fm(INCH/HR) =  0.23
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.78
 TOTAL AREA(ACRES) =        7.1       PEAK FLOW RATE(CFS) =      26.54

****************************************************************************
 FLOW PROCESS FROM NODE    423.00 TO NODE    424.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   454.00
 FLOW LENGTH(FEET) =   995.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.78
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      26.54
 PIPE TRAVEL TIME(MIN.) =   1.41    Tc(MIN.) =    9.12
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    424.00 =    2004.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.12
 *  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
 APARTMENTS                 B        0.80      0.30     0.200    56
 APARTMENTS                 B        0.40      0.30     0.200    56
 PUBLIC PARK                B        0.90      0.30     0.850    56
 PUBLIC PARK                B        0.40      0.30     0.850    56
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        0.10      0.30     0.900    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 =  0.626
 SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =   10.83
```

```
  EFFECTIVE AREA(ACRES) =     10.40   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       10.4       PEAK FLOW RATE(CFS) =      33.83

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.12
  *  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
  "3-4 DWELLINGS/ACRE"       B        3.30      0.30     0.600    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 =  0.600
  SUBAREA AREA(ACRES) =    5.40      SUBAREA RUNOFF(CFS) =   17.76
  EFFECTIVE AREA(ACRES) =     15.80   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       15.8       PEAK FLOW RATE(CFS) =      51.59

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 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) =   454.00  DOWNSTREAM(FEET) =   415.00
  FLOW LENGTH(FEET) =  1555.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.06
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      51.59
  PIPE TRAVEL TIME(MIN.) =   1.84    Tc(MIN.) =   10.97
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    416.00 =    3559.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.97
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.331
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        3.70      0.30     0.200    56
  APARTMENTS                 B        6.80      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        0.70      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        2.60      0.30     0.200    56
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        2.20      0.30     0.600    56
```



```
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       B        9.90      0.30     0.600    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.387
  SUBAREA AREA(ACRES) =   25.90      SUBAREA RUNOFF(CFS) =   74.94
  EFFECTIVE AREA(ACRES) =     41.70   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       41.7       PEAK FLOW RATE(CFS) =     119.39

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.97
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.331
  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        1.30      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) =    1.30      SUBAREA RUNOFF(CFS) =    3.72
  EFFECTIVE AREA(ACRES) =     43.00   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       43.0       PEAK FLOW RATE(CFS) =     123.11

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 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.) =   10.97
  RAINFALL INTENSITY(INCH/HR) =   3.33
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      43.00
  TOTAL STREAM AREA(ACRES) =      43.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     123.11

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      192.73    9.63    3.635  0.30( 0.12) 0.41      61.0     410.00
      2      123.11   10.97    3.331  0.30( 0.15) 0.50      43.0     420.00

  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      311.15    9.63    3.635  0.30( 0.13) 0.45      98.8     410.00
```

```
     2      299.19   10.97    3.331  0.30( 0.13) 0.45     104.0     420.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     311.15    Tc(MIN.) =     9.63
  EFFECTIVE AREA(ACRES) =      98.76   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      104.0
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    416.00 =    3559.00 FEET.

****************************************************************************
  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) =   415.00  DOWNSTREAM(FEET) =   395.00
  FLOW LENGTH(FEET) =  1084.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  45.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.41
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     311.15
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =   10.56
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    417.00 =    4643.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.56
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.398
  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
  COMMERCIAL                 B        2.90      0.30     0.100    56
  PUBLIC PARK                B        3.60      0.30     0.850    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.50      0.30     0.200    56
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       B        4.50      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 =  0.313
  SUBAREA AREA(ACRES) =   17.30      SUBAREA RUNOFF(CFS) =   51.44
  EFFECTIVE AREA(ACRES) =    116.06   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      121.3       PEAK FLOW RATE(CFS) =     341.54

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.56
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.398
  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        0.80      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 =  0.400
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    2.95
  EFFECTIVE AREA(ACRES) =    117.06   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      122.3       PEAK FLOW RATE(CFS) =     344.49

