

PRELIMINARY DRAINAGE REPORT FOR:

GILDRED TPM

San Diego County, California

PREPARED FOR:

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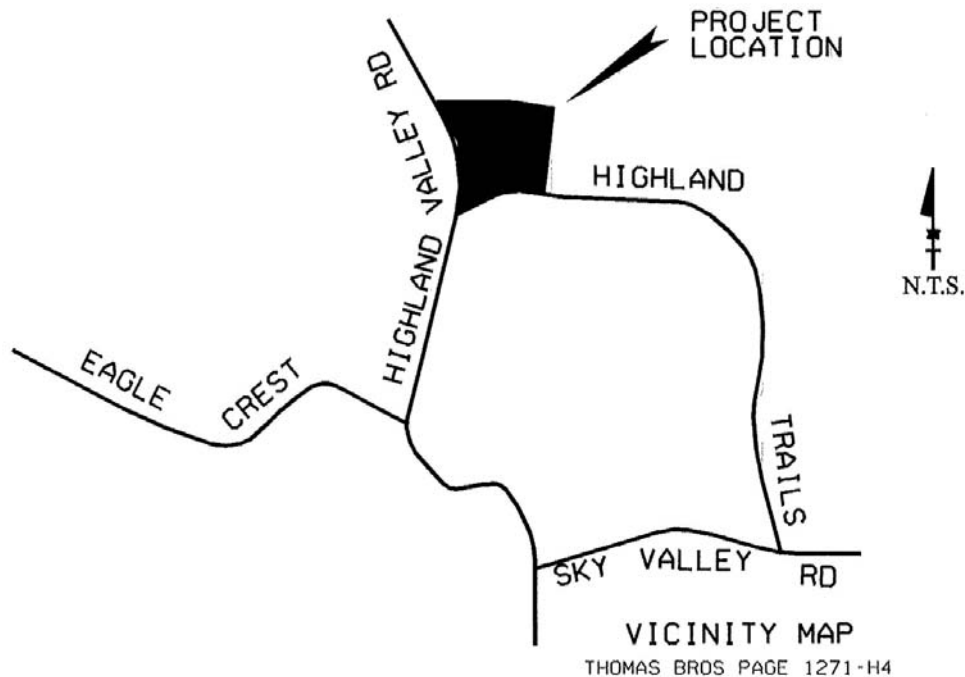
DISCUSSION

PURPOSE FOR PROJECT

The purpose of this project is to subdivide 53.1 acres of vacant land into four residential lots. The project site is at the northerly end of an overall watershed of 353 acres.

The proposed improvements include drainage improvements such as spillways and culverts and frontage road improvements.

VICINITY MAP



DESCRIPTION OF WATERSHE

The project is located at the northeasterly corner of the intersection of Highland Valley Road and Highland Trails, in the community of Ramona, in the County of San Diego, State of California.

Under the existing conditions, there are three sub-basins on the project site - the northerly, central and southerly sub-basins. The northerly sub-basin drains the north westerly corner of the site into an existing natural swale that conveys the runoff northerly across the north project boundary. The southerly sub-basin lays parallel to the southerly project boundary. The runoff from this sub-basin is conveyed westerly in an existing natural swale along the southerly boundary. The runoff is eventually conveyed off-site crossing under Highland Valley Road near the southwesterly corner of the site via an existing culvert. This runoff then conflues with the off-site upstream runoff from the overall watershed and flows northerly approximately 500' along the westerly side of Highland Valley Road. The combined runoff then crosses Highland Valley Road via an existing culvert and discharges back onto the project site, in an existing

natural channel along the easterly side of Highland Valley Road where it confluences with the runoff from the central sub-basin of the project site.

The central sub-basin, the largest of sub-basins of the project site, flows westerly via several existing natural swales. These existing natural swales confluence into an existing major natural channel along the westerly project boundary, just easterly of the existing Highland Valley Road. This major natural channel conveys the runoff from the central and southerly sub-basin than combines with the runoff from the overall watershed northerly and exits the project boundary at the northwesterly corner.

Under the proposed conditions, the runoff pattern will be preserved where the runoff from the proposed pads and driveways will be designed to flow into the existing receiving sub-basin areas and be conveyed to the eventual discharge point exiting the site.

The purpose of this report is to determine the peak runoff rate from the site and compare it to the pre-development, natural state runoff rate.

METHODOLOGY

3.1 THE RATIONAL METHOD

The Rational Method (RM) is a mathematical formula used to determine the maximum runoff rate from a given rainfall. It has particular application in urban storm drainage, where it is used to estimate peak runoff rates from small urban and rural watersheds for the design of storm drains and small drainage structures. The RM is recommended for analyzing the runoff response from drainage areas up to approximately 1 square mile in size. It should not be used in instances where there is a junction of independent drainage systems or for drainage areas greater than approximately 1 square mile in size. In these instances, the Modified Rational Method (MRM) should be used for junctions of independent drainage systems in watersheds up to approximately 1 square mile in size (see Section 3.4); or the NRCS Hydrologic Method should be used for watersheds greater than approximately 1 square mile in size (see Section 4).

The RM can be applied using any design storm frequency (e.g., 100-year, 50-year, 10-year, etc.). The local agency determines the design storm frequency that must be used based on the type of project and specific local requirements. A discussion of design storm frequency is provided in Section 2.3 of this manual. A procedure has been developed that converts the 6-hour and 24-hour precipitation isopluvial map data to an Intensity-Duration curve that can be used for the rainfall intensity in the RM formula as shown in Figure 3-1. The RM is applicable to a 6-hour storm duration because the procedure uses Intensity-Duration Design Charts that are based on a 6-hour storm duration.

3.1.1 Rational Method Formula

The RM formula estimates the peak rate of runoff at any location in a watershed as a function of the drainage area (A), runoff coefficient (C), and rainfall intensity (I) for a duration equal to the time of concentration (T_c), which is the time required for water to

flow from the most remote point of the basin to the location being analyzed. The RM formula is expressed as follows:

$$Q = C I A$$

Where: Q = peak discharge, in cubic feet per second (cfs)
 C = runoff coefficient, proportion of the rainfall that runs off the surface (no units)
 I = average rainfall intensity for a duration equal to the T_c for the area, in inches per hour (Note: If the computed T_c is less than 5 minutes, use 5 minutes for computing the peak discharge, Q)
 A = drainage area contributing to the design location, in acres

Combining the units for the expression CIA yields:

$$\left(\frac{1 \text{ acre} \times \text{inch}}{\text{hour}} \right) \left(\frac{43,560 \text{ ft}^2}{\text{acre}} \right) \left(\frac{1 \text{ foot}}{12 \text{ inches}} \right) \left(\frac{1 \text{ hour}}{3,600 \text{ seconds}} \right) \Rightarrow 1.008 \text{ cfs}$$

For practical purposes the unit conversion coefficient difference of 0.8% can be ignored.

The RM formula is based on the assumption that for constant rainfall intensity, the peak discharge rate at a point will occur when the raindrop that falls at the most upstream point in the tributary drainage basin arrives at the point of interest.

Unlike the MRM (discussed in Section 3.4) or the NRCS hydrologic method (discussed in Section 4), the RM does not create hydrographs and therefore does not add separate subarea hydrographs at collection points. Instead, the RM develops peak discharges in the main line by increasing the T_c as flow travels downstream.

Characteristics of, or assumptions inherent to, the RM are listed below:

- The discharge flow rate resulting from any I is maximum when the I lasts as long as or longer than the T_c .

- The storm frequency of peak discharges is the same as that of I for the given T_c .
- The fraction of rainfall that becomes runoff (or the runoff coefficient, C) is independent of I or precipitation zone number (PZN) condition (PZN Condition is discussed in Section 4.1.2.4).
- The peak rate of runoff is the only information produced by using the RM.

3.1.2 Runoff Coefficient

Table 3-1 lists the estimated runoff coefficients for urban areas. The concepts related to the runoff coefficient were evaluated in a report entitled *Evaluation, Rational Method "C" Values* (Hill, 2002) that was reviewed by the Hydrology Manual Committee. The Report is available at San Diego County Department of Public Works, Flood Control Section and on the San Diego County Department of Public Works web page.

The runoff coefficients are based on land use and soil type. Soil type can be determined from the soil type map provided in Appendix A. An appropriate runoff coefficient (C) for each type of land use in the subarea should be selected from this table and multiplied by the percentage of the total area (A) included in that class. The sum of the products for all land uses is the weighted runoff coefficient ($\Sigma[CA]$). Good engineering judgment should be used when applying the values presented in Table 3-1, as adjustments to these values may be appropriate based on site-specific characteristics. In any event, the impervious percentage (% Impervious) as given in the table, for any area, shall govern the selected value for C. The runoff coefficient can also be calculated for an area based on soil type and impervious percentage using the following formula:

$$C = 0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$$

Where: C_p = Pervious Coefficient Runoff Value for the soil type (shown in Table 3-1 as Undisturbed Natural Terrain/Permanent Open Space, 0% Impervious). Soil type can be determined from the soil type map provided in Appendix A.

The values in Table 3-1 are typical for most urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the local agency.

3.1.4 Time of Concentration

The Time of Concentration (T_c) is the time required for runoff to flow from the most remote part of the drainage area to the point of interest. The T_c is composed of two components: initial time of concentration (T_i) and travel time (T_t). Methods of computation for T_i and T_t are discussed below. The T_i is the time required for runoff to travel across the surface of the most remote subarea in the study, or “initial subarea.” Guidelines for designating the initial subarea are provided within the discussion of computation of T_i . The T_t is the time required for the runoff to flow in a watercourse (e.g., swale, channel, gutter, pipe) or series of watercourses from the initial subarea to the point of interest. For the RM, the T_c at any point within the drainage area is given by:

$$T_c = T_i + T_t$$

Methods of calculation differ for natural watersheds (nonurbanized) and for urban drainage systems. When analyzing storm drain systems, the designer must consider the possibility that an existing natural watershed may become urbanized during the useful life of the storm drain system. Future land uses must be used for T_c and runoff calculations, and can be determined from the local Community General Plan.

