APPENDIX 'B'

PRELIMINARY HYDROLOGY STUDY
FOR
BRIDGESTON SPECIFIC PLAN

INTRODUCTION:

The project site is located on the north side of the Pomona Freeway (Route 60) at the southwest corner of Milliken Avenue and Mission Boulevard in the City of Ontario, San Bernardino County, California. The total tributary drainage area to the site is approximately 119 acres. The drainage area is bounded by Milliken Avenue to the east and Mission Avenue to the north. In developing the runoff storm flows, both existing and developed conditions for the 10 year and the 100 year were calculated at boundary "exit points".

METHODOLOGY:

The hydrology study was performed in accordance with the current San Bernardino County Flood Control Hydrology Manual dated May 1983. The manual suggests that for watershed areas in excess of 640 acres, the unit hydrograph should be utilized for hydrologic studies. Drainage areas less than 640 acres should utilized the Rational method. Based on the above criteria, the Rational method was used in calculating the 10 year and the 100 year peak flows.

The Rational method computer program Version 5.2A, developed by Advanced Engineering Software (AES), was used to calculate storm flows. See Pocket for **Exhibit 'B-1,"** drainage area map.

Soil properties and the physical characteristics of the drainage area, such as land use, must be considered when generating runoff figures. The U.S. Soil Conservation Service classifies soils into four hydrologic groupings. The grouping or classification signifies the relative permeability of the soil, with Group "A" being the most permeable soil, and Group "D" the lease permeable soil. Within the drainage boundary, the predominant soil type is Group "B" and the existing ground cover is agricultural. In analyzing the developed condition, the effect of the impervious surfaces on the average infiltration rate over the drainage area is also considered. Based on the proposed land use, it is our understanding that the proposed development will dewater as with existing conditions. Thus, no diversion of storm runoff through the development is anticipated.

COMPARISON OF DEVELOPED AND UNDEVELOPED RUNOFF:

As discussed in the methodology, the developed flows are calculated by analyzing the effect of impervious surfaces on the average infiltration rate over the drainage area. This was based on the criteria that developed storm flows are not diverted from their historically outlet points. As expected, significant increase in runoff generated by the proposed site was expected due to the reduction of pervious areas which occurs with development. Table providing a breakdown of each drainage area . Storm drain facilities will be constructed on site. If necessary, detention basin will be constructed to reduce peak flow into the storm drain system. Please be aware that this study is at the preliminary stage and that additional engineering study will be required during the design stage. Although the calculated runoffs are preliminary, it portrays the impact development will have on drainage exit points along the project boundaries.

TABLE   SUMMARY OF FLOWS

CONCENTRATION POINT	1 TO 2	2 TO 7	4 TO 5	5 TO 6	6 TO 7	JUNCTION AT PT 7
Area (Acres)	9.8	8.1	5.1	4.9	7.9	
Undeveloped - 10 year	10.3	12.0	5.3	5.7	6.3	18.6
Developed - 10 year	18.7	26.0	9.7	13.9	19.8	44.4
Undeveloped-100 year	17.1	22.0	8.8	11.3	14.4	35.8
Developed - 100 year	28.0	41.3	14.5	21.4	31.3	70.2
Increase - 10 year	8.4	14	4.4	8.2	13.5	25.8
Increase - 100 year	10.9	19.3	5.7	10.1	16.9	34.4

	10 TO 11	11 TO 12	12 TO 13	22 TO 23	23 TO 13	30 TO 31	31 TO 32	32 TO 13	JUNCTION AT 13
Area (Acres)	9.9	7.9	10.4	7.8	7.2	5.1	9.7	16.2	
Undeveloped-10 year	9.9	13.4	18.2	10.1	10.1	7.0	13.6	20.4	48.4
Developed - 10 year	18.1	28.1	41.1	12.8	16.4	12.0	27.5	48.1	99.5
Undeveloped-100 year	16.4	23.7	33.5	18.1	19.4	11.4	23.9	38.6	88.9
Developed - 100 year	27.2	42.9	63.1	20.9	27.5	18.1	42.2	74.2	153.7
Increase - 10 year	8.2	14.7	22.9	2.7	6.3	5.0	13.9	27.7	51.1
Increase - 100 year	10.8	19.2	29.6	2.8	8.1	6.7	18.3	35.6	64.8

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*******************************************************************************
                  RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
                  (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
                  (c) Copyright 1983-88 Advanced Engineering Software (aes)
                     Ver. 5.2A  Release Date: 7/08/88  Serial # DE1742

                             Especially prepared for:

                                 J. F. DAVIDSON

   *********************** DESCRIPTION OF STUDY ***************************
   * BRIDGETONE SPECIFIC PLAN
   * 100-YEAR EXISTING STUDY      BRIDGE100-EY.DAT
   * COMPUTER FILE:  [TERESITOT.BRIDGE100.DAT = BRIDGE100_EX.RES]
   *******************************************************************************

     FILE NAME: BRIDGE100.DAT
     TIME/DATE OF STUDY: 10:55  14-MAR-97
==============================================================================
   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 LOGARITHMIC INTERPOLATION USED FOR RAINFALL*
   10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
   100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
   COMPUTED RAINFALL INTENSITY DATA:
   STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) = 1.2000
   SLOPE OF INTENSITY DURATION CURVE = 0.6000



   ****************************************************************************
   FLOW PROCESS FROM NODE     1.00 TO NODE     2.00 IS CODE =   2
   ----------------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
   ============================================================================
   DEVELOPMENT IS AGRICULTURE
   TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
   INITIAL SUBAREA FLOW-LENGTH(FEET) =    960.00
   UPSTREAM ELEVATION(FEET) =      52.00
   DOWNSTREAM ELEVATION(FEET) =      40.00
   ELEVATION DIFFERENCE(FEET) =      12.00
   TC(MIN.) = 0.525*[(  960.00** 3.00)/(    12.00)]**0.20 =    19.665
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.343
   SOIL CLASSIFICATION IS "B"
   AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
   SUBAREA RUNOFF(CFS) =       17.05
   TOTAL AREA(ACRES) =        9.80   PEAK FLOW RATE(CFS) =       17.05



   ****************************************************************************
   FLOW PROCESS FROM NODE     2.00 TO NODE     3.00 IS CODE =   9
   ----------------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
   ============================================================================
   UPSTREAM NODE ELEVATION(FEET) =      40.00
   DOWNSTREAM NODE ELEVATION(FEET) =      29.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =     805.00
   "V" GUTTER WIDTH(FEET) = 100.00   GUTTER HIKE(FEET) =  0.001
   PAVEMENT LIP(FEET) =  0.001   MANNING'S N = .0400
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
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MAXIMUM DEPTH(FEET) =    1.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.773
SOIL CLASSIFICATION IS "B"
AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    1.15
AVERAGE FLOW DEPTH(FEET) =    0.17   FLOOD WIDTH(FEET) =  132.75
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   11.64   TC(MIN.) =   31.30
SUBAREA AREA(ACRES) =     8.10   SUBAREA RUNOFF(CFS) =     9.94
EFFECTIVE AREA(ACRES) =    17.90   AVERAGED Fm(INCH/HR) =     0.41
TOTAL AREA(ACRES) =    17.90   PEAK FLOW RATE(CFS) =     21.96
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =   0.17   FLOOD WIDTH(FEET) =  132.75
FLOW VELOCITY(FEET/SEC.) =    1.14   DEPTH*VELOCITY =    0.19


**************************************************************************
  FLOW PROCESS FROM NODE     3.00 TO NODE      7.00 IS CODE =    9
--------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==========================================================================
UPSTREAM NODE ELEVATION(FEET) =      29.00
DOWNSTREAM NODE ELEVATION(FEET) =      27.00
CHANNEL LENGTH THRU SUBAREA(FEET) =     550.00
"V" GUTTER WIDTH(FEET) =    0.01   GUTTER HIKE(FEET) =  0.010
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0400
PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
MAXIMUM DEPTH(FEET) =    1.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.494
SOIL CLASSIFICATION IS "B"
AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    0.89
AVERAGE FLOW DEPTH(FEET) =    0.52   FLOOD WIDTH(FEET) =   99.54
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   10.34   TC(MIN.) =   41.64
SUBAREA AREA(ACRES) =     0.00   SUBAREA RUNOFF(CFS) =     0.00
EFFECTIVE AREA(ACRES) =    17.90   AVERAGED Fm(INCH/HR) =     0.41
TOTAL AREA(ACRES) =    17.90   PEAK FLOW RATE(CFS) =     21.96
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =   0.52   FLOOD WIDTH(FEET) =   99.54
FLOW VELOCITY(FEET/SEC.) =    0.89   DEPTH*VELOCITY =    0.46


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  FLOW PROCESS FROM NODE     3.00 TO NODE      7.00 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.) =   41.64
  RAINFALL INTENSITY(INCH/HR) =    1.49
  AVERAGED Fm(INCH/HR) =   0.41
  EFFECTIVE STREAM AREA(ACRES) =    17.90
  TOTAL STREAM AREA(ACRES) =    17.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.96


**************************************************************************
  FLOW PROCESS FROM NODE     4.00 TO NODE      5.00 IS CODE =    2
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  DEVELOPMENT IS AGRICULTURE
  TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  INITIAL SUBAREA FLOW-LENGTH(FEET) =     865.00
  UPSTREAM ELEVATION(FEET) =      44.00
  DOWNSTREAM ELEVATION(FEET) =      35.50
  ELEVATION DIFFERENCE(FEET) =       8.50
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TC(MIN.) = 0.525*[( 865.00** 3.00)/(        8.50)]**0.20 =    19.792
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.334
SOIL CLASSIFICATION IS "B"
AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
SUBAREA RUNOFF(CFS) =         8.83
TOTAL AREA(ACRES) =           5.10   PEAK FLOW RATE(CFS) =         8.83


**************************************************************************
  FLOW PROCESS FROM NODE     5.00 TO NODE      6.00 IS CODE =    9
-------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=========================================================================
  UPSTREAM NODE ELEVATION(FEET) =       35.50
  DOWNSTREAM NODE ELEVATION(FEET) =       33.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    610.00
  "V" GUTTER WIDTH(FEET) = 100.00   GUTTER HIKE(FEET) =  0.001
  PAVEMENT LIP(FEET) =  0.001   MANNING'S N = .0400
  PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
  MAXIMUM DEPTH(FEET) =    1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.663
  SOIL CLASSIFICATION IS "B"
  AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    0.68
  AVERAGE FLOW DEPTH(FEET) =     0.15   FLOOD WIDTH(FEET) =   129.63
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   15.03   TC(MIN.) =   34.83
  SUBAREA AREA(ACRES) =      4.90   SUBAREA RUNOFF(CFS) =      5.53
  EFFECTIVE AREA(ACRES) =     10.00   AVERAGED Fm(INCH/HR) =    0.41
  TOTAL AREA(ACRES) =     10.00   PEAK FLOW RATE(CFS) =       11.28
  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.15   FLOOD WIDTH(FEET) =   129.63
  FLOW VELOCITY(FEET/SEC.) =    0.66   DEPTH*VELOCITY =    0.10


**************************************************************************
  FLOW PROCESS FROM NODE     6.00 TO NODE      7.00 IS CODE =    9
-------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=========================================================================
  UPSTREAM NODE ELEVATION(FEET) =       33.00
  DOWNSTREAM NODE ELEVATION(FEET) =       27.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   1000.00
  "V" GUTTER WIDTH(FEET) =   0.01   GUTTER HIKE(FEET) =  0.010
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0400
  PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
  MAXIMUM DEPTH(FEET) =    1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.301
  SOIL CLASSIFICATION IS "B"
  AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    0.95
  AVERAGE FLOW DEPTH(FEET) =     0.41   FLOOD WIDTH(FEET) =    78.10
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   17.58   TC(MIN.) =   52.41
  SUBAREA AREA(ACRES) =      7.90   SUBAREA RUNOFF(CFS) =      6.34
  EFFECTIVE AREA(ACRES) =     17.90   AVERAGED Fm(INCH/HR) =    0.41
  TOTAL AREA(ACRES) =     17.90   PEAK FLOW RATE(CFS) =       14.36
  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.41   FLOOD WIDTH(FEET) =    78.10
  FLOW VELOCITY(FEET/SEC.) =    0.94   DEPTH*VELOCITY =    0.39