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    430.00 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) =   372.00
  FLOW LENGTH(FEET) =  1572.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  48.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.34
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     344.49
  PIPE TRAVEL TIME(MIN.) =   1.43    Tc(MIN.) =   11.99
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    430.00 =    6215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.99
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.163
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.70      0.30     0.100    56
  COMMERCIAL                 B        0.20      0.30     0.100    56
  COMMERCIAL                 B        0.40      0.30     0.100    56
  PUBLIC PARK                B        5.70      0.30     0.850    56
  PUBLIC PARK                B        4.50      0.30     0.850    56
  PUBLIC PARK                B        9.40      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.803
  SUBAREA AREA(ACRES) =   20.90      SUBAREA RUNOFF(CFS) =   54.97
  EFFECTIVE AREA(ACRES) =    137.96   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      143.2       PEAK FLOW RATE(CFS) =     374.78

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.99
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.163
```

```
  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
  PUBLIC PARK                 B        8.90      0.30      0.850    56
  PUBLIC PARK                 B        1.20      0.30      0.850    56
  PUBLIC PARK                 B        3.70      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) =   14.50      SUBAREA RUNOFF(CFS) =   37.95
  EFFECTIVE AREA(ACRES) =    152.46   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =      157.7       PEAK FLOW RATE(CFS) =     412.74

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 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      412.74   11.99    3.163  0.30( 0.16) 0.52     152.5     410.00
      2      394.97   13.37    2.938  0.30( 0.16) 0.52     157.7     420.00
  LONGEST FLOWPATH FROM NODE    420.00 TO NODE    430.00 =    6215.00 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      546.51   17.72    2.431  0.30( 0.13) 0.45     260.6     400.00
      2      495.69   20.36    2.208  0.30( 0.14) 0.45     262.6     430.00
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      900.60   11.99    3.163  0.30( 0.14) 0.48     328.8     410.00
      2      898.28   13.37    2.938  0.30( 0.14) 0.48     354.3     420.00
      3      869.44   17.72    2.431  0.30( 0.14) 0.48     418.3     400.00
      4      787.03   20.36    2.208  0.30( 0.14) 0.48     420.3     430.00
    TOTAL AREA(ACRES) =       420.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      900.60  Tc(MIN.) =   11.991
  EFFECTIVE AREA(ACRES) =    328.82  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =      420.3
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =    9709.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    431.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   372.00  DOWNSTREAM(FEET) =   300.00
  FLOW LENGTH(FEET) =  1358.00   MANNING'S N =  0.013
```



```
  DEPTH OF FLOW IN  72.0 INCH PIPE IS  57.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  37.29
  ESTIMATED PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     900.60
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =   12.60
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    431.00 =   11067.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.60
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.064
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                  B        7.40      0.30      0.200    56
  APARTMENTS                  B       15.00      0.30      0.200    56
  APARTMENTS                  B        5.80      0.30      0.200    56
  APARTMENTS                  B        2.50      0.30      0.200    56
  COMMERCIAL                  B        9.10      0.30      0.100    56
  COMMERCIAL                  B        1.50      0.30      0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.174
  SUBAREA AREA(ACRES) =   41.30      SUBAREA RUNOFF(CFS) =  111.94
  EFFECTIVE AREA(ACRES) =    370.12   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      461.6       PEAK FLOW RATE(CFS) =     975.93

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.60
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.064
  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        0.40      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) =    0.90      SUBAREA RUNOFF(CFS) =    2.46
  EFFECTIVE AREA(ACRES) =    371.02   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =      462.5       PEAK FLOW RATE(CFS) =     978.38

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    331.00 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	978.38	12.60	3.064	0.30(0.13)	0.45	371.0	410.00
2	964.99	13.97	2.839	0.30(0.13)	0.45	396.5	420.00
3	929.58	18.33	2.377	0.30(0.13)	0.45	460.5	400.00
4	847.12	20.99	2.170	0.30(0.13)	0.45	462.5	430.00

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 331.00 = 11067.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1446.88	17.91	2.414	0.30(0.12)	0.40	700.9	310.00
2	1452.73	21.62	2.132	0.30(0.12)	0.40	803.0	300.00
3	1452.63	21.71	2.126	0.30(0.12)	0.40	805.2	320.00
4	1273.61	27.44	1.832	0.30(0.13)	0.42	829.8	390.00