3.1.4.1 Initial Time of Concentration

The initial time of concentration is typically based on sheet flow at the upstream end of a drainage basin. The Overland Time of Flow (Figure 3-3) is approximated by an equation developed by the Federal Aviation Agency (FAA) for analyzing flow on runways (FAA, 1970). The usual runway configuration consists of a crown, like most freeways, with sloping pavement that directs flow to either side of the runway. This type of flow is uniform in the direction perpendicular to the velocity and is very shallow. Since these depths are $\frac{1}{4}$ of an inch (more or less) in magnitude, the relative roughness is high. Some higher relative roughness values for overland flow are presented in Table 3.5 of the *HEC-1 Flood Hydrograph Package User's Manual* (USACE, 1990).

SUMMARY

Basin 100

	NODE	AREA	PEAK Q	Tc	VEL
		(AC)	(CFS)	(MIN)	(FPS)
PRE-DEV	103	11.0	17.9	11.4	4.5
POST-DEV	113	11.9	11.3	28.9	4.1

Basin 200

	NODE	AREA	PEAK Q	Tc	VEL
		(AC)	(CFS)	(MIN)	(FPS)
PRE-DEV	216	342.5	355.4	26.5	5.6
POST-DEV	233	341.2	357.5	26.3	5.6

Basin 300*

	NODE	AREA	PEAK Q	Tc	VEL
		(AC)	(CFS)	(MIN)	(FPS)
PRE-DEV	303	23.7	35.7	12.8	6.0
POST-DEV	307	23.6	33.5	14.1	5.2

- Basin 300 is later combined with the discharge from Basin 200

Based on the hydrology calculations presented in this preliminary drainage report, the discharge from the Basin 100 will decrease by 6.6cfs due to increased time of concentration. The discharge from the combined Basins 200 and 300, along with the large off-site upstream watershed will increase by 1.3 cfs, or 0.37% of the total runoff.

According to the HECRAS hydraulic analysis presented in this report, the post-development velocity in the existing natural channel along the easterly side of Highland Valley Road is 5.6 fps same as the pre-development velocity. The post-development water surface elevation in the channel is 1088.7, also the same of that of the pre-development condition's.

The minimal increase in peak discharge (0.37%) Basins 200 and 300 has no impact to neither the exit velocity nor the water surface elevation in the creek. Furthermore, the post-development discharge from Basin 100 will be reduced by 6.6 cfs. Therefore, the overall project will have no additional impact to downstream drainage facilities.

DECLARATION OF RESPONSIBLE CHARGE

I hereby declare that I am the civil Engineer of Work for this project, that I have exercised responsible charge over the design of this project as defined in Section 6703 of the Business and Professions code, and that the design is consistent with current design.

I understand that the check of project drawings and specifications by the County of San Diego is confined to a review only and does not relieve me, as Engineer of Work, of my responsibilities for project design.

David Yeh, RCE 62717, EXP. 6-30-18

100-YEAR HYDROLOGY CALCULATIONS

UPSTREAM WATERSHED

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
2003,1985,1981 HYDROLOGY MANUAL
(c) Copyright 1982-2004 Advanced Engineering Software (aes)
Ver. 2.0 Release Date: 01/01/2004 License ID 1503

Analysis prepared by:

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TEL: 858-587-8070

***** DESCRIPTION OF STUDY *****
* GILDRED TPM, RAMONA, CALIFORNIA *
* 100-YEAR STORM *
* SOUTHERLY UPSTREAM RUNOFF *

FILE NAME: 1671USC.DAT
TIME/DATE OF STUDY: 16:42 08/12/2010

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

2003 SAN DIEGO MANUAL CRITERIA

USER SPECIFIED STORM EVENT(YEAR) = 100.00
6-HOUR DURATION PRECIPITATION (INCHES) = 3.500
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====

CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 81
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 20.00
 UPSTREAM ELEVATION(FEET) = 1650.00
 DOWNSTREAM ELEVATION(FEET) = 1635.00
 ELEVATION DIFFERENCE(FEET) = 15.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 2.989
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) = 0.28
 TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.28

FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 51

 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
 =====

ELEVATION DATA: UPSTREAM(FEET) = 1635.00 DOWNSTREAM(FEET) = 1390.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2018.00 CHANNEL SLOPE = 0.1214
 CHANNEL BASE(FEET) = 40.00 "Z" FACTOR = 2.000
 MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.103
 CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 81
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.32
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.53
 AVERAGE FLOW DEPTH(FEET) = 0.17 TRAVEL TIME(MIN.) = 9.52
 Tc(MIN.) = 12.51
 SUBAREA AREA(ACRES) = 28.70 SUBAREA RUNOFF(CFS) = 43.94
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
 TOTAL AREA(ACRES) = 28.80 PEAK FLOW RATE(CFS) = 44.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25 FLOW VELOCITY(FEET/SEC.) = 4.41
 LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 2038.00 FEET.

FLOW PROCESS FROM NODE 3.00 TO NODE 3.00 IS CODE = 1

 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
 =====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 12.51
 RAINFALL INTENSITY(INCH/HR) = 5.10
 TOTAL STREAM AREA(ACRES) = 28.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 44.09

FLOW PROCESS FROM NODE 4.00 TO NODE 5.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 =====

CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 81
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
 UPSTREAM ELEVATION(FEET) = 1601.50

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DOWNSTREAM ELEVATION(FEET) = 1600.00
ELEVATION DIFFERENCE(FEET) = 1.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.060
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.382
SUBAREA RUNOFF(CFS) = 0.22
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.22
*****
FLOW PROCESS FROM NODE 5.00 TO NODE 3.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1600.00 DOWNSTREAM(FEET) = 1390.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1426.00 CHANNEL SLOPE = 0.1473
CHANNEL BASE(FEET) = 40.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.680
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.74
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.28
AVERAGE FLOW DEPTH(FEET) = 0.13 TRAVEL TIME(MIN.) = 7.25
Tc(MIN.) = 14.31
SUBAREA AREA(ACRES) = 22.50 SUBAREA RUNOFF(CFS) = 31.59
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 22.60 PEAK FLOW RATE(CFS) = 31.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.19 FLOW VELOCITY(FEET/SEC.) = 4.18
LONGEST FLOWPATH FROM NODE 4.00 TO NODE 3.00 = 1476.00 FEET.
*****
FLOW PROCESS FROM NODE 3.00 TO NODE 3.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 14.31
RAINFALL INTENSITY(INCH/HR) = 4.68
TOTAL STREAM AREA(ACRES) = 22.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 31.73

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 44.09 12.51 5.103 28.80
2 31.73 14.31 4.680 22.60

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

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 71.84 12.51 5.103
2 72.17 14.31 4.680

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COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      72.17    Tc(MIN.) =    14.31
TOTAL AREA(ACRES) =      51.40
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =  2038.00 FEET.

*****
FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  1390.00  DOWNSTREAM(FEET) =  1350.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  745.00  CHANNEL SLOPE =  0.0537
CHANNEL BASE(FEET) =  15.00  "Z" FACTOR =  5.000
MANNING'S FACTOR = 0.045  MAXIMUM DEPTH(FEET) =  2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.266
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    80.30
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  5.62
AVERAGE FLOW DEPTH(FEET) =  0.76  TRAVEL TIME(MIN.) =  2.21
Tc(MIN.) =  16.52
SUBAREA AREA(ACRES) =  12.70  SUBAREA RUNOFF(CFS) =  16.25
AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
TOTAL AREA(ACRES) =  64.10  PEAK FLOW RATE(CFS) =    82.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.77  FLOW VELOCITY(FEET/SEC.) =  5.67
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =  2783.00 FEET.

*****
FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =  1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  16.52
RAINFALL INTENSITY(INCH/HR) =  4.27
TOTAL STREAM AREA(ACRES) =  64.10
PEAK FLOW RATE(CFS) AT CONFLUENCE =    82.04

*****
FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  81
INITIAL SUBAREA FLOW-LENGTH(FEET) =  50.00
UPSTREAM ELEVATION(FEET) =  1627.50
DOWNSTREAM ELEVATION(FEET) =  1620.00
ELEVATION DIFFERENCE(FEET) =  7.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) =  4.727
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.

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SUBAREA RUNOFF(CFS) =      0.28
TOTAL AREA(ACRES) =      0.10    TOTAL RUNOFF(CFS) =      0.28
*****
FLOW PROCESS FROM NODE      8.00 TO NODE      6.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  1620.00  DOWNSTREAM(FEET) =  1350.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1456.00  CHANNEL SLOPE =  0.1854
CHANNEL BASE(FEET) =  20.00  "Z" FACTOR =  2.500
MANNING'S FACTOR = 0.045  MAXIMUM DEPTH(FEET) =  2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.066
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =  21.66
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  5.01
AVERAGE FLOW DEPTH(FEET) =  0.21  TRAVEL TIME(MIN.) =  4.85
Tc(MIN.) =  9.57
SUBAREA AREA(ACRES) =  22.50    SUBAREA RUNOFF(CFS) =  40.94
AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
TOTAL AREA(ACRES) =  22.60    PEAK FLOW RATE(CFS) =  41.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.31  FLOW VELOCITY(FEET/SEC.) =  6.39
LONGEST FLOWPATH FROM NODE      7.00 TO NODE      6.00 =  1506.00 FEET.
*****
FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =  1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  9.57
RAINFALL INTENSITY(INCH/HR) =  6.07
TOTAL STREAM AREA(ACRES) =  22.60
PEAK FLOW RATE(CFS) AT CONFLUENCE =  41.13

** CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)      (ACRE)
    1      82.04      16.52      4.266      64.10
    2      41.13      9.57      6.066      22.60

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

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)
    1      98.82      9.57      6.066
    2     110.96     16.52      4.266

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =  110.96  Tc(MIN.) =  16.52
TOTAL AREA(ACRES) =  86.70

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LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 = 2783.00 FEET.
*****
FLOW PROCESS FROM NODE      6.00 TO NODE      9.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1345.00 DOWNSTREAM(FEET) = 1340.00
FLOW LENGTH(FEET) = 87.00 MANNING'S N = 0.024
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.57
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 110.96
PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 16.62
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 = 2870.00 FEET.
*****
FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1340.00 DOWNSTREAM(FEET) = 1330.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 145.00 CHANNEL SLOPE = 0.0690
CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.500
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.200
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 111.91
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.97
AVERAGE FLOW DEPTH(FEET) = 1.10 TRAVEL TIME(MIN.) = 0.30
Tc(MIN.) = 16.92
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 1.89
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 88.20 PEAK FLOW RATE(CFS) = 111.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.10 FLOW VELOCITY(FEET/SEC.) = 7.96
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 = 3015.00 FEET.
*****
FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE = 10
-----
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
=====
*****
FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1690.00
DOWNSTREAM ELEVATION(FEET) = 1670.00

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ELEVATION DIFFERENCE(FEET) =      20.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =      4.727
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =      9.222
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      0.28
TOTAL AREA(ACRES) =      0.10    TOTAL RUNOFF(CFS) =      0.28

*****
FLOW PROCESS FROM NODE      12.00 TO NODE      13.00 IS CODE =   51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   1670.00  DOWNSTREAM(FEET) =   1395.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   2004.00  CHANNEL SLOPE =   0.1372
CHANNEL BASE(FEET) =    25.00  "Z" FACTOR =    2.000
MANNING'S FACTOR = 0.045  MAXIMUM DEPTH(FEET) =    2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =    5.097
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =   81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    23.55
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    4.28
AVERAGE FLOW DEPTH(FEET) =    0.22  TRAVEL TIME(MIN.) =    7.81
Tc(MIN.) =   12.54
SUBAREA AREA(ACRES) =    28.00    SUBAREA RUNOFF(CFS) =   42.82
AREA-AVERAGE RUNOFF COEFFICIENT =   0.300
TOTAL AREA(ACRES) =    28.10    PEAK FLOW RATE(CFS) =   42.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =   0.31  FLOW VELOCITY(FEET/SEC.) =    5.45
LONGEST FLOWPATH FROM NODE      11.00 TO NODE      13.00 =  2054.00 FEET.