**************************************************************************
  FLOW PROCESS FROM NODE     6.00 TO NODE      7.00 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.) = 52.41
RAINFALL INTENSITY(INCH/HR) =   1.30
AVERAGED Fm(INCH/HR) = 0.41
EFFECTIVE STREAM AREA(ACRES) =   17.90
TOTAL STREAM AREA(ACRES) =   17.90
PEAK FLOW RATE(CFS) AT CONFLUENCE =   14.36

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

** PEAK FLOW RATE TABLE **
	Q(CFS)	Tc(MIN.)	Fm(INCH/HR)	Ae(ACRES)
1	35.83	41.64	0.410	32.12
2	32.42	52.41	0.410	35.80

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =   35.83   Tc(MIN.) =   41.642
EFFECTIVE AREA(ACRES) =   32.12   AVERAGED Fm(INCH/HR) = 0.41
TOTAL AREA(ACRES) =   35.80

****
FLOW PROCESS FROM NODE   10.00 TO NODE   11.00 IS CODE =   2

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
===
DEVELOPMENT IS AGRICULTURE
TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
INITIAL SUBAREA FLOW-LENGTH(FEET) =   1100.00
UPSTREAM ELEVATION(FEET) =   44.00
DOWNSTREAM ELEVATION(FEET) =   31.00
ELEVATION DIFFERENCE(FEET) =   13.00
TC(MIN.) = 0.525*[(1100.00** 3.00)/(13.00)]**0.20 =   20.999
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.253
SOIL CLASSIFICATION IS "B"
AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
SUBAREA RUNOFF(CFS) =   16.42
TOTAL AREA(ACRES) =   9.90   PEAK FLOW RATE(CFS) =   16.42

****
FLOW PROCESS FROM NODE   11.00 TO NODE   12.00 IS CODE =   9

>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===
UPSTREAM NODE ELEVATION(FEET) =   31.00
DOWNSTREAM NODE ELEVATION(FEET) =   26.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   530.00
"V" GUTTER WIDTH(FEET) =   0.01   GUTTER HIKE(FEET) =   0.010
PAVEMENT LIP(FEET) = 0.010   MANNING'S N = .0400
PAVEMENT CROSSFALL(DECIMAL NOTATION) =   0.01
MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.887
SOIL CLASSIFICATION IS "B"
AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.23
AVERAGE FLOW DEPTH(FEET) =   0.44   FLOOD WIDTH(FEET) =   84.23
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   7.21   TC(MIN.) = 28.21
SUBAREA AREA(ACRES) =   7.90   SUBAREA RUNOFF(CFS) =   10.50
EFFECTIVE AREA(ACRES) =   17.80   AVERAGED Fm(INCH/HR) =   0.41
TOTAL AREA(ACRES) =   17.80   PEAK FLOW RATE(CFS) =   23.67
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.44   FLOOD WIDTH(FEET) =   84.23
FLOW VELOCITY(FEET/SEC.) =   1.33   DEPTH*VELOCITY =   0.59

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*******************************************************************************
   FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =     9
-------------------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===============================================================================
   UPSTREAM NODE ELEVATION(FEET) =        26.00
   DOWNSTREAM NODE ELEVATION(FEET) =      19.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =      450.00
   "V" GUTTER WIDTH(FEET) =    0.01   GUTTER HIKE(FEET) =   0.010
   PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0400
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
   MAXIMUM DEPTH(FEET) =    1.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.728
   SOIL CLASSIFICATION IS "B"
   AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.68
   AVERAGE FLOW DEPTH(FEET) =     0.44    FLOOD WIDTH(FEET) =    84.23
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =     4.46    TC(MIN.) =  32.67
   SUBAREA AREA(ACRES) =     10.40   SUBAREA RUNOFF(CFS) =   12.34
   EFFECTIVE AREA(ACRES) =     28.20   AVERAGED Fm(INCH/HR) =   0.41
   TOTAL AREA(ACRES) =     28.20    PEAK FLOW RATE(CFS) =      33.45
   END OF SUBAREA "V" GUTTER HYDRAULICS:
   DEPTH(FEET) =   0.46   FLOOD WIDTH(FEET) =    87.29
   FLOW VELOCITY(FEET/SEC.) =    1.76   DEPTH*VELOCITY =    0.80


*******************************************************************************
   FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 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.) =  32.67
   RAINFALL INTENSITY(INCH/HR) =   1.73
   AVERAGED Fm(INCH/HR) =   0.41
   EFFECTIVE STREAM AREA(ACRES) =    28.20
   TOTAL STREAM AREA(ACRES) =     28.20
   PEAK FLOW RATE(CFS) AT CONFLUENCE =       33.45


*******************************************************************************
   FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =     2
-------------------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
===============================================================================
   NATURAL POOR COVER
   TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   1000.00
   UPSTREAM ELEVATION(FEET) =      55.00
   DOWNSTREAM ELEVATION(FEET) =      50.00
   ELEVATION DIFFERENCE(FEET) =      5.00
   TC(MIN.) = 0.525*[( 1000.00** 3.00)/(      5.00)]**0.20 =    24.009
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.079
   SOIL CLASSIFICATION IS "B"
   NATURAL POOR COVER "BARREN" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.2700
   SUBAREA RUNOFF(CFS) =        4.23
   TOTAL AREA(ACRES) =        2.60   PEAK FLOW RATE(CFS) =        4.23


*******************************************************************************
   FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =     9
-------------------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===============================================================================
   UPSTREAM NODE ELEVATION(FEET) =       50.00
   DOWNSTREAM NODE ELEVATION(FEET) =       42.00
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CHANNEL LENGTH THRU SUBAREA(FEET) = 1650.00
"V" GUTTER WIDTH(FEET) = 0.01   GUTTER HIKE(FEET) = 0.010
PAVEMENT LIP(FEET) = 0.010   MANNING'S N = .0300
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.50
MAXIMUM DEPTH(FEET) = 3.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.640
SOIL CLASSIFICATION IS "B"
NATURAL POOR COVER "BARREN" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.2700
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.36
AVERAGE FLOW DEPTH(FEET) = 1.31   FLOOD WIDTH(FEET) = 5.16
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 11.65   TC(MIN.) = 35.65
SUBAREA AREA(ACRES) = 5.80   SUBAREA RUNOFF(CFS) = 7.15
EFFECTIVE AREA(ACRES) = 8.40   AVERAGED Fm(INCH/HR) = 0.27
TOTAL AREA(ACRES) = 8.40   PEAK FLOW RATE(CFS) = 10.36
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 1.45   FLOOD WIDTH(FEET) = 5.71
FLOW VELOCITY(FEET/SEC.) = 2.54   DEPTH*VELOCITY = 3.67

* *
  FLOW PROCESS FROM NODE   22.00 TO NODE   23.00 IS CODE =   9
- -
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===
UPSTREAM NODE ELEVATION(FEET) = 422.00
DOWNSTREAM NODE ELEVATION(FEET) = 31.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 780.00
"V" GUTTER WIDTH(FEET) = 0.01   GUTTER HIKE(FEET) = 0.010
PAVEMENT LIP(FEET) = 0.010   MANNING'S N = .0400
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01
MAXIMUM DEPTH(FEET) = 2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.578
SOIL CLASSIFICATION IS "B"
AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.46
AVERAGE FLOW DEPTH(FEET) = 0.18   FLOOD WIDTH(FEET) = 32.49
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 2.38   TC(MIN.) = 38.03
SUBAREA AREA(ACRES) = 7.80   SUBAREA RUNOFF(CFS) = 8.20
EFFECTIVE AREA(ACRES) = 16.20   AVERAGED Fm(INCH/HR) = 0.34
TOTAL AREA(ACRES) = 16.20   PEAK FLOW RATE(CFS) = 18.08
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.20   FLOOD WIDTH(FEET) = 35.59
FLOW VELOCITY(FEET/SEC.) = 5.71   DEPTH*VELOCITY = 1.13

* *
  FLOW PROCESS FROM NODE   23.00 TO NODE   13.00 IS CODE =   9
- -
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===
UPSTREAM NODE ELEVATION(FEET) = 31.00
DOWNSTREAM NODE ELEVATION(FEET) = 19.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1170.00
"V" GUTTER WIDTH(FEET) = 0.01   GUTTER HIKE(FEET) = 0.010
PAVEMENT LIP(FEET) = 0.010   MANNING'S N = .0400
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01
MAXIMUM DEPTH(FEET) = 2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.283
SOIL CLASSIFICATION IS "B"
AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.25
AVERAGE FLOW DEPTH(FEET) = 0.43   FLOOD WIDTH(FEET) = 81.99
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 15.65   TC(MIN.) = 53.68
SUBAREA AREA(ACRES) = 7.20   SUBAREA RUNOFF(CFS) = 5.66
EFFECTIVE AREA(ACRES) = 23.40   AVERAGED Fm(INCH/HR) = 0.36
TOTAL AREA(ACRES) = 23.40   PEAK FLOW RATE(CFS) = 19.44
END OF SUBAREA "V" GUTTER HYDRAULICS:

```
    DEPTH(FEET) =   0.41   FLOOD WIDTH(FEET) =    78.90
    FLOW VELOCITY(FEET/SEC.) =    1.25   DEPTH*VELOCITY =     0.52


**************************************************************************
   FLOW PROCESS FROM NODE    23.00 TO NODE    13.00 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.) =   53.68
   RAINFALL INTENSITY(INCH/HR) =    1.28
   AVERAGED Fm(INCH/HR) =   0.36
   EFFECTIVE STREAM AREA(ACRES) =    23.40
   TOTAL STREAM AREA(ACRES) =    23.40
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.44


**************************************************************************
   FLOW PROCESS FROM NODE    30.00 TO NODE    31.00 IS CODE =    2
-------------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=========================================================================
   DEVELOPMENT IS AGRICULTURE
   TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
   INITIAL SUBAREA FLOW-LENGTH(FEET) =    600.00
   UPSTREAM ELEVATION(FEET) =     47.20
   DOWNSTREAM ELEVATION(FEET) =      30.50
   ELEVATION DIFFERENCE(FEET) =      16.70
   TC(MIN.) = 0.525*[(  600.00** 3.00)/(    16.70)]**0.20 =    13.884
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.888
   SOIL CLASSIFICATION IS "B"
   AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
   SUBAREA RUNOFF(CFS) =      11.37
   TOTAL AREA(ACRES) =       5.10   PEAK FLOW RATE(CFS) =      11.37


**************************************************************************
   FLOW PROCESS FROM NODE    31.00 TO NODE    32.00 IS CODE =    9
-------------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=========================================================================
   UPSTREAM NODE ELEVATION(FEET) =     30.50
   DOWNSTREAM NODE ELEVATION(FEET) =     25.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =    586.00
   "V" GUTTER WIDTH(FEET) =   0.01   GUTTER HIKE(FEET) =  0.010
   PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0400
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
   MAXIMUM DEPTH(FEET) =    2.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.203
   SOIL CLASSIFICATION IS "B"
   AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.23
   AVERAGE FLOW DEPTH(FEET) =    0.41   FLOOD WIDTH(FEET) =    78.90
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =    7.92   TC(MIN.) =  21.81
   SUBAREA AREA(ACRES) =    9.70   SUBAREA RUNOFF(CFS) =    15.65
   EFFECTIVE AREA(ACRES) =   14.80   AVERAGED Fm(INCH/HR) =   0.41
   TOTAL AREA(ACRES) =    14.80   PEAK FLOW RATE(CFS) =     23.88
   END OF SUBAREA "V" GUTTER HYDRAULICS:
   DEPTH(FEET) =   0.45   FLOOD WIDTH(FEET) =    85.09
   FLOW VELOCITY(FEET/SEC.) =    1.32   DEPTH*VELOCITY =     0.59


**************************************************************************
   FLOW PROCESS FROM NODE    32.00 TO NODE    13.00 IS CODE =    9
-------------------------------------------------------------------------
```

>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===
  UPSTREAM NODE ELEVATION(FEET) =   25.00
  DOWNSTREAM NODE ELEVATION(FEET) =   19.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   720.00
  "V" GUTTER WIDTH(FEET) =   0.01   GUTTER HIKE(FEET) =   0.010
  PAVEMENT LIP(FEET) = 0.010   MANNING'S N = .0400
  PAVEMENT CROSSFALL(DECIMAL NOTATION) =   0.01
  MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.793
  SOIL CLASSIFICATION IS "B"
  AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.35
  AVERAGE FLOW DEPTH(FEET) =   0.52   FLOOD WIDTH(FEET) =   100.56
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   8.92   TC(MIN.) =   30.73
  SUBAREA AREA(ACRES) =   16.20   SUBAREA RUNOFF(CFS) =   20.16
  EFFECTIVE AREA(ACRES) =   31.00   AVERAGED Fm(INCH/HR) =   0.41
  TOTAL AREA(ACRES) =   31.00   PEAK FLOW RATE(CFS) =   38.58
  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =   0.55   FLOOD WIDTH(FEET) =   106.74
  FLOW VELOCITY(FEET/SEC.) =   1.35   DEPTH*VELOCITY =   0.75

****
  FLOW PROCESS FROM NODE   32.00 TO NODE   13.00 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.) =   30.73
  RAINFALL INTENSITY(INCH/HR) =   1.79
  AVERAGED Fm(INCH/HR) =   0.41
  EFFECTIVE STREAM AREA(ACRES) =   31.00
  TOTAL STREAM AREA(ACRES) =   31.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =   38.58

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR   3 STREAMS.