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2284.42	12.60	3.064	0.30(0.13)	0.42	864.0	410.00
2	2302.60	13.97	2.839	0.30(0.13)	0.42	943.2	420.00
3	2379.84	17.91	2.414	0.30(0.13)	0.42	1155.4	310.00
4	2377.12	18.33	2.377	0.30(0.13)	0.42	1172.9	400.00
5	2298.86	20.99	2.170	0.30(0.13)	0.42	1248.1	430.00
6	2283.93	21.62	2.132	0.30(0.13)	0.42	1265.5	300.00
7	2281.43	21.71	2.126	0.30(0.13)	0.42	1267.7	320.00
8	1979.90	27.44	1.832	0.30(0.13)	0.43	1292.3	390.00

TOTAL AREA(ACRES) = 1292.3

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 2379.84 Tc(MIN.) = 17.914
EFFECTIVE AREA(ACRES) = 1155.36 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 1292.3
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 1292.3 TC(MIN.) = 17.91
EFFECTIVE AREA(ACRES) = 1155.36 AREA-AVERAGED Fm(INCH/HR)= 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.419
PEAK FLOW RATE(CFS) = 2379.84

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2284.42	12.60	3.064	0.30(0.13)	0.42	864.0	410.00
2	2302.60	13.97	2.839	0.30(0.13)	0.42	943.2	420.00
3	2379.84	17.91	2.414	0.30(0.13)	0.42	1155.4	310.00
4	2377.12	18.33	2.377	0.30(0.13)	0.42	1172.9	400.00
5	2298.86	20.99	2.170	0.30(0.13)	0.42	1248.1	430.00
6	2283.93	21.62	2.132	0.30(0.13)	0.42	1265.5	300.00
7	2281.43	21.71	2.126	0.30(0.13)	0.42	1267.7	320.00
8	1979.90	27.44	1.832	0.30(0.13)	0.43	1292.3	390.00

==========
==========

END OF RATIONAL METHOD ANALYSIS

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****************************************************************************
            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 1237

                        Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 BODR 2022 - SUBWATERSHED O                                  *
* RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL                       *
* 100-YR EV SEPT 2022 ROKAMOTO                                         *
 ***********************************************************************

  FILE NAME: 3O00EVRL.DAT
  TIME/DATE OF STUDY: 12:06 09/20/2022
============================================================================
  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;  6.101
   2)   10.00;  3.900
   3)   15.00;  3.005
   4)   20.00;  2.465
   5)   25.00;  2.128
   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) =  3.921
  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.) =   7.02
```

```
 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) =  3.380
 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        0.20      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) =      32.28
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.28
 AVERAGE FLOW DEPTH(FEET) =   1.22   TRAVEL TIME(MIN.) =   2.00
 Tc(MIN.) =   12.90
 SUBAREA AREA(ACRES) =    15.00       SUBAREA RUNOFF(CFS) =   41.59
 EFFECTIVE AREA(ACRES) =     18.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       18.7         PEAK FLOW RATE(CFS) =      51.84

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.45   FLOW VELOCITY(FEET/SEC.) =   8.19
 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
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.134
 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
 "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        1.90      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.986
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      69.35
```



```
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.89
 AVERAGE FLOW DEPTH(FEET) =   1.61   TRAVEL TIME(MIN.) =   1.37
 Tc(MIN.) =   14.28
 SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   35.00
 EFFECTIVE AREA(ACRES) =     32.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.99
 TOTAL AREA(ACRES) =       32.4         PEAK FLOW RATE(CFS) =      82.70

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.72   FLOW VELOCITY(FEET/SEC.) =   9.30
 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  23.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.28
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      82.70
 PIPE TRAVEL TIME(MIN.) =   2.11    Tc(MIN.) =   16.39
 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.) =   16.39
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.855
 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"           A        0.10      0.40     1.000    44
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.30      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.30      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        8.20      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.982
 SUBAREA AREA(ACRES) =   12.50      SUBAREA RUNOFF(CFS) =   28.79
 EFFECTIVE AREA(ACRES) =     44.90   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.99
 TOTAL AREA(ACRES) =       44.9       PEAK FLOW RATE(CFS) =     103.34

****************************************************************************
 FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
```

```
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   16.39
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.855
  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        6.20      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) =    6.20      SUBAREA RUNOFF(CFS) =   14.42
  EFFECTIVE AREA(ACRES) =     51.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =       51.1       PEAK FLOW RATE(CFS) =     117.77
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       51.1  TC(MIN.) =     16.39
  EFFECTIVE AREA(ACRES) =     51.10  AREA-AVERAGED Fm(INCH/HR)=  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.979
  PEAK FLOW RATE(CFS)   =     117.77
================================================================================
================================================================================
  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 BODR 2022 - SUBWATERSHED O                                    *
* RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL                         *
* 2-YR EV APRIL 2022 CPHAN                                               *
 ****************************************************************************