*****
FLOW PROCESS FROM NODE      13.00 TO NODE      13.00 IS CODE =    1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS =   2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM   1 ARE:
TIME OF CONCENTRATION(MIN.) =   12.54
RAINFALL INTENSITY(INCH/HR) =    5.10
TOTAL STREAM AREA(ACRES) =    28.10
PEAK FLOW RATE(CFS) AT CONFLUENCE =   42.97

*****
FLOW PROCESS FROM NODE      14.00 TO NODE      15.00 IS CODE =   21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =   81
INITIAL SUBAREA FLOW-LENGTH(FEET) =   50.00
UPSTREAM ELEVATION(FEET) =   1651.00
DOWNSTREAM ELEVATION(FEET) =   1645.00
ELEVATION DIFFERENCE(FEET) =    6.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.727
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!

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100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) = 0.28
 TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.28

FLOW PROCESS FROM NODE 15.00 TO NODE 13.00 IS CODE = 51

>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1645.00 DOWNSTREAM(FEET) = 1395.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1306.00 CHANNEL SLOPE = 0.1914
 CHANNEL BASE(FEET) = 30.00 "Z" FACTOR = 2.000
 MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.577
 CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 81
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.70
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.52
 AVERAGE FLOW DEPTH(FEET) = 0.12 TRAVEL TIME(MIN.) = 6.18
 Tc(MIN.) = 10.90
 SUBAREA AREA(ACRES) = 14.00 SUBAREA RUNOFF(CFS) = 23.42
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
 TOTAL AREA(ACRES) = 14.10 PEAK FLOW RATE(CFS) = 23.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.17 FLOW VELOCITY(FEET/SEC.) = 4.50
 LONGEST FLOWPATH FROM NODE 14.00 TO NODE 13.00 = 1356.00 FEET.

FLOW PROCESS FROM NODE 13.00 TO NODE 13.00 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 10.90
 RAINFALL INTENSITY(INCH/HR) = 5.58
 TOTAL STREAM AREA(ACRES) = 14.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 23.59

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	42.97	12.54	5.097	28.10
2	23.59	10.90	5.577	14.10

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	60.97	10.90	5.577
2	64.53	12.54	5.097

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:


```

PEAK FLOW RATE(CFS) =      64.53    Tc(MIN.) =      12.54
TOTAL AREA(ACRES) =      42.20
LONGEST FLOWPATH FROM NODE      11.00 TO NODE      13.00 = 2054.00 FEET.

*****
FLOW PROCESS FROM NODE      13.00 TO NODE      10.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1395.00 DOWNSTREAM(FEET) = 1330.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 772.00 CHANNEL SLOPE = 0.0842
CHANNEL BASE(FEET) = 35.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.518
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 70.03
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.99
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 2.58
Tc(MIN.) = 15.11
SUBAREA AREA(ACRES) = 8.10 SUBAREA RUNOFF(CFS) = 10.98
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 50.30 PEAK FLOW RATE(CFS) = 68.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.38 FLOW VELOCITY(FEET/SEC.) = 4.96
LONGEST FLOWPATH FROM NODE      11.00 TO NODE      10.00 = 2826.00 FEET.

*****
FLOW PROCESS FROM NODE      10.00 TO NODE      10.00 IS CODE = 11
-----
>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
=====

** MAIN STREAM CONFLUENCE DATA **
STREAM    RUNOFF    Tc    INTENSITY    AREA
NUMBER    (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
1         68.18    15.11     4.518         50.30
LONGEST FLOWPATH FROM NODE      11.00 TO NODE      10.00 = 2826.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM    RUNOFF    Tc    INTENSITY    AREA
NUMBER    (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
1         111.14    16.92     4.200         88.20
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      10.00 = 3015.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM    RUNOFF    Tc    INTENSITY
NUMBER    (CFS)    (MIN.)    (INCH/HOUR)
1         167.43    15.11     4.518
2         174.52    16.92     4.200

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 174.52 Tc(MIN.) = 16.92
TOTAL AREA(ACRES) = 138.50

*****
FLOW PROCESS FROM NODE      10.00 TO NODE      16.00 IS CODE = 51

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-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1330.00 DOWNSTREAM(FEET) = 1275.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1164.00 CHANNEL SLOPE = 0.0473
CHANNEL BASE(FEET) = 30.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.783
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 201.32
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.50
AVERAGE FLOW DEPTH(FEET) = 0.94 TRAVEL TIME(MIN.) = 2.98
Tc(MIN.) = 19.91
SUBAREA AREA(ACRES) = 47.20 SUBAREA RUNOFF(CFS) = 53.56
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 185.70 PEAK FLOW RATE(CFS) = 210.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 6.59
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 16.00 = 4179.00 FEET.

*****
FLOW PROCESS FROM NODE 16.00 TO NODE 16.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 19.91
RAINFALL INTENSITY(INCH/HR) = 3.78
TOTAL STREAM AREA(ACRES) = 185.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 210.73

*****
FLOW PROCESS FROM NODE 17.00 TO NODE 18.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1538.00
DOWNSTREAM ELEVATION(FEET) = 1535.00
ELEVATION DIFFERENCE(FEET) = 3.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.604
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.568
SUBAREA RUNOFF(CFS) = 0.26
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.26

*****
FLOW PROCESS FROM NODE 18.00 TO NODE 19.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1535.00 DOWNSTREAM(FEET) = 1385.00

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CHANNEL LENGTH THRU SUBAREA(FEET) = 1718.00    CHANNEL SLOPE = 0.0873
CHANNEL BASE(FEET) = 35.00    "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.045    MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.692
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.59
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(Feet/Sec.) = 3.31
AVERAGE FLOW DEPTH(Feet) = 0.20    TRAVEL TIME(MIN.) = 8.65
Tc(MIN.) = 14.25
SUBAREA AREA(ACRES) = 30.60    SUBAREA RUNOFF(CFS) = 43.08
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 30.70    PEAK FLOW RATE(CFS) = 43.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(Feet) = 0.29    FLOW VELOCITY(Feet/Sec.) = 4.23
LONGEST FLOWPATH FROM NODE 17.00 TO NODE 19.00 = 1768.00 FEET.

*****
FLOW PROCESS FROM NODE 19.00 TO NODE 20.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(Feet) = 1381.00    DOWNSTREAM(Feet) = 1380.00
FLOW LENGTH(Feet) = 50.00    MANNING'S N = 0.024
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.5 INCHES
PIPE-FLOW VELOCITY(Feet/Sec.) = 7.75
ESTIMATED PIPE DIAMETER(INCH) = 36.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 43.22
PIPE TRAVEL TIME(MIN.) = 0.11    Tc(MIN.) = 14.36
LONGEST FLOWPATH FROM NODE 17.00 TO NODE 20.00 = 1818.00 FEET.

*****
FLOW PROCESS FROM NODE 20.00 TO NODE 16.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(Feet) = 1380.00    DOWNSTREAM(Feet) = 1375.00
CHANNEL LENGTH THRU SUBAREA(Feet) = 80.00    CHANNEL SLOPE = 0.0625
CHANNEL BASE(Feet) = 10.00    "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.045    MAXIMUM DEPTH(Feet) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 43.22
FLOW VELOCITY(Feet/Sec.) = 5.72    FLOW DEPTH(Feet) = 0.67
TRAVEL TIME(MIN.) = 0.23    Tc(MIN.) = 14.59
LONGEST FLOWPATH FROM NODE 17.00 TO NODE 16.00 = 1898.00 FEET.

*****
FLOW PROCESS FROM NODE 16.00 TO NODE 16.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 14.59
RAINFALL INTENSITY(INCH/HR) = 4.62
TOTAL STREAM AREA(ACRES) = 30.70

```

PEAK FLOW RATE(CFS) AT CONFLUENCE = 43.22

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	210.73	19.91	3.783	185.70
2	43.22	14.59	4.621	30.70

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	197.70	14.59	4.621
2	246.10	19.91	3.783

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 246.10 Tc(MIN.) = 19.91

TOTAL AREA(ACRES) = 216.40

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 16.00 = 4179.00 FEET.

FLOW PROCESS FROM NODE 16.00 TO NODE 21.00 IS CODE = 51

>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1375.00 DOWNSTREAM(FEET) = 1126.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 1119.00 CHANNEL SLOPE = 0.2225

CHANNEL BASE(FEET) = 30.00 "Z" FACTOR = 2.000

MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 3.00

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.602

CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 81

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 262.80

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.87

AVERAGE FLOW DEPTH(FEET) = 0.70 TRAVEL TIME(MIN.) = 1.57

Tc(MIN.) = 21.48

SUBAREA AREA(ACRES) = 30.90 SUBAREA RUNOFF(CFS) = 33.39

AREA-AVERAGE RUNOFF COEFFICIENT = 0.300

TOTAL AREA(ACRES) = 247.30 PEAK FLOW RATE(CFS) = 267.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.71 FLOW VELOCITY(FEET/SEC.) = 11.94

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 21.00 = 5298.00 FEET.