  ** PEAK FLOW RATE TABLE **
       Q(CFS)   Tc(MIN.)   Fm(INCH/HR)   Ae(ACRES)
  1   87.77   32.67   0.400   73.44
  2   65.95   53.68   0.396   82.60
  3   88.87   30.73   0.401   70.91

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =   88.87   Tc(MIN.) =   30.726
  EFFECTIVE AREA(ACRES) =   70.91   AVERAGED Fm(INCH/HR) =   0.40
  TOTAL AREA(ACRES) =   82.60
===
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)   =   82.60   TC(MIN.) =   30.73
  EFFECTIVE AREA(ACRES) =   70.91   AVERAGED Fm(INCH/HR)=   0.40
  PEAK FLOW RATE(CFS)   =   88.87
  *** PEAK FLOW RATE TABLE ***
       Q(CFS)   Tc(MIN.)   Fm(INCH/HR)   Ae(ACRES)
  1   87.77   32.67   0.400   73.44
  2   65.95   53.68   0.396   82.60
  3   88.87   30.73   0.401   70.91
===
===
  END OF RATIONAL METHOD ANALYSIS

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*****************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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               Ver. 5.2A   Release Date: 7/08/88   Serial # DE1742

                        Especially prepared for:

                            J. F. DAVIDSON


   *********************** DESCRIPTION OF STUDY ************************
   * BRIDGESTONE SPECIFIC PLAN
   * 100-YEAR PROPOSED CONDITION
   * COMPUTER FILE:  [TERESITOT.BRIDGE100_PR.DAT]
   ******************************************************************

     FILE NAME: BRIDGE100_PR.DAT
     TIME/DATE OF STUDY: 11:41  14-MAR-97
   ==================================================================
     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 LOGARITHMIC INTERPOLATION USED FOR RAINFALL*
     10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
     100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
     COMPUTED RAINFALL INTENSITY DATA:
     STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) = 1.2000
     SLOPE OF INTENSITY DURATION CURVE = 0.6000



   *****************************************************************
     FLOW PROCESS FROM NODE    1.00 TO NODE    2.00 IS CODE =   2
   ------------------------------------------------------------------
     >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
   ==================================================================
     DEVELOPMENT IS COMMERCIAL
     TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
     INITIAL SUBAREA FLOW-LENGTH(FEET) =    960.00
     UPSTREAM ELEVATION(FEET) =       52.00
     DOWNSTREAM ELEVATION(FEET) =      40.00
     ELEVATION DIFFERENCE(FEET) =      12.00
     TC(MIN.) = 0.304*[(  960.00** 3.00)/(    12.00)]**0.20 =   11.387
       100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.253
     SOIL CLASSIFICATION IS "B"
     COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
     SUBAREA RUNOFF(CFS) =       28.03
     TOTAL AREA(ACRES) =        9.80   PEAK FLOW RATE(CFS) =      28.03



   *****************************************************************
     FLOW PROCESS FROM NODE    2.00 TO NODE    3.00 IS CODE =   9
   ------------------------------------------------------------------
     >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
   ==================================================================
     UPSTREAM NODE ELEVATION(FEET) =      40.00
     DOWNSTREAM NODE ELEVATION(FEET) =     29.00
     CHANNEL LENGTH THRU SUBAREA(FEET) =    805.00
     "V" GUTTER WIDTH(FEET) = 100.00   GUTTER HIKE(FEET) =   0.001
     PAVEMENT LIP(FEET) =  0.001   MANNING'S N = .0150
     PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
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    MAXIMUM DEPTH(FEET) =    1.00
     100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.641
    SOIL CLASSIFICATION IS "B"
    COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
    TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.)  =    2.84
    AVERAGE FLOW DEPTH(FEET) =    0.12    FLOOD WIDTH(FEET) =  123.39
    "V" GUTTER FLOW TRAVEL TIME(MIN.) =    4.73    TC(MIN.) =   16.12
    SUBAREA AREA(ACRES) =    8.10    SUBAREA RUNOFF(CFS) =   18.70
    EFFECTIVE AREA(ACRES) =   17.90    AVERAGED Fm(INCH/HR) =    0.07
    TOTAL AREA(ACRES) =   17.90    PEAK FLOW RATE(CFS) =     41.33
    END OF SUBAREA "V" GUTTER HYDRAULICS:
    DEPTH(FEET) =  0.13    FLOOD WIDTH(FEET) =  126.51
    FLOW VELOCITY(FEET/SEC.) =    2.73    DEPTH*VELOCITY =    0.37



    **************************************************************
    FLOW PROCESS FROM NODE     3.00 TO NODE      7.00 IS CODE =    9
    ---------------------------------------------------------------
    >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
    ===============================================================
    UPSTREAM NODE ELEVATION(FEET) =    29.00
    DOWNSTREAM NODE ELEVATION(FEET) =    27.00
    CHANNEL LENGTH THRU SUBAREA(FEET) =   550.00
    "V" GUTTER WIDTH(FEET) =   0.01    GUTTER HIKE(FEET) =  0.010
    PAVEMENT LIP(FEET) =  0.010    MANNING'S N = .0150
    PAVEMENT CROSSFALL(DECIMAL NOTATION) =   0.01
    MAXIMUM DEPTH(FEET) =    1.00
     100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.296
    SOIL CLASSIFICATION IS "B"
    COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
    TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.)  =    2.17
    AVERAGE FLOW DEPTH(FEET) =    0.46    FLOOD WIDTH(FEET) =   87.29
    "V" GUTTER FLOW TRAVEL TIME(MIN.) =    4.23    TC(MIN.) =   20.34
    SUBAREA AREA(ACRES) =    0.00    SUBAREA RUNOFF(CFS) =    0.00
    EFFECTIVE AREA(ACRES) =   17.90    AVERAGED Fm(INCH/HR) =    0.07
    TOTAL AREA(ACRES) =   17.90    PEAK FLOW RATE(CFS) =     41.33
    END OF SUBAREA "V" GUTTER HYDRAULICS:
    DEPTH(FEET) =  0.46    FLOOD WIDTH(FEET) =   87.29
    FLOW VELOCITY(FEET/SEC.) =    2.17    DEPTH*VELOCITY =    0.99



    **************************************************************
    FLOW PROCESS FROM NODE     3.00 TO NODE      7.00 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.) =   20.34
    RAINFALL INTENSITY(INCH/HR) =    2.30
    AVERAGED Fm(INCH/HR) =   0.07
    EFFECTIVE STREAM AREA(ACRES) =    17.90
    TOTAL STREAM AREA(ACRES) =    17.90
    PEAK FLOW RATE(CFS) AT CONFLUENCE =     41.33



    **************************************************************
    FLOW PROCESS FROM NODE     4.00 TO NODE      5.00 IS CODE =    2
    ---------------------------------------------------------------
    >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
    ===============================================================
    DEVELOPMENT IS COMMERCIAL
    TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
    INITIAL SUBAREA FLOW-LENGTH(FEET) =   865.00
    UPSTREAM ELEVATION(FEET) =     44.00
    DOWNSTREAM ELEVATION(FEET) =     35.50
    ELEVATION DIFFERENCE(FEET) =      8.50
```

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TC(MIN.) = 0.304*[(  865.00** 3.00)/(       8.50)]**0.20 =     11.460
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.240
 SOIL CLASSIFICATION IS "B"
 COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
 SUBAREA RUNOFF(CFS) =       14.53
 TOTAL AREA(ACRES) =        5.10   PEAK FLOW RATE(CFS) =       14.53


********************************************************************
 FLOW PROCESS FROM NODE     5.00 TO NODE      6.00 IS CODE =    9
------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==================================================================
 UPSTREAM NODE ELEVATION(FEET) =       35.50
 DOWNSTREAM NODE ELEVATION(FEET) =       33.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =    610.00
 "V" GUTTER WIDTH(FEET) = 100.00   GUTTER HIKE(FEET) =   0.001
 PAVEMENT LIP(FEET) =  0.001   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
 MAXIMUM DEPTH(FEET) =    1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.453
 SOIL CLASSIFICATION IS "B"
 COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    1.50
 AVERAGE FLOW DEPTH(FEET) =    0.12   FLOOD WIDTH(FEET) =  123.39
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =     6.76   TC(MIN.) =   18.22
 SUBAREA AREA(ACRES) =     4.90   SUBAREA RUNOFF(CFS) =   10.49
 EFFECTIVE AREA(ACRES) =    10.00   AVERAGED Fm(INCH/HR) =    0.08
 TOTAL AREA(ACRES) =    10.00   PEAK FLOW RATE(CFS) =     21.40
 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.12   FLOOD WIDTH(FEET) =  123.39
 FLOW VELOCITY(FEET/SEC.) =    1.62   DEPTH*VELOCITY =    0.19


********************************************************************
 FLOW PROCESS FROM NODE     6.00 TO NODE      7.00 IS CODE =    9
------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==================================================================
 UPSTREAM NODE ELEVATION(FEET) =       33.00
 DOWNSTREAM NODE ELEVATION(FEET) =       27.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   1000.00
 "V" GUTTER WIDTH(FEET) =    0.01   GUTTER HIKE(FEET) =   0.010
 PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
 MAXIMUM DEPTH(FEET) =    1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.020
 SOIL CLASSIFICATION IS "B"
 COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    2.39
 AVERAGE FLOW DEPTH(FEET) =    0.36   FLOOD WIDTH(FEET) =    68.92
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =     6.97   TC(MIN.) =   25.20
 SUBAREA AREA(ACRES) =     7.90   SUBAREA RUNOFF(CFS) =   13.83
 EFFECTIVE AREA(ACRES) =    17.90   AVERAGED Fm(INCH/HR) =    0.08
 TOTAL AREA(ACRES) =    17.90   PEAK FLOW RATE(CFS) =     31.33
 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.38   FLOOD WIDTH(FEET) =    71.98
 FLOW VELOCITY(FEET/SEC.) =    2.42   DEPTH*VELOCITY =    0.92


********************************************************************
 FLOW PROCESS FROM NODE     6.00 TO NODE      7.00 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.) =  25.20
RAINFALL INTENSITY(INCH/HR) =   2.02
AVERAGED Fm(INCH/HR) =  0.08
EFFECTIVE STREAM AREA(ACRES) =   17.90
TOTAL STREAM AREA(ACRES) =   17.90
PEAK FLOW RATE(CFS) AT CONFLUENCE =       31.33


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

** PEAK FLOW RATE TABLE **
        Q(CFS)    Tc(MIN.)    Fm(INCH/HR)    Ae(ACRES)
1       70.22     20.34        0.075          32.35
2       67.51     25.20        0.075          35.80

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =       70.22   Tc(MIN.) =     20.343
EFFECTIVE AREA(ACRES) =       32.35   AVERAGED Fm(INCH/HR) =   0.08
TOTAL AREA(ACRES) =       35.80


*********************************************************************
 FLOW PROCESS FROM NODE    10.00 TO NODE    11.00 IS CODE =    2
---------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====================================================================
 DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  1100.00
 UPSTREAM ELEVATION(FEET) =      44.00
 DOWNSTREAM ELEVATION(FEET) =      31.00
 ELEVATION DIFFERENCE(FEET) =      13.00
 TC(MIN.) = 0.304*[( 1100.00** 3.00)/(    13.00)]**0.20 =    12.160
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.127
 SOIL CLASSIFICATION IS "B"
 COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
 SUBAREA RUNOFF(CFS) =       27.19
 TOTAL AREA(ACRES) =       9.90   PEAK FLOW RATE(CFS) =        27.19


*********************************************************************
 FLOW PROCESS FROM NODE    11.00 TO NODE    12.00 IS CODE =    9
---------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=====================================================================
 UPSTREAM NODE ELEVATION(FEET) =      31.00
 DOWNSTREAM NODE ELEVATION(FEET) =      26.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =     530.00
 "V" GUTTER WIDTH(FEET) =   0.01   GUTTER HIKE(FEET) =  0.010
 PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
 MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.755
 SOIL CLASSIFICATION IS "B"
 COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.09
 AVERAGE FLOW DEPTH(FEET) =   0.36   FLOOD WIDTH(FEET) =   68.92
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =    2.86   TC(MIN.) =   15.02
 SUBAREA AREA(ACRES) =     7.90   SUBAREA RUNOFF(CFS) =   19.05
 EFFECTIVE AREA(ACRES) =    17.80   AVERAGED Fm(INCH/HR) =   0.08
 TOTAL AREA(ACRES) =    17.80   PEAK FLOW RATE(CFS) =      42.93
 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.40   FLOOD WIDTH(FEET) =    75.04
 FLOW VELOCITY(FEET/SEC.) =   3.05   DEPTH*VELOCITY =    1.20
```

```
****************************************************************************
   FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =     9
---------------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===========================================================================
   UPSTREAM NODE ELEVATION(FEET) =       26.00
   DOWNSTREAM NODE ELEVATION(FEET) =      19.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =    450.00
   "V" GUTTER WIDTH(FEET) =    0.01    GUTTER HIKE(FEET) =  0.010
   PAVEMENT LIP(FEET) =  0.010    MANNING'S N = .0150
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
   MAXIMUM DEPTH(FEET) =    1.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.561
   SOIL CLASSIFICATION IS "B"
   COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    3.88
   AVERAGE FLOW DEPTH(FEET) =    0.40    FLOOD WIDTH(FEET) =    75.04
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =    1.93    TC(MIN.) =  16.96
   SUBAREA AREA(ACRES) =     10.40    SUBAREA RUNOFF(CFS) =    23.27
   EFFECTIVE AREA(ACRES) =    28.20    AVERAGED Fm(INCH/HR) =   0.08
   TOTAL AREA(ACRES) =    28.20    PEAK FLOW RATE(CFS) =      63.11
   END OF SUBAREA "V" GUTTER HYDRAULICS:
   DEPTH(FEET) =    0.41    FLOOD WIDTH(FEET) =    78.10
   FLOW VELOCITY(FEET/SEC.) =    4.14    DEPTH*VELOCITY =    1.70


****************************************************************************
   FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 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.) =   16.96
   RAINFALL INTENSITY(INCH/HR) =    2.56
   AVERAGED Fm(INCH/HR) =   0.08
   EFFECTIVE STREAM AREA(ACRES) =     28.20
   TOTAL STREAM AREA(ACRES) =     28.20
   PEAK FLOW RATE(CFS) AT CONFLUENCE =       63.11


****************************************************************************
   FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =     2
---------------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
===========================================================================
   NATURAL POOR COVER
   TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
   INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
   UPSTREAM ELEVATION(FEET) =       55.00
   DOWNSTREAM ELEVATION(FEET) =      50.00
   ELEVATION DIFFERENCE(FEET) =       5.00
   TC(MIN.) = 0.525*[( 1000.00** 3.00)/(      5.00)]**0.20 =    24.009
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.079
   SOIL CLASSIFICATION IS "B"
   NATURAL POOR COVER "BARREN" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.2700
   SUBAREA RUNOFF(CFS) =       4.23
   TOTAL AREA(ACRES) =     2.60    PEAK FLOW RATE(CFS) =      4.23


****************************************************************************
   FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =     9
---------------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===========================================================================
   UPSTREAM NODE ELEVATION(FEET) =       50.00
   DOWNSTREAM NODE ELEVATION(FEET) =      42.00
```