  FILE NAME: 3O02EVRL.DAT
  TIME/DATE OF STUDY: 19:35 04/29/2022
============================================================================
  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    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               -        0.20      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) =    15.00       SUBAREA RUNOFF(CFS) =    5.01
  EFFECTIVE AREA(ACRES) =     18.70     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       18.7         PEAK FLOW RATE(CFS) =       6.24

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.65   FLOW VELOCITY(FEET/SEC.) =   4.87
  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               -        1.90      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.986
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.16
  AVERAGE FLOW DEPTH(FEET) =   0.72   TRAVEL TIME(MIN.) =   2.37
  Tc(MIN.) =   17.05
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =    3.55
  EFFECTIVE AREA(ACRES) =     32.40     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   0.99
```



```
  TOTAL AREA(ACRES) =       32.4         PEAK FLOW RATE(CFS) =       8.27

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.73   FLOW VELOCITY(FEET/SEC.) =   5.21
  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   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.72
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.27
  PIPE TRAVEL TIME(MIN.) =   3.65    Tc(MIN.) =   20.70
  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.) =   20.70
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.762
  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               -        2.30      0.60     1.000     -
  USER-DEFINED               -        0.60      0.60     1.000     -
  USER-DEFINED               -        1.00      0.60     1.000     -
  USER-DEFINED               -        8.20      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) =   12.50      SUBAREA RUNOFF(CFS) =    1.82
  EFFECTIVE AREA(ACRES) =     44.90   AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       44.9       PEAK FLOW RATE(CFS) =       8.27
  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.) =   20.70
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.762
  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     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    6.20      SUBAREA RUNOFF(CFS) =    1.24
  EFFECTIVE AREA(ACRES) =     51.10   AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =       51.1       PEAK FLOW RATE(CFS) =       8.27
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       51.1  TC(MIN.) =     20.70
  EFFECTIVE AREA(ACRES) =     51.10  AREA-AVERAGED Fm(INCH/HR)=  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap = 0.984
  PEAK FLOW RATE(CFS)   =       8.27
================================================================================
================================================================================
  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 1237

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 BODR 2022 - SUBWATERSHED O                                    *
* RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL                         *
* 5-YR EV SEPT 2022 ROKAMOTO                                            *
 ************************************************************************

  FILE NAME: 3O05EVRL.DAT
  TIME/DATE OF STUDY: 12:16 09/20/2022
============================================================================
  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;  2.738
   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    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) =  1.441
  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               -        0.20      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) =      10.42
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.48
  AVERAGE FLOW DEPTH(FEET) =   0.80   TRAVEL TIME(MIN.) =   2.65
  Tc(MIN.) =   13.82
  SUBAREA AREA(ACRES) =    15.00       SUBAREA RUNOFF(CFS) =   12.71
  EFFECTIVE AREA(ACRES) =     18.70     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       18.7         PEAK FLOW RATE(CFS) =      15.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.93   FLOW VELOCITY(FEET/SEC.) =   6.13
  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) =  1.299
  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               -        1.90      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.986
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.81
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.58
  AVERAGE FLOW DEPTH(FEET) =   1.03   TRAVEL TIME(MIN.) =   1.86
  Tc(MIN.) =   15.68
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =    9.94
  EFFECTIVE AREA(ACRES) =     32.40     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   0.99
```



```
  TOTAL AREA(ACRES) =       32.4         PEAK FLOW RATE(CFS) =      23.40

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.07   FLOW VELOCITY(FEET/SEC.) =   6.78
  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  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.17
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.40
  PIPE TRAVEL TIME(MIN.) =   2.82    Tc(MIN.) =   18.50
  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.) =   18.50
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.192
  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               -        2.30      0.50     1.000     -
  USER-DEFINED               -        0.60      0.50     1.000     -
  USER-DEFINED               -        1.00      0.50     1.000     -
  USER-DEFINED               -        8.20      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) =   12.50      SUBAREA RUNOFF(CFS) =    7.78
  EFFECTIVE AREA(ACRES) =     44.90   AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       44.9       PEAK FLOW RATE(CFS) =      28.05

****************************************************************************
  FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.50
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.192
  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     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    6.20      SUBAREA RUNOFF(CFS) =    4.14
```