SEE ON-SITE HYDROLOGY FOR BASINS 100-300 FOR CONTINUATION

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 247.30 TC(MIN.) = 21.48

PEAK FLOW RATE(CFS) = 267.21

END OF RATIONAL METHOD ANALYSIS

100-YEAR HYDROLOGY CALCULATIONS

PRE-DEVELOPMENT CONDITIONS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
2003,1985,1981 HYDROLOGY MANUAL
(c) Copyright 1982-2004 Advanced Engineering Software (aes)
Ver. 2.0 Release Date: 01/01/2004 License ID 1503

Analysis prepared by:

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***** DESCRIPTION OF STUDY *****

* GILDRED TPM, RAMONA, CALIFORNIA *
* 100-YEAR STORM *
* PRE-DEVELOPMENT CONDITIONS *

FILE NAME: 1671XC.DAT
TIME/DATE OF STUDY: 08:41 08/13/2010

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

2003 SAN DIEGO MANUAL CRITERIA

USER SPECIFIED STORM EVENT(YEAR) = 100.00
6-HOUR DURATION PRECIPITATION (INCHES) = 3.500
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====

CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000

```

SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1475.50
DOWNSTREAM ELEVATION(FEET) = 1455.00
ELEVATION DIFFERENCE(FEET) = 20.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.727
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.28
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.28

*****
FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1455.00 DOWNSTREAM(FEET) = 1160.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1447.00 CHANNEL SLOPE = 0.2039
CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 10.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.412
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.71
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.60
AVERAGE FLOW DEPTH(FEET) = 0.13 TRAVEL TIME(MIN.) = 6.70
Tc(MIN.) = 11.42
SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 17.70
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 11.00 PEAK FLOW RATE(CFS) = 17.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.18 FLOW VELOCITY(FEET/SEC.) = 4.54
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 103.00 = 1497.00 FEET.

+-----+
| FLOW EXITS PROJECT AT NORTHERLY BOUNDARY |
| |
+-----+

*****
FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1559.00
DOWNSTREAM ELEVATION(FEET) = 1550.00
ELEVATION DIFFERENCE(FEET) = 9.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.727
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222

```

NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.

SUBAREA RUNOFF(CFS) = 0.28

TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.28

FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 51

>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1550.00 DOWNSTREAM(FEET) = 1140.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 2313.00 CHANNEL SLOPE = 0.1773

CHANNEL BASE(FEET) = 18.00 "Z" FACTOR = 5.000

MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.059

CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 81

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.46

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.85

AVERAGE FLOW DEPTH(FEET) = 0.21 TRAVEL TIME(MIN.) = 7.95

Tc(MIN.) = 12.68

SUBAREA AREA(ACRES) = 23.60 SUBAREA RUNOFF(CFS) = 35.82

AREA-AVERAGE RUNOFF COEFFICIENT = 0.300

TOTAL AREA(ACRES) = 23.70 PEAK FLOW RATE(CFS) = 35.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 FLOW VELOCITY(FEET/SEC.) = 5.98

LONGEST FLOWPATH FROM NODE 301.00 TO NODE 303.00 = 2363.00 FEET.

FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1136.00 DOWNSTREAM(FEET) = 1134.00

FLOW LENGTH(FEET) = 90.00 MANNING'S N = 0.024

DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 7.71

ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 35.97

PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 12.88

LONGEST FLOWPATH FROM NODE 301.00 TO NODE 304.00 = 2453.00 FEET.

FLOW PROCESS FROM NODE 304.00 TO NODE 305.00 IS CODE = 51

>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1134.00 DOWNSTREAM(FEET) = 1118.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 205.00 CHANNEL SLOPE = 0.0780

CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 2.000

MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00

CHANNEL FLOW THRU SUBAREA(CFS) = 35.97

FLOW VELOCITY(FEET/SEC.) = 4.67 FLOW DEPTH(FEET) = 0.37

TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 13.61

LONGEST FLOWPATH FROM NODE 301.00 TO NODE 305.00 = 2658.00 FEET.

```

*****
FLOW PROCESS FROM NODE      305.00 TO NODE      305.00 IS CODE =   1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  13.61
RAINFALL INTENSITY(INCH/HR) =   4.83
TOTAL STREAM AREA(ACRES) =   23.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =   35.97

*****
FLOW PROCESS FROM NODE      21.00 TO NODE      21.00 IS CODE =   7
-----
>>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
=====
USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN) =  21.48   RAIN INTENSITY(INCH/HOUR) =   3.60
TOTAL AREA(ACRES) =  247.30   TOTAL RUNOFF(CFS) =   267.21

+-----+
| FLOW DATA PER UPSTREAM CALCULATION |
|                                     |
+-----+

*****
FLOW PROCESS FROM NODE      21.00 TO NODE      305.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  1119.00  DOWNSTREAM(FEET) =  1118.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   72.00  CHANNEL SLOPE =  0.0139
CHANNEL BASE(FEET) =   30.00  "Z" FACTOR =   2.000
MANNING'S FACTOR = 0.045  MAXIMUM DEPTH(FEET) =   4.00
CHANNEL FLOW THRU SUBAREA(CFS) =   267.21
FLOW VELOCITY(FEET/SEC.) =   4.98  FLOW DEPTH(FEET) =   1.61
TRAVEL TIME(MIN.) =   0.24  Tc(MIN.) =  21.72
LONGEST FLOWPATH FROM NODE      0.00 TO NODE      305.00 =   72.00 FEET.

*****
FLOW PROCESS FROM NODE      305.00 TO NODE      305.00 IS CODE =   1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  21.72
RAINFALL INTENSITY(INCH/HR) =   3.58
TOTAL STREAM AREA(ACRES) =  247.30
PEAK FLOW RATE(CFS) AT CONFLUENCE =   267.21

** CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)
    1         35.97    13.61         4.835        23.70
    2        267.21    21.72         3.576       247.30

```


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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	203.36	13.61	4.835
2	293.81	21.72	3.576

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 293.81 Tc(MIN.) = 21.72

TOTAL AREA(ACRES) = 271.00

LONGEST FLOWPATH FROM NODE 301.00 TO NODE 305.00 = 2658.00 FEET.

FLOW PROCESS FROM NODE 305.00 TO NODE 306.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1118.00 DOWNSTREAM(FEET) = 1116.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 500.00 CHANNEL SLOPE = 0.0040

CHANNEL BASE(FEET) = 30.00 "Z" FACTOR = 2.000

MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 4.00

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.339

CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 81

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 296.77

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.43

AVERAGE FLOW DEPTH(FEET) = 2.47 TRAVEL TIME(MIN.) = 2.43

Tc(MIN.) = 24.15

SUBAREA AREA(ACRES) = 5.90 SUBAREA RUNOFF(CFS) = 5.91

AREA-AVERAGE RUNOFF COEFFICIENT = 0.300

TOTAL AREA(ACRES) = 276.90 PEAK FLOW RATE(CFS) = 293.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.46 FLOW VELOCITY(FEET/SEC.) = 3.42

LONGEST FLOWPATH FROM NODE 301.00 TO NODE 306.00 = 3158.00 FEET.

FLOW PROCESS FROM NODE 306.00 TO NODE 215.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1115.00 DOWNSTREAM(FEET) = 1114.00

FLOW LENGTH(FEET) = 40.00 MANNING'S N = 0.024

DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.47

ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 293.81

PIPE TRAVEL TIME(MIN.) = 0.05 Tc(MIN.) = 24.20

LONGEST FLOWPATH FROM NODE 301.00 TO NODE 215.00 = 3198.00 FEET.

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<

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=====
*****
FLOW PROCESS FROM NODE      201.00 TO NODE      202.00 IS CODE =  21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1528.50
DOWNSTREAM ELEVATION(FEET) = 1525.00
ELEVATION DIFFERENCE(FEET) = 3.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.323
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.856
SUBAREA RUNOFF(CFS) = 0.27
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.27
*****
FLOW PROCESS FROM NODE      202.00 TO NODE      203.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1525.00 DOWNSTREAM(FEET) = 1202.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1712.00 CHANNEL SLOPE = 0.1887
CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 8.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.313
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.14
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.44
AVERAGE FLOW DEPTH(FEET) = 0.18 TRAVEL TIME(MIN.) = 6.43
Tc(MIN.) = 11.76
SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 31.88
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 20.10 PEAK FLOW RATE(CFS) = 32.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.26 FLOW VELOCITY(FEET/SEC.) = 5.53
LONGEST FLOWPATH FROM NODE      201.00 TO NODE      203.00 = 1762.00 FEET.
*****
FLOW PROCESS FROM NODE      203.00 TO NODE      203.00 IS CODE =  1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 11.76
RAINFALL INTENSITY(INCH/HR) = 5.31
TOTAL STREAM AREA(ACRES) = 20.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 32.04
*****
FLOW PROCESS FROM NODE      204.00 TO NODE      205.00 IS CODE =  21
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>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1447.00
DOWNSTREAM ELEVATION(FEET) = 1435.00
ELEVATION DIFFERENCE(FEET) = 12.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.727
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.28
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.28

*****
FLOW PROCESS FROM NODE 205.00 TO NODE 203.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1435.00 DOWNSTREAM(FEET) = 1202.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 551.00 CHANNEL SLOPE = 0.4229
CHANNEL BASE(FEET) = 15.00 "Z" FACTOR = 4.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.169
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.47
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.45
AVERAGE FLOW DEPTH(FEET) = 0.07 TRAVEL TIME(MIN.) = 2.66
Tc(MIN.) = 7.39
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 6.24
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 3.00 PEAK FLOW RATE(CFS) = 6.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.09 FLOW VELOCITY(FEET/SEC.) = 4.44
LONGEST FLOWPATH FROM NODE 204.00 TO NODE 203.00 = 601.00 FEET.