CHANNEL LENGTH THRU SUBAREA(FEET) = 1650.00
"V" GUTTER WIDTH(FEET) =   0.01   GUTTER HIKE(FEET) =   0.010
PAVEMENT LIP(FEET) = 0.010   MANNING'S N = .0300
PAVEMENT CROSSFALL(DECIMAL NOTATION) =   0.50
MAXIMUM DEPTH(FEET) =   3.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.640
SOIL CLASSIFICATION IS "B"
NATURAL POOR COVER "BARREN" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.2700
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.36
AVERAGE FLOW DEPTH(FEET) =   1.31   FLOOD WIDTH(FEET) =   5.16
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 11.65   TC(MIN.) = 35.65
SUBAREA AREA(ACRES) =   5.80   SUBAREA RUNOFF(CFS) =   7.15
EFFECTIVE AREA(ACRES) =   8.40   AVERAGED Fm(INCH/HR) =   0.27
TOTAL AREA(ACRES) =   8.40   PEAK FLOW RATE(CFS) =   10.36
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =   1.45   FLOOD WIDTH(FEET) =   5.71
FLOW VELOCITY(FEET/SEC.) =   2.54   DEPTH*VELOCITY =   3.67

****
   FLOW PROCESS FROM NODE   22.00 TO NODE   23.00 IS CODE =   9
- -
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===
   UPSTREAM NODE ELEVATION(FEET) =   422.00
   DOWNSTREAM NODE ELEVATION(FEET) =   31.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   780.00
   "V" GUTTER WIDTH(FEET) =   0.01   GUTTER HIKE(FEET) =   0.010
   PAVEMENT LIP(FEET) = 0.010   MANNING'S N = .0150
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =   0.01
   MAXIMUM DEPTH(FEET) =   2.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.610
   SOIL CLASSIFICATION IS "B"
   COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   11.68
   AVERAGE FLOW DEPTH(FEET) =   0.14   FLOOD WIDTH(FEET) =   23.21
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.11   TC(MIN.) = 36.77
   SUBAREA AREA(ACRES) =   7.80   SUBAREA RUNOFF(CFS) =   10.77
   EFFECTIVE AREA(ACRES) =   16.20   AVERAGED Fm(INCH/HR) =   0.18
   TOTAL AREA(ACRES) =   16.20   PEAK FLOW RATE(CFS) =   20.90
   END OF SUBAREA "V" GUTTER HYDRAULICS:
   DEPTH(FEET) =   0.15   FLOOD WIDTH(FEET) =   26.31
   FLOW VELOCITY(FEET/SEC.) =   12.08   DEPTH*VELOCITY =   1.83

****
   FLOW PROCESS FROM NODE   23.00 TO NODE   13.00 IS CODE =   9
- -
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===
   UPSTREAM NODE ELEVATION(FEET) =   31.00
   DOWNSTREAM NODE ELEVATION(FEET) =   19.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   1170.00
   "V" GUTTER WIDTH(FEET) =   0.01   GUTTER HIKE(FEET) =   0.010
   PAVEMENT LIP(FEET) = 0.010   MANNING'S N = .0150
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =   0.01
   MAXIMUM DEPTH(FEET) =   2.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.450
   SOIL CLASSIFICATION IS "B"
   COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.79
   AVERAGE FLOW DEPTH(FEET) =   0.32   FLOOD WIDTH(FEET) =   60.34
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =   7.00   TC(MIN.) = 43.76
   SUBAREA AREA(ACRES) =   7.20   SUBAREA RUNOFF(CFS) =   8.91
   EFFECTIVE AREA(ACRES) =   23.40   AVERAGED Fm(INCH/HR) =   0.14
   TOTAL AREA(ACRES) =   23.40   PEAK FLOW RATE(CFS) =   27.49
   END OF SUBAREA "V" GUTTER HYDRAULICS:

```
    DEPTH(FEET) =  0.32   FLOOD WIDTH(FEET) =    60.34
    FLOW VELOCITY(FEET/SEC.) =    3.02   DEPTH*VELOCITY =     0.97



*****************************************************************************
   FLOW PROCESS FROM NODE    23.00 TO NODE     13.00 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.) =  43.76
   RAINFALL INTENSITY(INCH/HR) =   1.45
   AVERAGED Fm(INCH/HR) =  0.14
   EFFECTIVE STREAM AREA(ACRES) =    23.40
   TOTAL STREAM AREA(ACRES) =    23.40
   PEAK FLOW RATE(CFS) AT CONFLUENCE =       27.49



*****************************************************************************
   FLOW PROCESS FROM NODE    30.00 TO NODE     31.00 IS CODE =    2
---------------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
===========================================================================
   DEVELOPMENT IS COMMERCIAL
   TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
   INITIAL SUBAREA FLOW-LENGTH(FEET) =    600.00
   UPSTREAM ELEVATION(FEET) =     47.20
   DOWNSTREAM ELEVATION(FEET) =      30.50
   ELEVATION DIFFERENCE(FEET) =      16.70
   TC(MIN.) = 0.304*[(  600.00** 3.00)/(    16.70)]**0.20 =     8.039
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.008
   SOIL CLASSIFICATION IS "B"
   COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
   SUBAREA RUNOFF(CFS) =      18.05
   TOTAL AREA(ACRES) =        5.10   PEAK FLOW RATE(CFS) =      18.05



*****************************************************************************
   FLOW PROCESS FROM NODE    31.00 TO NODE     32.00 IS CODE =    9
---------------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===========================================================================
   UPSTREAM NODE ELEVATION(FEET) =       30.50
   DOWNSTREAM NODE ELEVATION(FEET) =       25.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =     586.00
   "V" GUTTER WIDTH(FEET) =    0.01   GUTTER HIKE(FEET) =   0.010
   PAVEMENT LIP(FEET) =   0.010   MANNING'S N = .0150
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
   MAXIMUM DEPTH(FEET) =    2.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.246
   SOIL CLASSIFICATION IS "B"
   COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    2.88
   AVERAGE FLOW DEPTH(FEET) =     0.35   FLOOD WIDTH(FEET) =     66.53
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =    3.39   TC(MIN.) =   11.43
   SUBAREA AREA(ACRES) =      9.70   SUBAREA RUNOFF(CFS) =    27.68
   EFFECTIVE AREA(ACRES) =    14.80   AVERAGED Fm(INCH/HR) =    0.08
   TOTAL AREA(ACRES) =    14.80   PEAK FLOW RATE(CFS) =      42.24
   END OF SUBAREA "V" GUTTER HYDRAULICS:
   DEPTH(FEET) =  0.38   FLOOD WIDTH(FEET) =    72.71
   FLOW VELOCITY(FEET/SEC.) =    3.20   DEPTH*VELOCITY =     1.23



*****************************************************************************
   FLOW PROCESS FROM NODE    32.00 TO NODE     13.00 IS CODE =    9
---------------------------------------------------------------------------
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```
        >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
================================================================================
   UPSTREAM NODE ELEVATION(FEET) =        25.00
   DOWNSTREAM NODE ELEVATION(FEET) =       19.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =    720.00
   "V" GUTTER WIDTH(FEET) =    0.01   GUTTER HIKE(FEET) =   0.010
   PAVEMENT LIP(FEET) =   0.010   MANNING'S N = .0150
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
   MAXIMUM DEPTH(FEET) =    2.00
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.735
   SOIL CLASSIFICATION IS "B"
   COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    3.18
   AVERAGE FLOW DEPTH(FEET) =     0.46   FLOOD WIDTH(FEET) =      88.18
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =    3.78   TC(MIN.) =   15.20
   SUBAREA AREA(ACRES) =     16.20   SUBAREA RUNOFF(CFS) =    38.78
   EFFECTIVE AREA(ACRES) =     31.00   AVERAGED Fm(INCH/HR) =    0.08
   TOTAL AREA(ACRES) =     31.00   PEAK FLOW RATE(CFS) =      74.21
   END OF SUBAREA "V" GUTTER HYDRAULICS:
   DEPTH(FEET) =   0.49   FLOOD WIDTH(FEET) =     94.37
   FLOW VELOCITY(FEET/SEC.) =    3.33   DEPTH*VELOCITY =    1.64



 *******************************************************************************
   FLOW PROCESS FROM NODE    32.00 TO NODE    13.00 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.) =   15.20
   RAINFALL INTENSITY(INCH/HR) =    2.73
   AVERAGED Fm(INCH/HR) =   0.08
   EFFECTIVE STREAM AREA(ACRES) =    31.00
   TOTAL STREAM AREA(ACRES) =    31.00
   PEAK FLOW RATE(CFS) AT CONFLUENCE =       74.21

   RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
   CONFLUENCE FORMULA USED FOR  3 STREAMS.

   ** PEAK FLOW RATE TABLE **
         Q(CFS)    Tc(MIN.)   Fm(INCH/HR)    Ae(ACRES)
   1     152.20     16.96       0.084         68.27
   2     100.75     43.76       0.095         82.60
   3     153.68     15.20       0.084         64.41

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =     153.68   Tc(MIN.) =    15.201
   EFFECTIVE AREA(ACRES) =      64.41   AVERAGED Fm(INCH/HR) =   0.08
   TOTAL AREA(ACRES) =       82.60
================================================================================
   END OF STUDY SUMMARY:
   TOTAL AREA(ACRES)      =      82.60   TC(MIN.) =       15.20
   EFFECTIVE AREA(ACRES) =      64.41   AVERAGED Fm(INCH/HR)=   0.08
   PEAK FLOW RATE(CFS)    =     153.68
   *** PEAK FLOW RATE TABLE ***
         Q(CFS)    Tc(MIN.)   Fm(INCH/HR)    Ae(ACRES)
   1     152.20     16.96       0.084         68.27
   2     100.75     43.76       0.095         82.60
   3     153.68     15.20       0.084         64.41
================================================================================
================================================================================
   END OF RATIONAL METHOD ANALYSIS
```