```
  EFFECTIVE AREA(ACRES) =     51.10   AREA-AVERAGED Fm(INCH/HR) =  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =       51.1       PEAK FLOW RATE(CFS) =      32.19
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       51.1  TC(MIN.) =     18.50
  EFFECTIVE AREA(ACRES) =     51.10  AREA-AVERAGED Fm(INCH/HR)=  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap = 0.984
  PEAK FLOW RATE(CFS)   =      32.19
================================================================================
================================================================================
  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 1237

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 BODR 2022 - SUBWATERSHED O                                   *
* RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL                        *
* 10-YR EV SEPT 2022 ROKAMOTO                                          *
 ************************************************************************

  FILE NAME: 3O10EVRL.DAT
  TIME/DATE OF STUDY: 12:15 09/20/2022
============================================================================
  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;  3.912
   2)   10.00;  2.592
   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;  0.732
  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    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) =  2.605
  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) =  2.449
  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
  "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) =  2.131
 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        0.20      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) =      19.58
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.40
 AVERAGE FLOW DEPTH(FEET) =   1.01   TRAVEL TIME(MIN.) =   2.27
 Tc(MIN.) =   13.30
 SUBAREA AREA(ACRES) =    15.00       SUBAREA RUNOFF(CFS) =   24.73
 EFFECTIVE AREA(ACRES) =     18.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       18.7         PEAK FLOW RATE(CFS) =      30.83

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.19   FLOW VELOCITY(FEET/SEC.) =   7.20
 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) =  1.912
 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        1.90      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.986
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      40.80
```



```
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.77
 AVERAGE FLOW DEPTH(FEET) =   1.32   TRAVEL TIME(MIN.) =   1.57
 Tc(MIN.) =   14.87
 SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   19.92
 EFFECTIVE AREA(ACRES) =     32.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.99
 TOTAL AREA(ACRES) =       32.4         PEAK FLOW RATE(CFS) =      47.05

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.39   FLOW VELOCITY(FEET/SEC.) =   8.08
 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  19.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.51
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      47.05
 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        2.30      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        8.20      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.982
 SUBAREA AREA(ACRES) =   12.50      SUBAREA RUNOFF(CFS) =   16.57
 EFFECTIVE AREA(ACRES) =     44.90   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.99
 TOTAL AREA(ACRES) =       44.9       PEAK FLOW RATE(CFS) =      59.40

****************************************************************************
 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        6.20      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) =    6.20      SUBAREA RUNOFF(CFS) =    8.35
  EFFECTIVE AREA(ACRES) =     51.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =       51.1       PEAK FLOW RATE(CFS) =      67.76
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       51.1  TC(MIN.) =     17.31
  EFFECTIVE AREA(ACRES) =     51.10  AREA-AVERAGED Fm(INCH/HR)=  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.979
  PEAK FLOW RATE(CFS)   =      67.76
================================================================================
================================================================================
  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 1237

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 BODR 2022 - SUBWATERSHED O                                    *
* RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL                         *
* 25-YR EV SEPT 2022 ROKAMOTO                                           *
 ***********************************************************************

  FILE NAME: 3O25EVRL.DAT
  TIME/DATE OF STUDY: 12:12 09/20/2022
============================================================================
  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;  4.985
   2)   10.00;  3.243
   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    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) =  3.260
  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) =  3.094
  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) =    7.29
  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.) =   6.63
```

```
 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) =  2.769
 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        0.20      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) =      26.01
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.93
 AVERAGE FLOW DEPTH(FEET) =   1.12   TRAVEL TIME(MIN.) =   2.10
 Tc(MIN.) =   13.06
 SUBAREA AREA(ACRES) =    15.00       SUBAREA RUNOFF(CFS) =   33.34
 EFFECTIVE AREA(ACRES) =     18.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       18.7         PEAK FLOW RATE(CFS) =      41.56

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.34   FLOW VELOCITY(FEET/SEC.) =   7.74
 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) =  2.544
 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        1.90      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.986
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      55.43
```



```
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.40
 AVERAGE FLOW DEPTH(FEET) =   1.48   TRAVEL TIME(MIN.) =   1.45
 Tc(MIN.) =   14.51
 SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   27.72
 EFFECTIVE AREA(ACRES) =     32.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.99
 TOTAL AREA(ACRES) =       32.4         PEAK FLOW RATE(CFS) =      65.49