*****
FLOW PROCESS FROM NODE 203.00 TO NODE 203.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 7.39
RAINFALL INTENSITY(INCH/HR) = 7.17
TOTAL STREAM AREA(ACRES) = 3.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.45

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 32.04 11.76 5.313 20.10
2 6.45 7.39 7.169 3.00

```

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	26.58	7.39	7.169
2	36.82	11.76	5.313

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 36.82 Tc(MIN.) = 11.76

TOTAL AREA(ACRES) = 23.10

LONGEST FLOWPATH FROM NODE 201.00 TO NODE 203.00 = 1762.00 FEET.

FLOW PROCESS FROM NODE 203.00 TO NODE 206.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1202.00 DOWNSTREAM(FEET) = 1178.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 208.00 CHANNEL SLOPE = 0.1154

CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 5.000

MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.127

CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 81

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.13

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.19

AVERAGE FLOW DEPTH(FEET) = 0.34 TRAVEL TIME(MIN.) = 0.67

Tc(MIN.) = 12.42

SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 2.61

AREA-AVERAGE RUNOFF COEFFICIENT = 0.300

TOTAL AREA(ACRES) = 24.80 PEAK FLOW RATE(CFS) = 38.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 FLOW VELOCITY(FEET/SEC.) = 5.19

LONGEST FLOWPATH FROM NODE 201.00 TO NODE 206.00 = 1970.00 FEET.

FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 207.00 TO NODE 208.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 81

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00

UPSTREAM ELEVATION(FEET) = 1587.50

DOWNSTREAM ELEVATION(FEET) = 1580.00

ELEVATION DIFFERENCE(FEET) = 7.50

SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.727

WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) = 0.28
 TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.28

 FLOW PROCESS FROM NODE 208.00 TO NODE 209.00 IS CODE = 51

 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 1580.00 DOWNSTREAM(FEET) = 1390.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 863.00 CHANNEL SLOPE = 0.2202
 CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 5.000
 MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.504
 CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 81
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.65
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.25
 AVERAGE FLOW DEPTH(FEET) = 0.06 TRAVEL TIME(MIN.) = 6.40
 Tc(MIN.) = 11.13
 SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 4.46
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
 TOTAL AREA(ACRES) = 2.80 PEAK FLOW RATE(CFS) = 4.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.08 FLOW VELOCITY(FEET/SEC.) = 2.86
 LONGEST FLOWPATH FROM NODE 207.00 TO NODE 209.00 = 913.00 FEET.

 FLOW PROCESS FROM NODE 209.00 TO NODE 209.00 IS CODE = 1

 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
 =====
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 11.13
 RAINFALL INTENSITY(INCH/HR) = 5.50
 TOTAL STREAM AREA(ACRES) = 2.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.62

 FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 =====
 CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 81
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
 UPSTREAM ELEVATION(FEET) = 1544.00
 DOWNSTREAM ELEVATION(FEET) = 1540.00
 ELEVATION DIFFERENCE(FEET) = 4.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.092
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.114
 SUBAREA RUNOFF(CFS) = 0.27
 TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.27

```

*****
FLOW PROCESS FROM NODE      211.00 TO NODE      209.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  1540.00  DOWNSTREAM(FEET) =  1390.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1151.00  CHANNEL SLOPE =  0.1303
CHANNEL BASE(FEET) =  18.00  "Z" FACTOR =  6.000
MANNING'S FACTOR = 0.045  MAXIMUM DEPTH(FEET) =  2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.630
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =  10.50
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  3.39
AVERAGE FLOW DEPTH(FEET) =  0.16  TRAVEL TIME(MIN.) =  5.65
Tc(MIN.) = 10.74
SUBAREA AREA(ACRES) =  11.50  SUBAREA RUNOFF(CFS) =  19.42
AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
TOTAL AREA(ACRES) =  11.60  PEAK FLOW RATE(CFS) =  19.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.23  FLOW VELOCITY(FEET/SEC.) =  4.32
LONGEST FLOWPATH FROM NODE      210.00 TO NODE      209.00 = 1201.00 FEET.

*****
FLOW PROCESS FROM NODE      209.00 TO NODE      209.00 IS CODE =  1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) = 10.74
RAINFALL INTENSITY(INCH/HR) =  5.63
TOTAL STREAM AREA(ACRES) =  11.60
PEAK FLOW RATE(CFS) AT CONFLUENCE =  19.59

** CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)
    1         4.62      11.13        5.504        2.80
    2        19.59      10.74        5.630       11.60

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

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)
    1        24.06      10.74        5.630
    2        23.78      11.13        5.504

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =  24.06  Tc(MIN.) = 10.74
TOTAL AREA(ACRES) =  14.40
LONGEST FLOWPATH FROM NODE      210.00 TO NODE      209.00 = 1201.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE      209.00 TO NODE      206.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  1390.00  DOWNSTREAM(FEET) =  1178.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1261.00  CHANNEL SLOPE =  0.1681
CHANNEL BASE(FEET) =  35.00  "Z" FACTOR = 12.000
MANNING'S FACTOR = 0.045  MAXIMUM DEPTH(FEET) =  2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.411
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =  29.77
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  4.25
AVERAGE FLOW DEPTH(FEET) =  0.19  TRAVEL TIME(MIN.) =  4.94
Tc(MIN.) = 15.69
SUBAREA AREA(ACRES) =  8.60  SUBAREA RUNOFF(CFS) =  11.38
AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
TOTAL AREA(ACRES) =  23.00  PEAK FLOW RATE(CFS) =  30.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.19  FLOW VELOCITY(FEET/SEC.) =  4.35
LONGEST FLOWPATH FROM NODE      210.00 TO NODE      206.00 =  2462.00 FEET.

*****
FLOW PROCESS FROM NODE      206.00 TO NODE      206.00 IS CODE =  11
-----
>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
=====

** MAIN STREAM CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)      (ACRE)
1           30.44      15.69      4.411           23.00
LONGEST FLOWPATH FROM NODE      210.00 TO NODE      206.00 =  2462.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)      (ACRE)
1           38.14      12.42      5.127           24.80
LONGEST FLOWPATH FROM NODE      201.00 TO NODE      206.00 =  1970.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)
1           62.25      12.42      5.127
2           63.25      15.69      4.411

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =  63.25  Tc(MIN.) =  15.69
TOTAL AREA(ACRES) =  47.80

*****
FLOW PROCESS FROM NODE      206.00 TO NODE      206.00 IS CODE =  12
-----
>>>>>CLEAR MEMORY BANK # 1 <<<<<
=====

```

```

*****
FLOW PROCESS FROM NODE      206.00 TO NODE      212.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  1178.00  DOWNSTREAM(FEET) =  1118.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  684.00  CHANNEL SLOPE =  0.0877
CHANNEL BASE(FEET) =  25.00  "Z" FACTOR =  10.000
MANNING'S FACTOR = 0.045  MAXIMUM DEPTH(FEET) =  2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.053
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =  67.02
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  5.19
AVERAGE FLOW DEPTH(FEET) =  0.44  TRAVEL TIME(MIN.) =  2.20
Tc(MIN.) = 17.88
SUBAREA AREA(ACRES) =  6.20  SUBAREA RUNOFF(CFS) =  7.54
AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
TOTAL AREA(ACRES) =  54.00  PEAK FLOW RATE(CFS) =  65.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.44  FLOW VELOCITY(FEET/SEC.) =  5.11
LONGEST FLOWPATH FROM NODE      210.00 TO NODE      212.00 =  3146.00 FEET.

*****
FLOW PROCESS FROM NODE      212.00 TO NODE      212.00 IS CODE =  1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) = 17.88
RAINFALL INTENSITY(INCH/HR) =  4.05
TOTAL STREAM AREA(ACRES) =  54.00
PEAK FLOW RATE(CFS) AT CONFLUENCE =  65.66

*****
FLOW PROCESS FROM NODE      213.00 TO NODE      214.00 IS CODE =  21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  81
INITIAL SUBAREA FLOW-LENGTH(FEET) =  50.00
UPSTREAM ELEVATION(FEET) =  1392.00
DOWNSTREAM ELEVATION(FEET) =  1390.00
ELEVATION DIFFERENCE(FEET) =  2.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =  6.415
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.853
SUBAREA RUNOFF(CFS) =  0.24
TOTAL AREA(ACRES) =  0.10  TOTAL RUNOFF(CFS) =  0.24

*****
FLOW PROCESS FROM NODE      214.00 TO NODE      212.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

```



```

=====
ELEVATION DATA: UPSTREAM(FEET) = 1390.00 DOWNSTREAM(FEET) = 1118.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1308.00 CHANNEL SLOPE = 0.2080
CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 10.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.575
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.27
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.59
AVERAGE FLOW DEPTH(FEET) = 0.08 TRAVEL TIME(MIN.) = 8.41
Tc(MIN.) = 14.82
SUBAREA AREA(ACRES) = 5.50 SUBAREA RUNOFF(CFS) = 7.55
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 5.60 PEAK FLOW RATE(CFS) = 7.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.11 FLOW VELOCITY(FEET/SEC.) = 3.32
LONGEST FLOWPATH FROM NODE 213.00 TO NODE 212.00 = 1358.00 FEET.

*****
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 14.82
RAINFALL INTENSITY(INCH/HR) = 4.58
TOTAL STREAM AREA(ACRES) = 5.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.69

** CONFLUENCE DATA **


| STREAM<br>NUMBER | RUNOFF<br>(CFS) | Tc<br>(MIN.) | INTENSITY<br>(INCH/HOUR) | AREA<br>(ACRE) |
|------------------|-----------------|--------------|--------------------------|----------------|
| 1                | 65.66           | 17.88        | 4.053                    | 54.00          |
| 2                | 7.69            | 14.82        | 4.575                    | 5.60           |



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

** PEAK FLOW RATE TABLE **


| STREAM<br>NUMBER | RUNOFF<br>(CFS) | Tc<br>(MIN.) | INTENSITY<br>(INCH/HOUR) |
|------------------|-----------------|--------------|--------------------------|
| 1                | 62.10           | 14.82        | 4.575                    |
| 2                | 72.47           | 17.88        | 4.053                    |



COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 72.47 Tc(MIN.) = 17.88
TOTAL AREA(ACRES) = 59.60
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 3146.00 FEET.

*****
FLOW PROCESS FROM NODE 212.00 TO NODE 215.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 1118.00 DOWNSTREAM(FEET) = 1114.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 203.00 CHANNEL SLOPE = 0.0197
CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 6.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.921
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 73.18
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.59
AVERAGE FLOW DEPTH(FEET) = 0.82 TRAVEL TIME(MIN.) = 0.94
Tc(MIN.) = 18.83
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 1.41
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 60.80 PEAK FLOW RATE(CFS) = 72.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.81 FLOW VELOCITY(FEET/SEC.) = 3.58
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 3349.00 FEET.