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**********************************************************************
                RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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                  Ver. 5.2A  Release Date: 7/08/88  Serial # DE1742

                            Especially prepared for:

                                J. F. DAVIDSON


   ************************* DESCRIPTION OF STUDY *************************
* BRIDGETONE SPECIF PLAN
* 10-YEAR EXISTING CONDITION
* COMPUTER FILE:   [TERESITOT:BRIDGE10_EX.DAT]
   *********************************************************************

   FILE NAME: BRIDGE10_EX.DAT
   TIME/DATE OF STUDY: 11:05  14-MAR-97
==================================================================
   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 LOGARITHMIC INTERPOLATION USED FOR RAINFALL*
   10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
   100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
   COMPUTED RAINFALL INTENSITY DATA:
   STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) = 0.8080
   SLOPE OF INTENSITY DURATION CURVE = 0.6000



   ********************************************************************
   FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =    2
   ------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
   ==================================================================
   DEVELOPMENT IS AGRICULTURE
   TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   960.00
   UPSTREAM ELEVATION(FEET) =      52.00
   DOWNSTREAM ELEVATION(FEET) =     40.00
   ELEVATION DIFFERENCE(FEET) =     12.00
   TC(MIN.) = 0.525*[(  960.00** 3.00)/(    12.00)]**0.20 =   19.665
     10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.578
   SOIL CLASSIFICATION IS "B"
   AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
   SUBAREA RUNOFF(CFS) =      10.30
   TOTAL AREA(ACRES) =       9.80   PEAK FLOW RATE(CFS) =      10.30



   ********************************************************************
   FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =    9
   ------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
   ==================================================================
   UPSTREAM NODE ELEVATION(FEET) =      40.00
   DOWNSTREAM NODE ELEVATION(FEET) =      29.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =    805.00
   "V" GUTTER WIDTH(FEET) = 100.00   GUTTER HIKE(FEET) =   0.001
   PAVEMENT LIP(FEET) =  0.001   MANNING'S N = .0400
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
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    MAXIMUM DEPTH(FEET) =    1.00
      10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.153
    SOIL CLASSIFICATION IS "B"
    AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
    TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    0.99
    AVERAGE FLOW DEPTH(FEET) =     0.12    FLOOD WIDTH(FEET) =  123.39
    "V" GUTTER FLOW TRAVEL TIME(MIN.) =  13.52   TC(MIN.) =   33.18
    SUBAREA AREA(ACRES) =      8.10   SUBAREA RUNOFF(CFS) =     5.42
    EFFECTIVE AREA(ACRES) =    17.90   AVERAGED Fm(INCH/HR) =    0.41
    TOTAL AREA(ACRES) =    17.90    PEAK FLOW RATE(CFS) =      11.97
    END OF SUBAREA "V" GUTTER HYDRAULICS:
    DEPTH(FEET) =   0.12   FLOOD WIDTH(FEET) =  123.39
    FLOW VELOCITY(FEET/SEC.) =    0.91   DEPTH*VELOCITY =    0.11



*************************************************************************
    FLOW PROCESS FROM NODE      3.00 TO NODE      7.00 IS CODE =     9
-------------------------------------------------------------------------
    >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=========================================================================
    UPSTREAM NODE ELEVATION(FEET) =       29.00
    DOWNSTREAM NODE ELEVATION(FEET) =     27.00
    CHANNEL LENGTH THRU SUBAREA(FEET) =    550.00
    "V" GUTTER WIDTH(FEET) =    0.01   GUTTER HIKE(FEET) =  0.010
    PAVEMENT LIP(FEET) =   0.010   MANNING'S N = .0400
    PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
    MAXIMUM DEPTH(FEET) =    1.00
      10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.962
    SOIL CLASSIFICATION IS "B"
    AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
    TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    0.78
    AVERAGE FLOW DEPTH(FEET) =     0.41    FLOOD WIDTH(FEET) =   78.10
    "V" GUTTER FLOW TRAVEL TIME(MIN.) =  11.68   TC(MIN.) =   44.86
    SUBAREA AREA(ACRES) =      0.00   SUBAREA RUNOFF(CFS) =     0.00
    EFFECTIVE AREA(ACRES) =    17.90   AVERAGED Fm(INCH/HR) =    0.41
    TOTAL AREA(ACRES) =    17.90    PEAK FLOW RATE(CFS) =      11.97
    END OF SUBAREA "V" GUTTER HYDRAULICS:
    DEPTH(FEET) =   0.41   FLOOD WIDTH(FEET) =   78.10
    FLOW VELOCITY(FEET/SEC.) =    0.78   DEPTH*VELOCITY =    0.32



*************************************************************************
    FLOW PROCESS FROM NODE      3.00 TO NODE      7.00 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.) =   44.86
    RAINFALL INTENSITY(INCH/HR) =    0.96
    AVERAGED Fm(INCH/HR) =    0.41
    EFFECTIVE STREAM AREA(ACRES) =    17.90
    TOTAL STREAM AREA(ACRES) =     17.90
    PEAK FLOW RATE(CFS) AT CONFLUENCE =        11.97



*************************************************************************
    FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =     2
-------------------------------------------------------------------------
    >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=========================================================================
    DEVELOPMENT IS AGRICULTURE
    TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
    INITIAL SUBAREA FLOW-LENGTH(FEET) =     865.00
    UPSTREAM ELEVATION(FEET) =        44.00
    DOWNSTREAM ELEVATION(FEET) =       35.50
    ELEVATION DIFFERENCE(FEET) =        8.50
```

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    TC(MIN.) = 0.525*[( 865.00** 3.00)/(     8.50)]**0.20 =    19.792
      10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.572
    SOIL CLASSIFICATION IS "B"
    AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
    SUBAREA RUNOFF(CFS) =       5.33
    TOTAL AREA(ACRES) =        5.10   PEAK FLOW RATE(CFS) =       5.33


*******************************************************************************
   FLOW PROCESS FROM NODE     5.00 TO NODE     6.00 IS CODE =     9
-------------------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===============================================================================
   UPSTREAM NODE ELEVATION(FEET) =       35.50
   DOWNSTREAM NODE ELEVATION(FEET) =       33.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =      610.00
   "V" GUTTER WIDTH(FEET) = 100.00   GUTTER HIKE(FEET) =   0.001
   PAVEMENT LIP(FEET) =  0.001   MANNING'S N = .0400
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
   MAXIMUM DEPTH(FEET) =    1.00
      10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.038
   SOIL CLASSIFICATION IS "B"
   AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    0.52
   AVERAGE FLOW DEPTH(FEET) =     0.12   FLOOD WIDTH(FEET) =   123.39
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =  19.70   TC(MIN.) =    39.50
   SUBAREA AREA(ACRES) =    4.90   SUBAREA RUNOFF(CFS) =    2.77
   EFFECTIVE AREA(ACRES) =    10.00   AVERAGED Fm(INCH/HR) =    0.41
   TOTAL AREA(ACRES) =     10.00   PEAK FLOW RATE(CFS) =     5.66
   END OF SUBAREA "V" GUTTER HYDRAULICS:
   DEPTH(FEET) =   0.10   FLOOD WIDTH(FEET) =   120.27
   FLOW VELOCITY(FEET/SEC.) =    0.50   DEPTH*VELOCITY =    0.05


*******************************************************************************
   FLOW PROCESS FROM NODE     6.00 TO NODE     7.00 IS CODE =     9
-------------------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===============================================================================
   UPSTREAM NODE ELEVATION(FEET) =       33.00
   DOWNSTREAM NODE ELEVATION(FEET) =       27.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =     1000.00
   "V" GUTTER WIDTH(FEET) =    0.01   GUTTER HIKE(FEET) =   0.010
   PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0400
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
   MAXIMUM DEPTH(FEET) =    1.00
      10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 0.804
   SOIL CLASSIFICATION IS "B"
   AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    0.79
   AVERAGE FLOW DEPTH(FEET) =     0.32   FLOOD WIDTH(FEET) =    59.73
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =  21.05   TC(MIN.) =    60.55
   SUBAREA AREA(ACRES) =    7.90   SUBAREA RUNOFF(CFS) =    2.80
   EFFECTIVE AREA(ACRES) =    17.90   AVERAGED Fm(INCH/HR) =    0.41
   TOTAL AREA(ACRES) =     17.90   PEAK FLOW RATE(CFS) =     6.34
   END OF SUBAREA "V" GUTTER HYDRAULICS:
   DEPTH(FEET) =   0.30   FLOOD WIDTH(FEET) =    56.67
   FLOW VELOCITY(FEET/SEC.) =    0.79   DEPTH*VELOCITY =    0.24


*******************************************************************************
   FLOW PROCESS FROM NODE     6.00 TO NODE     7.00 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.) = 60.55
RAINFALL INTENSITY(INCH/HR) =   0.80
AVERAGED Fm(INCH/HR) = 0.41
EFFECTIVE STREAM AREA(ACRES) =   17.90
TOTAL STREAM AREA(ACRES) =   17.90
PEAK FLOW RATE(CFS) AT CONFLUENCE =   6.34

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

** PEAK FLOW RATE TABLE **

	Q(CFS)	Tc(MIN.)	Fm(INCH/HR)	Ae(ACRES)
1	18.56	44.86	0.410	31.16
2	14.87	60.55	0.410	35.80

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =   18.56   Tc(MIN.) =   44.865
EFFECTIVE AREA(ACRES) =   31.16   AVERAGED Fm(INCH/HR) =   0.41
TOTAL AREA(ACRES) =   35.80

****
  FLOW PROCESS FROM NODE   10.00 TO NODE   11.00 IS CODE =   2

  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==
DEVELOPMENT IS AGRICULTURE
TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
INITIAL SUBAREA FLOW-LENGTH(FEET) = 1100.00
UPSTREAM ELEVATION(FEET) =   44.00
DOWNSTREAM ELEVATION(FEET) =   31.00
ELEVATION DIFFERENCE(FEET) =   13.00
TC(MIN.) = 0.525*[(1100.00** 3.00)/(13.00)]**0.20 =   20.999
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.517
SOIL CLASSIFICATION IS "B"
AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
SUBAREA RUNOFF(CFS) =   9.86
TOTAL AREA(ACRES) =   9.90   PEAK FLOW RATE(CFS) =   9.86

****
  FLOW PROCESS FROM NODE   11.00 TO NODE   12.00 IS CODE =   9

  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==
  UPSTREAM NODE ELEVATION(FEET) =   31.00
  DOWNSTREAM NODE ELEVATION(FEET) =   26.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   530.00
  "V" GUTTER WIDTH(FEET) =   0.01   GUTTER HIKE(FEET) = 0.010
  PAVEMENT LIP(FEET) = 0.010   MANNING'S N = .0400
  PAVEMENT CROSSFALL(DECIMAL NOTATION) =   0.01
  MAXIMUM DEPTH(FEET) =   1.00
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.246
  SOIL CLASSIFICATION IS "B"
AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.09
AVERAGE FLOW DEPTH(FEET) =   0.36   FLOOD WIDTH(FEET) =   68.92
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   8.14   TC(MIN.) =   29.14
SUBAREA AREA(ACRES) =   7.90   SUBAREA RUNOFF(CFS) =   5.95
EFFECTIVE AREA(ACRES) =   17.80   AVERAGED Fm(INCH/HR) =   0.41
TOTAL AREA(ACRES) =   17.80   PEAK FLOW RATE(CFS) =   13.40
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =   0.36   FLOOD WIDTH(FEET) =   68.92
FLOW VELOCITY(FEET/SEC.) =   1.13   DEPTH*VELOCITY =   0.41