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.58   FLOW VELOCITY(FEET/SEC.) =   8.78
 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  21.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.94
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      65.49
 PIPE TRAVEL TIME(MIN.) =   2.26    Tc(MIN.) =   16.77
 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.) =   16.77
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.315
 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
 "WOODLAND,GRASS"           A        0.10      0.40     1.000    44
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.30      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.30      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        8.20      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.982
 SUBAREA AREA(ACRES) =   12.50      SUBAREA RUNOFF(CFS) =   22.72
 EFFECTIVE AREA(ACRES) =     44.90   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.99
 TOTAL AREA(ACRES) =       44.9       PEAK FLOW RATE(CFS) =      81.52

****************************************************************************
 FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
```

```
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   16.77
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.315
  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        6.20      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) =    6.20      SUBAREA RUNOFF(CFS) =   11.41
  EFFECTIVE AREA(ACRES) =     51.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =       51.1       PEAK FLOW RATE(CFS) =      92.92
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       51.1  TC(MIN.) =     16.77
  EFFECTIVE AREA(ACRES) =     51.10  AREA-AVERAGED Fm(INCH/HR)=  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.979
  PEAK FLOW RATE(CFS)   =      92.92
================================================================================
================================================================================
  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 1237

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 BODR 2022 - SUBWATERSHED O                                   *
* RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL                        *
* 50-YR EV SEPT 2022 ROKAMOTO                                          *
 ************************************************************************

  FILE NAME: 3O50EVRL.DAT
  TIME/DATE OF STUDY: 12:11 09/20/2022
============================================================================
  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;  5.515
   2)   10.00;  3.520
   3)   15.00;  2.687
   4)   20.00;  2.242
   5)   25.00;  1.935
   6)   30.00;  1.741
   7)   40.00;  1.473
   8)   50.00;  1.311
   9)   60.00;  1.211
  10)   90.00;  1.007
  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
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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
 *  50 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       14.80      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 =  0.999
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      28.64
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.06
 AVERAGE FLOW DEPTH(FEET) =   1.16   TRAVEL TIME(MIN.) =   2.06
 Tc(MIN.) =   12.98
 SUBAREA AREA(ACRES) =    15.00       SUBAREA RUNOFF(CFS) =   36.77
 EFFECTIVE AREA(ACRES) =     18.70     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       18.7         PEAK FLOW RATE(CFS) =      45.83

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.39   FLOW VELOCITY(FEET/SEC.) =   7.96
 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) =  2.787
 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        1.90      0.30     0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.986
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      61.20
```



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 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.62
 AVERAGE FLOW DEPTH(FEET) =   1.54   TRAVEL TIME(MIN.) =   1.42
 Tc(MIN.) =   14.40
 SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   30.71
 EFFECTIVE AREA(ACRES) =     32.40     AREA-AVERAGED Fm(INCH/HR) =   0.30
 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.99
 TOTAL AREA(ACRES) =       32.4         PEAK FLOW RATE(CFS) =      72.57

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.64   FLOW VELOCITY(FEET/SEC.) =   9.02
 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  20.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.93
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      72.57
 PIPE TRAVEL TIME(MIN.) =   2.15    Tc(MIN.) =   16.55
 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.) =   16.55
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.549
 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"           A        0.10      0.40     1.000    44
 NATURAL FAIR COVER
 "OPEN BRUSH"               B        0.30      0.30     1.000    66
 RESIDENTIAL
 ".4 DWELLING/ACRE"         B        2.30      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        8.20      0.30     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.982
 SUBAREA AREA(ACRES) =   12.50      SUBAREA RUNOFF(CFS) =   25.35
 EFFECTIVE AREA(ACRES) =     44.90   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.99
 TOTAL AREA(ACRES) =       44.9       PEAK FLOW RATE(CFS) =      90.99

****************************************************************************
 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.) =   16.55
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.549
  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        6.20      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) =    6.20      SUBAREA RUNOFF(CFS) =   12.72
  EFFECTIVE AREA(ACRES) =     51.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =       51.1       PEAK FLOW RATE(CFS) =     103.71
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       51.1  TC(MIN.) =     16.55
  EFFECTIVE AREA(ACRES) =     51.10  AREA-AVERAGED Fm(INCH/HR)=  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.979
  PEAK FLOW RATE(CFS)   =     103.71
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
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