*****
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 11
-----
>>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
=====

** MAIN STREAM CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 72.47 18.83 3.921 60.80
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 3349.00 FEET.

** MEMORY BANK # 3 CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 293.81 24.20 3.335 276.90
LONGEST FLOWPATH FROM NODE 301.00 TO NODE 215.00 = 3198.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 301.08 18.83 3.921
2 355.45 24.20 3.335

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 355.45 Tc(MIN.) = 24.20
TOTAL AREA(ACRES) = 337.70

*****
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 12
-----
>>>>>CLEAR MEMORY BANK # 3 <<<<<
=====

*****
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====

```

ELEVATION DATA: UPSTREAM(FEET) = 1114.00 DOWNSTREAM(FEET) = 1088.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 946.00 CHANNEL SLOPE = 0.0275
 CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 5.000
 MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 4.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.143
 CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 81
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 357.72
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.76
 AVERAGE FLOW DEPTH(FEET) = 1.82 TRAVEL TIME(MIN.) = 2.33
 Tc(MIN.) = 26.53
 SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 4.53
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
 TOTAL AREA(ACRES) = 342.50 PEAK FLOW RATE(CFS) = 355.45

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 1.81 FLOW VELOCITY(FEET/SEC.) = 6.75
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 4295.00 FEET.

```

+-----+
| FLOW EXITS PROJECT AT N/W CORNER |
+-----+
  
```

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=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      = 342.50 TC(MIN.) = 26.53
PEAK FLOW RATE(CFS)    = 355.45
=====
=====
END OF RATIONAL METHOD ANALYSIS
  
```


100-YEAR HYDROLOGY CALCULATIONS

POST-DEVELOPMENT CONDITIONS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
2003,1985,1981 HYDROLOGY MANUAL
(c) Copyright 1982-2004 Advanced Engineering Software (aes)
Ver. 2.0 Release Date: 01/01/2004 License ID 1503

Analysis prepared by:

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TEL: 858-587-8070

***** DESCRIPTION OF STUDY *****
* GILDRED TPM, RAMONA, CALIFORNIA *
* 100-YEAR STORM *
* POST-DEVELOPMENT CONDITIONS *

FILE NAME: 1671PC.DAT
TIME/DATE OF STUDY: 08:12 08/13/2010

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

2003 SAN DIEGO MANUAL CRITERIA

USER SPECIFIED STORM EVENT(YEAR) = 100.00
6-HOUR DURATION PRECIPITATION (INCHES) = 3.500
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)

*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====

CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81

```

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1475.50
DOWNSTREAM ELEVATION(FEET) = 1455.00
ELEVATION DIFFERENCE(FEET) = 20.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.727
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.28
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.28

*****
FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1455.00 DOWNSTREAM(FEET) = 1210.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 413.00 CHANNEL SLOPE = 0.5932
CHANNEL BASE(FEET) = 30.00 "Z" FACTOR = 12.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.685
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.53
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.96
AVERAGE FLOW DEPTH(FEET) = 0.03 TRAVEL TIME(MIN.) = 3.51
Tc(MIN.) = 8.23
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 2.41
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 2.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.03 FLOW VELOCITY(FEET/SEC.) = 2.57
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 103.00 = 463.00 FEET.

*****
FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1210.00 DOWNSTREAM(FEET) = 1090.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 298.00 CHANNEL SLOPE = 0.4027
CHANNEL BASE(FEET) = 30.00 "Z" FACTOR = 10.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.891
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.30
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.79
AVERAGE FLOW DEPTH(FEET) = 0.05 TRAVEL TIME(MIN.) = 1.78
Tc(MIN.) = 10.02
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 3.36
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 3.20 PEAK FLOW RATE(CFS) = 5.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