```
*********************************************************************
   FLOW PROCESS FROM NODE    12.00 TO NODE    13.00 IS CODE =    9
---------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=====================================================================
   UPSTREAM NODE ELEVATION(FEET) =       26.00
   DOWNSTREAM NODE ELEVATION(FEET) =       19.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =     450.00
   "V" GUTTER WIDTH(FEET) =    0.01   GUTTER HIKE(FEET) =   0.010
   PAVEMENT LIP(FEET) =  0.010    MANNING'S N = .0400
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
   MAXIMUM DEPTH(FEET) =    1.00
     10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.127
   SOIL CLASSIFICATION IS "B"
   AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.41
   AVERAGE FLOW DEPTH(FEET) =    0.36    FLOOD WIDTH(FEET) =    68.92
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =   5.31   TC(MIN.) = 34.45
   SUBAREA AREA(ACRES) =     10.40   SUBAREA RUNOFF(CFS) =    6.71
   EFFECTIVE AREA(ACRES) =    28.20   AVERAGED Fm(INCH/HR) =   0.41
   TOTAL AREA(ACRES) =    28.20    PEAK FLOW RATE(CFS) =     18.20
   END OF SUBAREA "V" GUTTER HYDRAULICS:
   DEPTH(FEET) =   0.38    FLOOD WIDTH(FEET) =    71.98
   FLOW VELOCITY(FEET/SEC.) =   1.41    DEPTH*VELOCITY =    0.53


*********************************************************************
   FLOW PROCESS FROM NODE    12.00 TO NODE    13.00 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.) =  34.45
   RAINFALL INTENSITY(INCH/HR) =    1.13
   AVERAGED Fm(INCH/HR) =   0.41
   EFFECTIVE STREAM AREA(ACRES) =    28.20
   TOTAL STREAM AREA(ACRES) =    28.20
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.20


*********************************************************************
   FLOW PROCESS FROM NODE    20.00 TO NODE    21.00 IS CODE =    2
---------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====================================================================
   NATURAL POOR COVER
   TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   1000.00
   UPSTREAM ELEVATION(FEET) =       55.00
   DOWNSTREAM ELEVATION(FEET) =       50.00
   ELEVATION DIFFERENCE(FEET) =       5.00
   TC(MIN.) = 0.525*[( 1000.00** 3.00)/(      5.00)]**0.20 =    24.009
     10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.400
   SOIL CLASSIFICATION IS "B"
   NATURAL POOR COVER "BARREN" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.2700
   SUBAREA RUNOFF(CFS) =        2.64
   TOTAL AREA(ACRES) =       2.60   PEAK FLOW RATE(CFS) =       2.64


*********************************************************************
   FLOW PROCESS FROM NODE    21.00 TO NODE    22.00 IS CODE =    9
---------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=====================================================================
   UPSTREAM NODE ELEVATION(FEET) =       50.00
   DOWNSTREAM NODE ELEVATION(FEET) =       42.00
```

```
    CHANNEL LENGTH THRU SUBAREA(FEET) =    1650.00
    "V" GUTTER WIDTH(FEET) =     0.01   GUTTER HIKE(FEET) =    0.010
    PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0300
    PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.50
    MAXIMUM DEPTH(FEET) =    3.00
       10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.078
    SOIL CLASSIFICATION IS "B"
    NATURAL POOR COVER "BARREN" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.2700
    TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    2.10
    AVERAGE FLOW DEPTH(FEET) =    1.09   FLOOD WIDTH(FEET) =    4.27
    "V" GUTTER FLOW TRAVEL TIME(MIN.) =   13.11   TC(MIN.) =  37.12
    SUBAREA AREA(ACRES) =    5.80   SUBAREA RUNOFF(CFS) =    4.22
    EFFECTIVE AREA(ACRES) =    8.40   AVERAGED Fm(INCH/HR) =    0.27
    TOTAL AREA(ACRES) =    8.40   PEAK FLOW RATE(CFS) =    6.11
    END OF SUBAREA "V" GUTTER HYDRAULICS:
    DEPTH(FEET) =   1.19   FLOOD WIDTH(FEET) =    4.69
    FLOW VELOCITY(FEET/SEC.) =    2.22   DEPTH*VELOCITY =    2.64



    ******************************************************************
    FLOW PROCESS FROM NODE   22.00 TO NODE   23.00 IS CODE =    9
    ------------------------------------------------------------------
    >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
    ==================================================================
    UPSTREAM NODE ELEVATION(FEET) =    422.00
    DOWNSTREAM NODE ELEVATION(FEET) =    31.00
    CHANNEL LENGTH THRU SUBAREA(FEET) =    780.00
    "V" GUTTER WIDTH(FEET) =     0.01   GUTTER HIKE(FEET) =    0.010
    PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0400
    PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
    MAXIMUM DEPTH(FEET) =    2.00
       10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.033
    SOIL CLASSIFICATION IS "B"
    AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
    TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    4.78
    AVERAGE FLOW DEPTH(FEET) =    0.15   FLOOD WIDTH(FEET) =   26.31
    "V" GUTTER FLOW TRAVEL TIME(MIN.) =    2.72   TC(MIN.) =  39.84
    SUBAREA AREA(ACRES) =    7.80   SUBAREA RUNOFF(CFS) =    4.37
    EFFECTIVE AREA(ACRES) =   16.20   AVERAGED Fm(INCH/HR) =    0.34
    TOTAL AREA(ACRES) =   16.20   PEAK FLOW RATE(CFS) =   10.14
    END OF SUBAREA "V" GUTTER HYDRAULICS:
    DEPTH(FEET) =   0.17   FLOOD WIDTH(FEET) =   29.40
    FLOW VELOCITY(FEET/SEC.) =    4.69   DEPTH*VELOCITY =    0.78



    ******************************************************************
    FLOW PROCESS FROM NODE   23.00 TO NODE   13.00 IS CODE =    9
    ------------------------------------------------------------------
    >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
    ==================================================================
    UPSTREAM NODE ELEVATION(FEET) =    31.00
    DOWNSTREAM NODE ELEVATION(FEET) =    19.00
    CHANNEL LENGTH THRU SUBAREA(FEET) =    1170.00
    "V" GUTTER WIDTH(FEET) =     0.01   GUTTER HIKE(FEET) =    0.010
    PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0400
    PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
    MAXIMUM DEPTH(FEET) =    2.00
       10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 0.834
    SOIL CLASSIFICATION IS "B"
    AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
    TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    1.14
    AVERAGE FLOW DEPTH(FEET) =    0.34   FLOOD WIDTH(FEET) =   63.43
    "V" GUTTER FLOW TRAVEL TIME(MIN.) =   17.05   TC(MIN.) =  56.88
    SUBAREA AREA(ACRES) =    7.20   SUBAREA RUNOFF(CFS) =    2.75
    EFFECTIVE AREA(ACRES) =   23.40   AVERAGED Fm(INCH/HR) =    0.36
    TOTAL AREA(ACRES) =   23.40   PEAK FLOW RATE(CFS) =   10.14
    END OF SUBAREA "V" GUTTER HYDRAULICS:
```

```
   DEPTH(FEET) =  0.32    FLOOD WIDTH(FEET) =    60.34
   FLOW VELOCITY(FEET/SEC.) =   1.11    DEPTH*VELOCITY =    0.36


*******************************************************************************
   FLOW PROCESS FROM NODE    23.00 TO NODE    13.00 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.) =  56.88
   RAINFALL INTENSITY(INCH/HR) =   0.83
   AVERAGED Fm(INCH/HR) =  0.36
   EFFECTIVE STREAM AREA(ACRES) =    23.40
   TOTAL STREAM AREA(ACRES) =    23.40
   PEAK FLOW RATE(CFS) AT CONFLUENCE =       10.14


*******************************************************************************
   FLOW PROCESS FROM NODE    30.00 TO NODE    31.00 IS CODE =    2
-------------------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
===============================================================================
   DEVELOPMENT IS AGRICULTURE
   TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
   INITIAL SUBAREA FLOW-LENGTH(FEET) =    600.00
   UPSTREAM ELEVATION(FEET) =      47.20
   DOWNSTREAM ELEVATION(FEET) =      30.50
   ELEVATION DIFFERENCE(FEET) =      16.70
   TC(MIN.) = 0.525*[(  600.00** 3.00)/(    16.70)]**0.20 =    13.884
     10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.944
   SOIL CLASSIFICATION IS "B"
   AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
   SUBAREA RUNOFF(CFS) =       7.04
   TOTAL AREA(ACRES) =        5.10   PEAK FLOW RATE(CFS) =       7.04


*******************************************************************************
   FLOW PROCESS FROM NODE    31.00 TO NODE    32.00 IS CODE =    9
-------------------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===============================================================================
   UPSTREAM NODE ELEVATION(FEET) =       30.50
   DOWNSTREAM NODE ELEVATION(FEET) =       25.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =     586.00
   "V" GUTTER WIDTH(FEET) =   0.01   GUTTER HIKE(FEET) =   0.010
   PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0400
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =   0.01
   MAXIMUM DEPTH(FEET) =    2.00
     10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.429
   SOIL CLASSIFICATION IS "B"
   AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.05
   AVERAGE FLOW DEPTH(FEET) =   0.35    FLOOD WIDTH(FEET) =    66.53
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =   9.31   TC(MIN.) =  23.19
   SUBAREA AREA(ACRES) =     9.70   SUBAREA RUNOFF(CFS) =     8.90
   EFFECTIVE AREA(ACRES) =    14.80   AVERAGED Fm(INCH/HR) =    0.41
   TOTAL AREA(ACRES) =    14.80   PEAK FLOW RATE(CFS) =      13.58
   END OF SUBAREA "V" GUTTER HYDRAULICS:
   DEPTH(FEET) =  0.37    FLOOD WIDTH(FEET) =    69.62
   FLOW VELOCITY(FEET/SEC.) =   1.12    DEPTH*VELOCITY =    0.41


*******************************************************************************
   FLOW PROCESS FROM NODE    32.00 TO NODE    13.00 IS CODE =    9
-------------------------------------------------------------------------------
```

```
        >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
================================================================================
  UPSTREAM NODE ELEVATION(FEET) =        25.00
  DOWNSTREAM NODE ELEVATION(FEET) =      19.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   720.00
  "V" GUTTER WIDTH(FEET) =    0.01   GUTTER HIKE(FEET) =   0.010
  PAVEMENT LIP(FEET) =   0.010   MANNING'S N = .0400
  PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
  MAXIMUM DEPTH(FEET) =    2.00
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.139
  SOIL CLASSIFICATION IS "B"
  AGRICULTURE "ROWCROPS" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.4100
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.13
  AVERAGE FLOW DEPTH(FEET) =    0.43   FLOOD WIDTH(FEET) =    81.99
  "V" GUTTER FLOW TRAVEL TIME(MIN.) = 10.65   TC(MIN.) = 33.84
  SUBAREA AREA(ACRES) =    16.20   SUBAREA RUNOFF(CFS) =   10.63
  EFFECTIVE AREA(ACRES) =    31.00   AVERAGED Fm(INCH/HR) =    0.41
  TOTAL AREA(ACRES) =    31.00   PEAK FLOW RATE(CFS) =     20.35
  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =   0.43   FLOOD WIDTH(FEET) =    81.99
  FLOW VELOCITY(FEET/SEC.) =    1.21   DEPTH*VELOCITY =    0.52



******************************************************************************
  FLOW PROCESS FROM NODE    32.00 TO NODE    13.00 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.) = 33.84
  RAINFALL INTENSITY(INCH/HR) =   1.14
  AVERAGED Fm(INCH/HR) =   0.41
  EFFECTIVE STREAM AREA(ACRES) =   31.00
  TOTAL STREAM AREA(ACRES) =    31.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.35