```

```

DEPTH(FEET) = 0.06    FLOW VELOCITY(FEET/SEC.) = 3.18
LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 = 761.00 FEET.

*****
FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1090.00 DOWNSTREAM(FEET) = 1089.30
CHANNEL LENGTH THRU SUBAREA(FEET) = 70.00 CHANNEL SLOPE = 0.0100
CHANNEL BASE(FEET) = 2.00 "Z" FACTOR = 20.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.66
FLOW VELOCITY(FEET/SEC.) = 1.70 FLOW DEPTH(FEET) = 0.36
TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 10.70
LONGEST FLOWPATH FROM NODE    101.00 TO NODE    105.00 = 831.00 FEET.

*****
FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE = 10
-----
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
=====

*****
FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 76
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1180.00
DOWNSTREAM ELEVATION(FEET) = 1170.00
ELEVATION DIFFERENCE(FEET) = 10.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.372
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.33
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.33

*****
FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1170.00 DOWNSTREAM(FEET) = 1090.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 413.00 CHANNEL SLOPE = 0.1937
CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 12.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.965
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.39
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.05
AVERAGE FLOW DEPTH(FEET) = 0.06 TRAVEL TIME(MIN.) = 3.35

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Tc(MIN.) = 7.73
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 3.97
AREA-AVERAGE RUNOFF COEFFICIENT = 0.303
TOTAL AREA(ACRES) = 2.00 PEAK FLOW RATE(CFS) = 4.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.08 FLOW VELOCITY(FEET/SEC.) = 2.55
LONGEST FLOWPATH FROM NODE 106.00 TO NODE 108.00 = 463.00 FEET.

*****
FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<
=====

*****
FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 76
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1200.00
DOWNSTREAM ELEVATION(FEET) = 1199.50
ELEVATION DIFFERENCE(FEET) = 0.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 9.419
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.129
SUBAREA RUNOFF(CFS) = 0.22
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.22

*****
FLOW PROCESS FROM NODE 226.00 TO NODE 227.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1199.50 DOWNSTREAM(FEET) = 1197.50
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.0100
CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 12.000
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 1.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.070
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 76
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.58
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.03
AVERAGE FLOW DEPTH(FEET) = 0.03 TRAVEL TIME(MIN.) = 3.22
Tc(MIN.) = 12.64
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.73
AREA-AVERAGE RUNOFF COEFFICIENT = 0.360
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.04 FLOW VELOCITY(FEET/SEC.) = 1.09
LONGEST FLOWPATH FROM NODE 225.00 TO NODE 227.00 = 250.00 FEET.

*****
FLOW PROCESS FROM NODE 227.00 TO NODE 2271.00 IS CODE = 51

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-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1197.50 DOWNSTREAM(FEET) = 1134.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 911.00 CHANNEL SLOPE = 0.0697
CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 12.000
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 1.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.944
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 76
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.52
AVERAGE FLOW DEPTH(FEET) = 0.03 TRAVEL TIME(MIN.) = 6.02
Tc(MIN.) = 18.66
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.99
AREA-AVERAGE RUNOFF COEFFICIENT = 0.360
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 1.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.03 FLOW VELOCITY(FEET/SEC.) = 2.50
LONGEST FLOWPATH FROM NODE 225.00 TO NODE 2271.00 = 1161.00 FEET.

*****
FLOW PROCESS FROM NODE 2271.00 TO NODE 2271.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 18.66
RAINFALL INTENSITY(INCH/HR) = 3.94
TOTAL STREAM AREA(ACRES) = 1.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.70

*****
FLOW PROCESS FROM NODE 2272.00 TO NODE 2273.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1212.00
DOWNSTREAM ELEVATION(FEET) = 1196.00
ELEVATION DIFFERENCE(FEET) = 16.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.727
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.28
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.28

*****
FLOW PROCESS FROM NODE 2273.00 TO NODE 2271.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 1196.00 DOWNSTREAM(FEET) = 1134.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 543.00 CHANNEL SLOPE = 0.1142
CHANNEL BASE(FEET) = 5.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.361
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.06
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.17
AVERAGE FLOW DEPTH(FEET) = 0.09 TRAVEL TIME(MIN.) = 4.17
Tc(MIN.) = 8.89
SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 1.53
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 1.72

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.12 FLOW VELOCITY(FEET/SEC.) = 2.62
LONGEST FLOWPATH FROM NODE 2272.00 TO NODE 2271.00 = 593.00 FEET.

*****
FLOW PROCESS FROM NODE 2271.00 TO NODE 2271.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 8.89
RAINFALL INTENSITY(INCH/HR) = 6.36
TOTAL STREAM AREA(ACRES) = 0.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.72

** CONFLUENCE DATA **


| STREAM<br>NUMBER | RUNOFF<br>(CFS) | Tc<br>(MIN.) | INTENSITY<br>(INCH/HOUR) | AREA<br>(ACRE) |
|------------------|-----------------|--------------|--------------------------|----------------|
| 1                | 1.70            | 18.66        | 3.944                    | 1.20           |
| 2                | 1.72            | 8.89         | 6.361                    | 0.90           |



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

** PEAK FLOW RATE TABLE **


| STREAM<br>NUMBER | RUNOFF<br>(CFS) | Tc<br>(MIN.) | INTENSITY<br>(INCH/HOUR) |
|------------------|-----------------|--------------|--------------------------|
| 1                | 2.53            | 8.89         | 6.361                    |
| 2                | 2.77            | 18.66        | 3.944                    |



COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 2.77 Tc(MIN.) = 18.66
TOTAL AREA(ACRES) = 2.10
LONGEST FLOWPATH FROM NODE 225.00 TO NODE 2271.00 = 1161.00 FEET.

*****
FLOW PROCESS FROM NODE 2271.00 TO NODE 2274.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 1130.00  DOWNSTREAM(FEET) = 1129.00
FLOW LENGTH(FEET) = 32.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.27
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.77
PIPE TRAVEL TIME(MIN.) = 0.07  Tc(MIN.) = 18.73
LONGEST FLOWPATH FROM NODE 225.00 TO NODE 2274.00 = 1193.00 FEET.

*****
FLOW PROCESS FROM NODE 2274.00 TO NODE 232.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1129.00  DOWNSTREAM(FEET) = 1116.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00  CHANNEL SLOPE = 0.0650
CHANNEL BASE(FEET) = 20.00  "Z" FACTOR = 10.000
MANNING'S FACTOR = 0.045  MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.678
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.62
AVERAGE FLOW DEPTH(FEET) = 0.09  TRAVEL TIME(MIN.) = 2.06
Tc(MIN.) = 20.79
SUBAREA AREA(ACRES) = 0.30  SUBAREA RUNOFF(CFS) = 0.33
AREA-AVERAGE RUNOFF COEFFICIENT = 0.330
TOTAL AREA(ACRES) = 2.40  PEAK FLOW RATE(CFS) = 2.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.09  FLOW VELOCITY(FEET/SEC.) = 1.61
LONGEST FLOWPATH FROM NODE 225.00 TO NODE 232.00 = 1393.00 FEET.

*****
FLOW PROCESS FROM NODE 232.00 TO NODE 232.00 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.) = 20.79
RAINFALL INTENSITY(INCH/HR) = 3.68
TOTAL STREAM AREA(ACRES) = 2.40
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.91

*****
FLOW PROCESS FROM NODE 229.00 TO NODE 230.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 76
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1124.00
DOWNSTREAM ELEVATION(FEET) = 1123.50
ELEVATION DIFFERENCE(FEET) = 0.50

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SUBAREA OVERLAND TIME OF FLOW(MIN.) = 9.419
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.129
SUBAREA RUNOFF(CFS) = 0.22
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.22
*****
FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1123.50 DOWNSTREAM(FEET) = 1121.50
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.0100
CHANNEL BASE(FEET) = 2.00 "Z" FACTOR = 12.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.181
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 76
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.88
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.19
AVERAGE FLOW DEPTH(FEET) = 0.18 TRAVEL TIME(MIN.) = 2.80
Tc(MIN.) = 12.22
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.31
AREA-AVERAGE RUNOFF COEFFICIENT = 0.360
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 1.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.23 FLOW VELOCITY(FEET/SEC.) = 1.35
LONGEST FLOWPATH FROM NODE 229.00 TO NODE 231.00 = 250.00 FEET.
*****
FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1121.50 DOWNSTREAM(FEET) = 1117.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 255.00 CHANNEL SLOPE = 0.0176
CHANNEL BASE(FEET) = 2.00 "Z" FACTOR = 12.000
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.820
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 76
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.67
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.93
AVERAGE FLOW DEPTH(FEET) = 0.15 TRAVEL TIME(MIN.) = 1.45
Tc(MIN.) = 13.67
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.35
AREA-AVERAGE RUNOFF COEFFICIENT = 0.360
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 1.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.16 FLOW VELOCITY(FEET/SEC.) = 2.89
LONGEST FLOWPATH FROM NODE 229.00 TO NODE 232.00 = 505.00 FEET.
*****
FLOW PROCESS FROM NODE 232.00 TO NODE 232.00 IS CODE = 1
-----

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>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 13.67
RAINFALL INTENSITY(INCH/HR) = 4.82
TOTAL STREAM AREA(ACRES) = 1.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.74

** CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/HR)      (ACRE)
    1         2.91      20.79      3.678         2.40
    2         1.74      13.67      4.820         1.00

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

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)  (INCH/HR)
    1         3.96      13.67      4.820
    2         4.24      20.79      3.678

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 4.24    Tc(MIN.) = 20.79
TOTAL AREA(ACRES) = 3.40
LONGEST FLOWPATH FROM NODE 225.00 TO NODE 232.00 = 1393.00 FEET.

*****
FLOW PROCESS FROM NODE 232.00 TO NODE 108.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1116.00 DOWNSTREAM(FEET) = 1090.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 180.00 CHANNEL SLOPE = 0.1444
CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 10.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.547
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.61
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.49
AVERAGE FLOW DEPTH(FEET) = 0.09 TRAVEL TIME(MIN.) = 1.21
Tc(MIN.) = 21.99
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.74
AREA-AVERAGE RUNOFF COEFFICIENT = 0.332
TOTAL AREA(ACRES) = 4.10 PEAK FLOW RATE(CFS) = 4.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.09 FLOW VELOCITY(FEET/SEC.) = 2.44
LONGEST FLOWPATH FROM NODE 225.00 TO NODE 108.00 = 1573.00 FEET.

*****
FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 11
-----
>>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<

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=====
** MAIN STREAM CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)
    1         4.83      21.99      3.547        4.10
LONGEST FLOWPATH FROM NODE      225.00 TO NODE      108.00 = 1573.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)
    1         4.22      7.73       6.965        2.00
LONGEST FLOWPATH FROM NODE      106.00 TO NODE      108.00 = 463.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)
    1         5.92      7.73       6.965
    2         6.98      21.99      3.547

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      6.98   Tc(MIN.) = 21.99
TOTAL AREA(ACRES) =      6.10

*****
FLOW PROCESS FROM NODE      108.00 TO NODE      108.00 IS CODE = 12
-----
>>>>>CLEAR MEMORY BANK # 2 <<<<<
=====

*****
FLOW PROCESS FROM NODE      108.00 TO NODE      105.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1090.00 DOWNSTREAM(FEET) = 1089.30
CHANNEL LENGTH THRU SUBAREA(FEET) = 361.00 CHANNEL SLOPE = 0.0019
CHANNEL BASE(FEET) = 2.00 "Z" FACTOR = 20.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.032
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 76
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.58
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 0.99
AVERAGE FLOW DEPTH(FEET) = 0.57 TRAVEL TIME(MIN.) = 6.05
Tc(MIN.) = 28.04
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 1.20
AREA-AVERAGE RUNOFF COEFFICIENT = 0.328
TOTAL AREA(ACRES) = 7.20 PEAK FLOW RATE(CFS) = 7.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.55 FLOW VELOCITY(FEET/SEC.) = 0.99
LONGEST FLOWPATH FROM NODE      225.00 TO NODE      105.00 = 1934.00 FEET.

*****
FLOW PROCESS FROM NODE      105.00 TO NODE      105.00 IS CODE = 11
-----
>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

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=====
** MAIN STREAM CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)      (ACRE)
    1         7.17      28.04         3.032         7.20
LONGEST FLOWPATH FROM NODE      225.00 TO NODE      105.00 = 1934.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)      (ACRE)
    1         5.66      10.70         5.644         3.20
LONGEST FLOWPATH FROM NODE      101.00 TO NODE      105.00 = 831.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)
    1         8.39      10.70         5.644
    2        10.21      28.04         3.032

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 10.21 Tc(MIN.) = 28.04
TOTAL AREA(ACRES) = 10.40

*****
FLOW PROCESS FROM NODE      105.00 TO NODE      105.00 IS CODE = 12
-----
>>>>>CLEAR MEMORY BANK # 1 <<<<<
=====

*****
FLOW PROCESS FROM NODE      105.00 TO NODE      109.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1089.30 DOWNSTREAM(FEET) = 1088.40
CHANNEL LENGTH THRU SUBAREA(FEET) = 89.00 CHANNEL SLOPE = 0.0101
CHANNEL BASE(FEET) = 2.00 "Z" FACTOR = 20.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.981
LAWNS, GOLF COURSES, ETC. GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 74
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.34
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.99
AVERAGE FLOW DEPTH(FEET) = 0.46 TRAVEL TIME(MIN.) = 0.75
Tc(MIN.) = 28.79
SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 0.27
AREA-AVERAGE RUNOFF COEFFICIENT = 0.319
TOTAL AREA(ACRES) = 10.70 PEAK FLOW RATE(CFS) = 10.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 1.98
LONGEST FLOWPATH FROM NODE      225.00 TO NODE      109.00 = 2023.00 FEET.

*****
FLOW PROCESS FROM NODE      109.00 TO NODE      109.00 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.) = 28.79
RAINFALL INTENSITY(INCH/HR) = 2.98
TOTAL STREAM AREA(ACRES) = 10.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 10.21

*****
FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1148.00
DOWNSTREAM ELEVATION(FEET) = 1144.00
ELEVATION DIFFERENCE(FEET) = 4.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.092
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.114
SUBAREA RUNOFF(CFS) = 0.27
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.27

*****
FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1144.00 DOWNSTREAM(FEET) = 1090.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 225.00 CHANNEL SLOPE = 0.2400
CHANNEL BASE(FEET) = 3.00 "Z" FACTOR = 20.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.647
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.85
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.35
AVERAGE FLOW DEPTH(FEET) = 0.08 TRAVEL TIME(MIN.) = 1.59
Tc(MIN.) = 6.68
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.15
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.10 FLOW VELOCITY(FEET/SEC.) = 2.68
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 275.00 FEET.

*****
FLOW PROCESS FROM NODE 112.00 TO NODE 109.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1090.00 DOWNSTREAM(FEET) = 1088.40
CHANNEL LENGTH THRU SUBAREA(FEET) = 78.00 CHANNEL SLOPE = 0.0205
CHANNEL BASE(FEET) = 2.00 "Z" FACTOR = 20.000

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MANNING'S FACTOR = 0.030    MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.38
FLOW VELOCITY(FEET/SEC.) = 1.57    FLOW DEPTH(FEET) = 0.16
TRAVEL TIME(MIN.) = 0.83    Tc(MIN.) = 7.51
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 109.00 = 353.00 FEET.

*****
FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 7.51
RAINFALL INTENSITY(INCH/HR) = 7.09
TOTAL STREAM AREA(ACRES) = 0.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.38

** CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/ HOUR)  (ACRE)
    1         10.21     28.79      2.981      10.70
    2          1.38      7.51      7.093       0.60

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

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)  (INCH/ HOUR)
    1         4.04      7.51      7.093
    2        10.79     28.79      2.981

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 10.79    Tc(MIN.) = 28.79
TOTAL AREA(ACRES) = 11.30
LONGEST FLOWPATH FROM NODE 225.00 TO NODE 109.00 = 2023.00 FEET.

*****
FLOW PROCESS FROM NODE 109.00 TO NODE 113.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1088.40    DOWNSTREAM(FEET) = 1056.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 67.00    CHANNEL SLOPE = 0.4836
CHANNEL BASE(FEET) = 1.00    "Z" FACTOR = 5.000
MANNING'S FACTOR = 0.030    MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.79
FLOW VELOCITY(FEET/SEC.) = 11.83    FLOW DEPTH(FEET) = 0.34
TRAVEL TIME(MIN.) = 0.09    Tc(MIN.) = 28.88
LONGEST FLOWPATH FROM NODE 225.00 TO NODE 113.00 = 2090.00 FEET.

*****
FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2

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```

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 28.88
RAINFALL INTENSITY(INCH/HR) = 2.98
TOTAL STREAM AREA(ACRES) = 11.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 10.79

*****
FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1315.00
DOWNSTREAM ELEVATION(FEET) = 1300.00
ELEVATION DIFFERENCE(FEET) = 15.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.727
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.28
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.28

*****
FLOW PROCESS FROM NODE 115.00 TO NODE 113.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1300.00 DOWNSTREAM(FEET) = 1056.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 290.00 CHANNEL SLOPE = 0.8414
CHANNEL BASE(FEET) = 2.00 "Z" FACTOR = 20.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.283
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.89
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.10
AVERAGE FLOW DEPTH(FEET) = 0.07 TRAVEL TIME(MIN.) = 1.18
Tc(MIN.) = 5.91
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.24
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.09 FLOW VELOCITY(FEET/SEC.) = 4.60
LONGEST FLOWPATH FROM NODE 114.00 TO NODE 113.00 = 340.00 FEET.

*****
FLOW PROCESS FROM NODE 113.00 TO NODE 113.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 5.91

```

RAINFALL INTENSITY(INCH/HR) = 8.28
 TOTAL STREAM AREA(ACRES) = 0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.49

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)	AREA (ACRE)
1	10.79	28.88	2.975	11.30
2	1.49	5.91	8.283	0.60

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HR)
1	5.37	5.91	8.283
2	11.32	28.88	2.975

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 11.32 Tc(MIN.) = 28.88
 TOTAL AREA(ACRES) = 11.90
 LONGEST FLOWPATH FROM NODE 225.00 TO NODE 113.00 = 2090.00 FEET.