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
        Q(CFS)    Tc(MIN.)    Fm(INCH/HR)    Ae(ACRES)
  1     48.15     34.45       0.400          73.37
  2     32.75     56.88       0.396          82.60
  3     48.44     33.84       0.400          72.63

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       48.44   Tc(MIN.) =    33.844
  EFFECTIVE AREA(ACRES) =      72.63   AVERAGED Fm(INCH/HR) =   0.40
  TOTAL AREA(ACRES) =      82.60
==============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)        =      82.60   TC(MIN.) =       33.84
  EFFECTIVE AREA(ACRES) =      72.63   AVERAGED Fm(INCH/HR)=   0.40
  PEAK FLOW RATE(CFS)      =      48.44
  *** PEAK FLOW RATE TABLE ***
        Q(CFS)    Tc(MIN.)    Fm(INCH/HR)    Ae(ACRES)
  1     48.15     34.45       0.400          73.37
  2     32.75     56.88       0.396          82.60
  3     48.44     33.84       0.400          72.63
==============================================================================
==============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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*********************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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              Ver. 5.2A   Release Date: 7/08/88   Serial # DE1742

                        Especially prepared for:

                            J. F. DAVIDSON


    ************************* DESCRIPTION OF STUDY *************************
 * BRIDGETONE SPECIFIC PLAN
 * 10-YEAR PROPOSED CONDITION\
 * COMPUTER FILE:   [TERESITOT.BRIDGE10_PR.DAT]
    *********************************************************************

    FILE NAME: BRIDGE10_PR.DAT
    TIME/DATE OF STUDY: 11:17  14-MAR-97
 ====================================================================
    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 LOGARITHMIC INTERPOLATION USED FOR RAINFALL*
    10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
    100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
    COMPUTED RAINFALL INTENSITY DATA:
    STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) = 0.8080
    SLOPE OF INTENSITY DURATION CURVE = 0.6000



    *********************************************************************
    FLOW PROCESS FROM NODE     1.00 TO NODE     2.00 IS CODE =   2
 ---------------------------------------------------------------------
    >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 ====================================================================
    DEVELOPMENT IS COMMERCIAL
    TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
    INITIAL SUBAREA FLOW-LENGTH(FEET) =   960.00
    UPSTREAM ELEVATION(FEET) =      52.00
    DOWNSTREAM ELEVATION(FEET) =      40.00
    ELEVATION DIFFERENCE(FEET) =      12.00
    TC(MIN.) = 0.304*[(  960.00** 3.00)/(     12.00)]**0.20 =    11.387
      10 YEAR RAINFALL INTENSITY(INCH/HOUR) =   2.190
    SOIL CLASSIFICATION IS "B"
    COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
    SUBAREA RUNOFF(CFS) =       18.66
    TOTAL AREA(ACRES) =       9.80    PEAK FLOW RATE(CFS) =       18.66


    *********************************************************************
    FLOW PROCESS FROM NODE     2.00 TO NODE     3.00 IS CODE =   9
 ---------------------------------------------------------------------
    >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
 ====================================================================
    UPSTREAM NODE ELEVATION(FEET) =      40.00
    DOWNSTREAM NODE ELEVATION(FEET) =      29.00
    CHANNEL LENGTH THRU SUBAREA(FEET) =     805.00
    "V" GUTTER WIDTH(FEET) = 100.00   GUTTER HIKE(FEET) =   0.001
    PAVEMENT LIP(FEET) =  0.001   MANNING'S N = .0150
    PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
```

```
   MAXIMUM DEPTH(FEET) =    1.00
     10 YEAR RAINFALL INTENSITY(INCH/HOUR) =   1.689
   SOIL CLASSIFICATION IS "B"
   COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    2.18
   AVERAGE FLOW DEPTH(FEET) =    0.10   FLOOD WIDTH(FEET) =   120.27
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =    6.16   TC(MIN.) =   17.55
   SUBAREA AREA(ACRES) =     8.10   SUBAREA RUNOFF(CFS) =    11.77
   EFFECTIVE AREA(ACRES) =    17.90   AVERAGED Fm(INCH/HR) =    0.07
   TOTAL AREA(ACRES) =    17.90   PEAK FLOW RATE(CFS) =     26.01
   END OF SUBAREA "V" GUTTER HYDRAULICS:
   DEPTH(FEET) =    0.10   FLOOD WIDTH(FEET) =   120.27
   FLOW VELOCITY(FEET/SEC.) =    2.30   DEPTH*VELOCITY =    0.24


******************************************************************************
   FLOW PROCESS FROM NODE      3.00 TO NODE      7.00 IS CODE =     9
------------------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==============================================================================
   UPSTREAM NODE ELEVATION(FEET) =      29.00
   DOWNSTREAM NODE ELEVATION(FEET) =      27.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =    550.00
   "V" GUTTER WIDTH(FEET) =    0.01   GUTTER HIKE(FEET) =   0.010
   PAVEMENT LIP(FEET) =   0.010   MANNING'S N = .0150
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
   MAXIMUM DEPTH(FEET) =    1.00
     10 YEAR RAINFALL INTENSITY(INCH/HOUR) =   1.471
   SOIL CLASSIFICATION IS "B"
   COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    2.01
   AVERAGE FLOW DEPTH(FEET) =    0.38   FLOOD WIDTH(FEET) =    71.98
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =    4.57   TC(MIN.) =   22.12
   SUBAREA AREA(ACRES) =     0.00   SUBAREA RUNOFF(CFS) =     0.00
   EFFECTIVE AREA(ACRES) =    17.90   AVERAGED Fm(INCH/HR) =    0.07
   TOTAL AREA(ACRES) =    17.90   PEAK FLOW RATE(CFS) =     26.01
   END OF SUBAREA "V" GUTTER HYDRAULICS:
   DEPTH(FEET) =    0.38   FLOOD WIDTH(FEET) =    71.98
   FLOW VELOCITY(FEET/SEC.) =    2.01   DEPTH*VELOCITY =    0.76


******************************************************************************
   FLOW PROCESS FROM NODE      3.00 TO NODE      7.00 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.) =   22.12
   RAINFALL INTENSITY(INCH/HR) =    1.47
   AVERAGED Fm(INCH/HR) =   0.07
   EFFECTIVE STREAM AREA(ACRES) =    17.90
   TOTAL STREAM AREA(ACRES) =    17.90
   PEAK FLOW RATE(CFS) AT CONFLUENCE =      26.01


******************************************************************************
   FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =     2
------------------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
   DEVELOPMENT IS COMMERCIAL
   TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
   INITIAL SUBAREA FLOW-LENGTH(FEET) =    865.00
   UPSTREAM ELEVATION(FEET) =      44.00
   DOWNSTREAM ELEVATION(FEET) =      35.50
   ELEVATION DIFFERENCE(FEET) =       8.50
```

```
TC(MIN.) = 0.304*[(  865.00** 3.00)/(        8.50)]**0.20 =    11.460
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.182
SOIL CLASSIFICATION IS "B"
COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
SUBAREA RUNOFF(CFS) =         9.67
TOTAL AREA(ACRES) =        5.10   PEAK FLOW RATE(CFS) =        9.67


*****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =     9
-----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=============================================================================
  UPSTREAM NODE ELEVATION(FEET) =       35.50
  DOWNSTREAM NODE ELEVATION(FEET) =       33.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    610.00
  "V" GUTTER WIDTH(FEET) = 100.00   GUTTER HIKE(FEET) =  0.001
  PAVEMENT LIP(FEET) =  0.001   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
  MAXIMUM DEPTH(FEET) =    1.00
     10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.618
  SOIL CLASSIFICATION IS "B"
  COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    1.37
  AVERAGE FLOW DEPTH(FEET) =     0.09   FLOOD WIDTH(FEET) =   117.15
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =     7.40   TC(MIN.) =   18.86
  SUBAREA AREA(ACRES) =      4.90   SUBAREA RUNOFF(CFS) =    6.80
  EFFECTIVE AREA(ACRES) =     10.00   AVERAGED Fm(INCH/HR) =    0.08
  TOTAL AREA(ACRES) =     10.00   PEAK FLOW RATE(CFS) =      13.89
  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOOD WIDTH(FEET) =   120.27
  FLOW VELOCITY(FEET/SEC.) =    1.23   DEPTH*VELOCITY =    0.13


*****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =     9
-----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=============================================================================
  UPSTREAM NODE ELEVATION(FEET) =       33.00
  DOWNSTREAM NODE ELEVATION(FEET) =       27.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   1000.00
  "V" GUTTER WIDTH(FEET) =    0.01   GUTTER HIKE(FEET) =  0.010
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
  MAXIMUM DEPTH(FEET) =    1.00
     10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.305
  SOIL CLASSIFICATION IS "B"
  COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    2.05
  AVERAGE FLOW DEPTH(FEET) =     0.32   FLOOD WIDTH(FEET) =    59.73
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =     8.12   TC(MIN.) =   26.98
  SUBAREA AREA(ACRES) =      7.90   SUBAREA RUNOFF(CFS) =    8.75
  EFFECTIVE AREA(ACRES) =     17.90   AVERAGED Fm(INCH/HR) =    0.08
  TOTAL AREA(ACRES) =     17.90   PEAK FLOW RATE(CFS) =      19.82
  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.32   FLOOD WIDTH(FEET) =    59.73
  FLOW VELOCITY(FEET/SEC.) =    2.22   DEPTH*VELOCITY =    0.71


*****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =     1
-----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=============================================================================
  TOTAL NUMBER OF STREAMS = 2
```

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 26.98
RAINFALL INTENSITY(INCH/HR) =   1.31
AVERAGED Fm(INCH/HR) = 0.08
EFFECTIVE STREAM AREA(ACRES) =   17.90
TOTAL STREAM AREA(ACRES) =   17.90
PEAK FLOW RATE(CFS) AT CONFLUENCE =   19.82

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

** PEAK FLOW RATE TABLE **

	Q(CFS)	Tc(MIN.)	Fm(INCH/HR)	Ae(ACRES)
1	44.44	22.12	0.075	32.57
2	42.75	26.98	0.075	35.80

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =   44.44   Tc(MIN.) =   22.115
EFFECTIVE AREA(ACRES) =   32.57 AVERAGED Fm(INCH/HR) =   0.08
TOTAL AREA(ACRES) =   35.80

* *
 FLOW PROCESS FROM NODE   10.00 TO NODE   11.00 IS CODE =   2
- -
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
===
DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
INITIAL SUBAREA FLOW-LENGTH(FEET) = 1100.00
UPSTREAM ELEVATION(FEET) =   44.00
DOWNSTREAM ELEVATION(FEET) =   31.00
ELEVATION DIFFERENCE(FEET) =   13.00
TC(MIN.) = 0.304*[(1100.00** 3.00)/(13.00)]**0.20 =   12.160
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =   2.105
SOIL CLASSIFICATION IS "B"
COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
SUBAREA RUNOFF(CFS) =   18.09
TOTAL AREA(ACRES) =   9.90   PEAK FLOW RATE(CFS) =   18.09

* *
 FLOW PROCESS FROM NODE   11.00 TO NODE   12.00 IS CODE =   9
- -
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===
UPSTREAM NODE ELEVATION(FEET) =   31.00
DOWNSTREAM NODE ELEVATION(FEET) =   26.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   530.00
"V" GUTTER WIDTH(FEET) =   0.01   GUTTER HIKE(FEET) =   0.010
PAVEMENT LIP(FEET) =   0.010   MANNING'S N = .0150
PAVEMENT CROSSFALL(DECIMAL NOTATION) =   0.01
MAXIMUM DEPTH(FEET) =   1.00
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =   1.828
SOIL CLASSIFICATION IS "B"
COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.73
AVERAGE FLOW DEPTH(FEET) =   0.32   FLOOD WIDTH(FEET) =   59.73
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   3.24   TC(MIN.) =   15.39
SUBAREA AREA(ACRES) =   7.90   SUBAREA RUNOFF(CFS) =   12.46
EFFECTIVE AREA(ACRES) =   17.80   AVERAGED Fm(INCH/HR) =   0.08
TOTAL AREA(ACRES) =   17.80   PEAK FLOW RATE(CFS) =   28.08
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =   0.33   FLOOD WIDTH(FEET) =   62.79
FLOW VELOCITY(FEET/SEC.) =   2.85   DEPTH*VELOCITY =   0.95

```
*****************************************************************************
   FLOW PROCESS FROM NODE      12.00 TO NODE      13.00 IS CODE =      9
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=============================================================================
   UPSTREAM NODE ELEVATION(FEET) =        26.00
   DOWNSTREAM NODE ELEVATION(FEET) =        19.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =      450.00
   "V" GUTTER WIDTH(FEET) =    0.01    GUTTER HIKE(FEET) =   0.010
   PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =     0.01
   MAXIMUM DEPTH(FEET) =    1.00
     10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.694
   SOIL CLASSIFICATION IS "B"
   COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.62
   AVERAGE FLOW DEPTH(FEET) =    0.33    FLOOD WIDTH(FEET) =    62.79
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =    2.07   TC(MIN.) =  17.47
   SUBAREA AREA(ACRES) =    10.40   SUBAREA RUNOFF(CFS) =   15.16
   EFFECTIVE AREA(ACRES) =     28.20   AVERAGED Fm(INCH/HR) =   0.08
   TOTAL AREA(ACRES) =    28.20    PEAK FLOW RATE(CFS) =    41.10
   END OF SUBAREA "V" GUTTER HYDRAULICS:
   DEPTH(FEET) =   0.35   FLOOD WIDTH(FEET) =   65.85
   FLOW VELOCITY(FEET/SEC.) =   3.79   DEPTH*VELOCITY =   1.32


*****************************************************************************
   FLOW PROCESS FROM NODE      12.00 TO NODE      13.00 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.) =  17.47
   RAINFALL INTENSITY(INCH/HR) =   1.69
   AVERAGED Fm(INCH/HR) =  0.08
   EFFECTIVE STREAM AREA(ACRES) =    28.20
   TOTAL STREAM AREA(ACRES) =    28.20
   PEAK FLOW RATE(CFS) AT CONFLUENCE =     41.10


*****************************************************************************
   FLOW PROCESS FROM NODE      20.00 TO NODE      21.00 IS CODE =      2
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=============================================================================
   NATURAL POOR COVER
   TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   1000.00
   UPSTREAM ELEVATION(FEET) =       55.00
   DOWNSTREAM ELEVATION(FEET) =       50.00
   ELEVATION DIFFERENCE(FEET) =       5.00
   TC(MIN.) = 0.525*[( 1000.00** 3.00)/(       5.00)]**0.20 =   24.009
     10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.400
   SOIL CLASSIFICATION IS "B"
   NATURAL POOR COVER "BARREN" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.2700
   SUBAREA RUNOFF(CFS) =       2.64
   TOTAL AREA(ACRES) =      2.60   PEAK FLOW RATE(CFS) =      2.64


*****************************************************************************
   FLOW PROCESS FROM NODE      21.00 TO NODE      22.00 IS CODE =      9
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=============================================================================
   UPSTREAM NODE ELEVATION(FEET) =       50.00
   DOWNSTREAM NODE ELEVATION(FEET) =       42.00
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CHANNEL LENGTH THRU SUBAREA(FEET) =  1650.00
"V" GUTTER WIDTH(FEET) =   0.01   GUTTER HIKE(FEET) =   0.010
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0300
PAVEMENT CROSSFALL(DECIMAL NOTATION) =   0.50
MAXIMUM DEPTH(FEET) =   3.00
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.078
SOIL CLASSIFICATION IS "B"
NATURAL POOR COVER "BARREN" SUBAREA LOSS RATE, Fm(INCH/HR) = 0.2700
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.10
AVERAGE FLOW DEPTH(FEET) =   1.09   FLOOD WIDTH(FEET) =   4.27
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 13.11   TC(MIN.) = 37.12
SUBAREA AREA(ACRES) =   5.80   SUBAREA RUNOFF(CFS) =   4.22
EFFECTIVE AREA(ACRES) =   8.40   AVERAGED Fm(INCH/HR) =   0.27
TOTAL AREA(ACRES) =   8.40   PEAK FLOW RATE(CFS) =   6.11
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  1.19   FLOOD WIDTH(FEET) =   4.69
FLOW VELOCITY(FEET/SEC.) =   2.22   DEPTH*VELOCITY =   2.64



*******************************************************************************
   FLOW PROCESS FROM NODE   22.00 TO NODE   23.00 IS CODE =   9
-------------------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===============================================================================
   UPSTREAM NODE ELEVATION(FEET) =   422.00
   DOWNSTREAM NODE ELEVATION(FEET) =    31.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =   780.00
   "V" GUTTER WIDTH(FEET) =   0.01   GUTTER HIKE(FEET) =   0.010
   PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =   0.01
   MAXIMUM DEPTH(FEET) =   2.00
      10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.054
   SOIL CLASSIFICATION IS "B"
   COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.43
   AVERAGE FLOW DEPTH(FEET) =   0.12   FLOOD WIDTH(FEET) =   20.12
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.38   TC(MIN.) = 38.50
   SUBAREA AREA(ACRES) =   7.80   SUBAREA RUNOFF(CFS) =   6.88
   EFFECTIVE AREA(ACRES) =   16.20   AVERAGED Fm(INCH/HR) =   0.18
   TOTAL AREA(ACRES) =   16.20   PEAK FLOW RATE(CFS) =   12.81
   END OF SUBAREA "V" GUTTER HYDRAULICS:
   DEPTH(FEET) =  0.14   FLOOD WIDTH(FEET) =   23.21
   FLOW VELOCITY(FEET/SEC.) =   9.51   DEPTH*VELOCITY =   1.29



*******************************************************************************
   FLOW PROCESS FROM NODE   23.00 TO NODE   13.00 IS CODE =   9
-------------------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
===============================================================================
   UPSTREAM NODE ELEVATION(FEET) =    31.00
   DOWNSTREAM NODE ELEVATION(FEET) =    19.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =  1170.00
   "V" GUTTER WIDTH(FEET) =   0.01   GUTTER HIKE(FEET) =   0.010
   PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =   0.01
   MAXIMUM DEPTH(FEET) =   2.00
      10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.940
   SOIL CLASSIFICATION IS "B"
   COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.40
   AVERAGE FLOW DEPTH(FEET) =   0.28   FLOOD WIDTH(FEET) =   51.06
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =   8.14   TC(MIN.) = 46.64
   SUBAREA AREA(ACRES) =   7.20   SUBAREA RUNOFF(CFS) =   5.60
   EFFECTIVE AREA(ACRES) =   23.40   AVERAGED Fm(INCH/HR) =   0.14
   TOTAL AREA(ACRES) =   23.40   PEAK FLOW RATE(CFS) =   16.74
   END OF SUBAREA "V" GUTTER HYDRAULICS:
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   DEPTH(FEET) =   0.28   FLOOD WIDTH(FEET) =    51.06
   FLOW VELOCITY(FEET/SEC.) =   2.57   DEPTH*VELOCITY =    0.71


************************************************************************
   FLOW PROCESS FROM NODE    23.00 TO NODE    13.00 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.) =  46.64
   RAINFALL INTENSITY(INCH/HR) =   0.94
   AVERAGED Fm(INCH/HR) =  0.14
   EFFECTIVE STREAM AREA(ACRES) =    23.40
   TOTAL STREAM AREA(ACRES) =    23.40
   PEAK FLOW RATE(CFS) AT CONFLUENCE =       16.74


************************************************************************
   FLOW PROCESS FROM NODE    30.00 TO NODE    31.00 IS CODE =    2
-----------------------------------------------------------------------
   >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=======================================================================
   DEVELOPMENT IS COMMERCIAL
   TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
   INITIAL SUBAREA FLOW-LENGTH(FEET) =   600.00
   UPSTREAM ELEVATION(FEET) =     47.20
   DOWNSTREAM ELEVATION(FEET) =     30.50
   ELEVATION DIFFERENCE(FEET) =     16.70
   TC(MIN.) = 0.304*[(  600.00** 3.00)/(    16.70)]**0.20 =    8.039
     10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.699
   SOIL CLASSIFICATION IS "B"
   COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
   SUBAREA RUNOFF(CFS) =       12.04
   TOTAL AREA(ACRES) =         5.10   PEAK FLOW RATE(CFS) =        12.04


************************************************************************
   FLOW PROCESS FROM NODE    31.00 TO NODE    32.00 IS CODE =    9
-----------------------------------------------------------------------
   >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
=======================================================================
   UPSTREAM NODE ELEVATION(FEET) =     30.50
   DOWNSTREAM NODE ELEVATION(FEET) =     25.00
   CHANNEL LENGTH THRU SUBAREA(FEET) =    586.00
   "V" GUTTER WIDTH(FEET) =   0.01   GUTTER HIKE(FEET) =   0.010
   PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0150
   PAVEMENT CROSSFALL(DECIMAL NOTATION) =   0.01
   MAXIMUM DEPTH(FEET) =    2.00
     10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.140
   SOIL CLASSIFICATION IS "B"
   COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
   TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.57
   AVERAGE FLOW DEPTH(FEET) =   0.31   FLOOD WIDTH(FEET) =    57.24
   "V" GUTTER FLOW TRAVEL TIME(MIN.) =   3.80   TC(MIN.) =  11.84
   SUBAREA AREA(ACRES) =    9.70   SUBAREA RUNOFF(CFS) =    18.02
   EFFECTIVE AREA(ACRES) =   14.80   AVERAGED Fm(INCH/HR) =   0.08
   TOTAL AREA(ACRES) =    14.80   PEAK FLOW RATE(CFS) =     27.50
   END OF SUBAREA "V" GUTTER HYDRAULICS:
   DEPTH(FEET) =  0.34   FLOOD WIDTH(FEET) =    63.43
   FLOW VELOCITY(FEET/SEC.) =   2.73   DEPTH*VELOCITY =    0.92


************************************************************************
   FLOW PROCESS FROM NODE    32.00 TO NODE    13.00 IS CODE =    9
-----------------------------------------------------------------------
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          >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
================================================================================
  UPSTREAM NODE ELEVATION(FEET) =        25.00
  DOWNSTREAM NODE ELEVATION(FEET) =      19.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    720.00
  "V" GUTTER WIDTH(FEET) =    0.01   GUTTER HIKE(FEET) =   0.010
  PAVEMENT LIP(FEET) =   0.010   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) =    0.01
  MAXIMUM DEPTH(FEET) =    2.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.799
  SOIL CLASSIFICATION IS "B"
  COMMERCIAL SUBAREA LOSS RATE, Fm(INCH/HR) = 0.0750
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    3.03
  AVERAGE FLOW DEPTH(FEET) =    0.38    FLOOD WIDTH(FEET)  =   72.71
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =    3.96   TC(MIN.) =   15.80
  SUBAREA AREA(ACRES) =    16.20   SUBAREA RUNOFF(CFS) =    25.14
  EFFECTIVE AREA(ACRES) =    31.00   AVERAGED Fm(INCH/HR) =   0.08
  TOTAL AREA(ACRES) =    31.00   PEAK FLOW RATE(CFS) =      48.11
  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =   0.41   FLOOD WIDTH(FEET) =    78.90
  FLOW VELOCITY(FEET/SEC.) =    3.09   DEPTH*VELOCITY =    1.28


**************************************************************************
  FLOW PROCESS FROM NODE    32.00 TO NODE     13.00 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.) =  15.80
  RAINFALL INTENSITY(INCH/HR) =   1.80
  AVERAGED Fm(INCH/HR) =  0.08
  EFFECTIVE STREAM AREA(ACRES) =    31.00
  TOTAL STREAM AREA(ACRES) =    31.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =        48.11

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
         Q(CFS)    Tc(MIN.)   Fm(INCH/HR)    Ae(ACRES)
  1      98.49      17.47      0.084          67.96
  2      62.82      46.64      0.095          82.60
  3      99.50      15.80      0.084          64.44

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       99.50   Tc(MIN.) =    15.801
  EFFECTIVE AREA(ACRES) =      64.44   AVERAGED Fm(INCH/HR) =   0.08
  TOTAL AREA(ACRES) =       82.60
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)        =      82.60   TC(MIN.) =      15.80
  EFFECTIVE AREA(ACRES) =      64.44   AVERAGED Fm(INCH/HR)=   0.08
  PEAK FLOW RATE(CFS)   =      99.50
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)    Tc(MIN.)   Fm(INCH/HR)    Ae(ACRES)
  1      98.49      17.47      0.084          67.96
  2      62.82      46.64      0.095          82.60
  3      99.50      15.80      0.084          64.44
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```