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+-----+
| FLOW EXITS NORTHERLY PROJECT BOUNDARY |
+-----+

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FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

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=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1559.00
DOWNSTREAM ELEVATION(FEET) = 1550.00
ELEVATION DIFFERENCE(FEET) = 9.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.727
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HR) = 9.222
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.28
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.28
=====

```

FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 1550.00 DOWNSTREAM(FEET) = 1348.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1127.00 CHANNEL SLOPE = 0.1792
CHANNEL BASE(FEET) = 18.00 "Z" FACTOR = 6.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.752
=====

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```

CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.39
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.31
AVERAGE FLOW DEPTH(FEET) = 0.12 TRAVEL TIME(MIN.) = 5.67
Tc(MIN.) = 10.39
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 13.46
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 7.90 PEAK FLOW RATE(CFS) = 13.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.17 FLOW VELOCITY(FEET/SEC.) = 4.15
LONGEST FLOWPATH FROM NODE 301.00 TO NODE 303.00 = 1177.00 FEET.

*****
FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1344.00 DOWNSTREAM(FEET) = 1339.00
FLOW LENGTH(FEET) = 55.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.59
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.63
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 10.45
LONGEST FLOWPATH FROM NODE 301.00 TO NODE 304.00 = 1232.00 FEET.

*****
FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 10.45
RAINFALL INTENSITY(INCH/HR) = 5.73
TOTAL STREAM AREA(ACRES) = 7.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 13.63

*****
FLOW PROCESS FROM NODE 305.00 TO NODE 306.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1394.00
DOWNSTREAM ELEVATION(FEET) = 1384.00
ELEVATION DIFFERENCE(FEET) = 10.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.727
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.28

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TOTAL AREA(ACRES) =      0.10    TOTAL RUNOFF(CFS) =      0.28
*****
FLOW PROCESS FROM NODE      306.00 TO NODE      304.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  1384.00  DOWNSTREAM(FEET) =  1339.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  240.00  CHANNEL SLOPE =  0.1875
CHANNEL BASE(FEET) =   1.00  "Z" FACTOR =  20.000
MANNING'S FACTOR = 0.015  MAXIMUM DEPTH(FEET) =  2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.628
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  76
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.59
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  4.90
AVERAGE FLOW DEPTH(FEET) =  0.06  TRAVEL TIME(MIN.) =  0.82
Tc(MIN.) =  5.54
SUBAREA AREA(ACRES) =      0.20      SUBAREA RUNOFF(CFS) =      0.62
AREA-AVERAGE RUNOFF COEFFICIENT =  0.340
TOTAL AREA(ACRES) =      0.30      PEAK FLOW RATE(CFS) =      0.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.07  FLOW VELOCITY(FEET/SEC.) =  5.06
LONGEST FLOWPATH FROM NODE      305.00 TO NODE      304.00 =  290.00 FEET.
*****
FLOW PROCESS FROM NODE      304.00 TO NODE      304.00 IS CODE =  1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  5.54
RAINFALL INTENSITY(INCH/HR) =  8.63
TOTAL STREAM AREA(ACRES) =      0.30
PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.88

** CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)
    1      13.63      10.45      5.732      7.90
    2       0.88       5.54      8.628      0.30

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

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)
    1       8.11       5.54      8.628
    2      14.22      10.45      5.732

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      14.22  Tc(MIN.) =  10.45
TOTAL AREA(ACRES) =      8.20
LONGEST FLOWPATH FROM NODE      301.00 TO NODE      304.00 =  1232.00 FEET.

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*****
FLOW PROCESS FROM NODE      304.00 TO NODE      307.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  1339.00  DOWNSTREAM(FEET) =  1140.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1137.00  CHANNEL SLOPE =  0.1750
CHANNEL BASE(FEET) =  18.00  "Z" FACTOR =  6.000
MANNING'S FACTOR = 0.045  MAXIMUM DEPTH(FEET) =  2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.725
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =  25.19
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  5.19
AVERAGE FLOW DEPTH(FEET) =  0.25  TRAVEL TIME(MIN.) =  3.65
Tc(MIN.) = 14.10
SUBAREA AREA(ACRES) =  15.40  SUBAREA RUNOFF(CFS) =  21.83
AREA-AVERAGE RUNOFF COEFFICIENT =  0.301
TOTAL AREA(ACRES) =  23.60  PEAK FLOW RATE(CFS) =  33.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.29  FLOW VELOCITY(FEET/SEC.) =  5.75
LONGEST FLOWPATH FROM NODE      301.00 TO NODE      307.00 = 2369.00 FEET.

*****
FLOW PROCESS FROM NODE      307.00 TO NODE      308.00 IS CODE =  31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1136.00  DOWNSTREAM(FEET) = 1134.00
FLOW LENGTH(FEET) =  90.00  MANNING'S N = 0.024
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  7.62
ESTIMATED PIPE DIAMETER(INCH) = 33.00  NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =  33.51
PIPE TRAVEL TIME(MIN.) =  0.20  Tc(MIN.) = 14.30
LONGEST FLOWPATH FROM NODE      301.00 TO NODE      308.00 = 2459.00 FEET.

*****
FLOW PROCESS FROM NODE      308.00 TO NODE      309.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1134.00  DOWNSTREAM(FEET) = 1118.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  205.00  CHANNEL SLOPE =  0.0780
CHANNEL BASE(FEET) =  20.00  "Z" FACTOR =  2.000
MANNING'S FACTOR = 0.045  MAXIMUM DEPTH(FEET) =  2.00
CHANNEL FLOW THRU SUBAREA(CFS) =  33.51
FLOW VELOCITY(FEET/SEC.) =  4.55  FLOW DEPTH(FEET) =  0.36
TRAVEL TIME(MIN.) =  0.75  Tc(MIN.) = 15.05
LONGEST FLOWPATH FROM NODE      301.00 TO NODE      309.00 = 2664.00 FEET.

*****
FLOW PROCESS FROM NODE      309.00 TO NODE      309.00 IS CODE =  1
-----

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>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 15.05
RAINFALL INTENSITY(INCH/HR) = 4.53
TOTAL STREAM AREA(ACRES) = 23.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 33.51

*****
FLOW PROCESS FROM NODE 21.00 TO NODE 21.00 IS CODE = 7
-----
>>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
=====
USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN) = 21.48 RAIN INTENSITY(INCH/HOUR) = 3.60
TOTAL AREA(ACRES) = 247.30 TOTAL RUNOFF(CFS) = 267.24

+-----+
| FLOW DATA PER UPSTREAM HYDROLOGY CALCULATIONS |
+-----+

*****
FLOW PROCESS FROM NODE 21.00 TO NODE 309.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1119.00 DOWNSTREAM(FEET) = 1118.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 72.00 CHANNEL SLOPE = 0.0139
CHANNEL BASE(FEET) = 30.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 267.24
FLOW VELOCITY(FEET/SEC.) = 4.96 FLOW DEPTH(FEET) = 1.62
TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 21.72
LONGEST FLOWPATH FROM NODE 305.00 TO NODE 309.00 = 362.00 FEET.

*****
FLOW PROCESS FROM NODE 309.00 TO NODE 309.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 21.72
RAINFALL INTENSITY(INCH/HR) = 3.58
TOTAL STREAM AREA(ACRES) = 247.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 267.24

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 33.51 15.05 4.531 23.60
2 267.24 21.72 3.576 247.30

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

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** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)
    1      218.63      15.05      4.531
    2      293.68      21.72      3.576

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 293.68   Tc(MIN.) = 21.72
TOTAL AREA(ACRES) = 270.90
LONGEST FLOWPATH FROM NODE 301.00 TO NODE 309.00 = 2664.00 FEET.

*****
FLOW PROCESS FROM NODE 309.00 TO NODE 310.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1118.00 DOWNSTREAM(FEET) = 1116.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 500.00 CHANNEL SLOPE = 0.0040
CHANNEL BASE(FEET) = 30.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 4.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.339
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 296.64
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.43
AVERAGE FLOW DEPTH(FEET) = 2.47 TRAVEL TIME(MIN.) = 2.43
Tc(MIN.) = 24.15
SUBAREA AREA(ACRES) = 5.90 SUBAREA RUNOFF(CFS) = 5.91
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 276.80 PEAK FLOW RATE(CFS) = 293.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.46 FLOW VELOCITY(FEET/SEC.) = 3.42
LONGEST FLOWPATH FROM NODE 301.00 TO NODE 310.00 = 3164.00 FEET.

*****
FLOW PROCESS FROM NODE 310.00 TO NODE 228.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1115.00 DOWNSTREAM(FEET) = 1114.00
FLOW LENGTH(FEET) = 40.00 MANNING'S N = 0.024
DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.47
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 293.68
PIPE TRAVEL TIME(MIN.) = 0.05 Tc(MIN.) = 24.20
LONGEST FLOWPATH FROM NODE 301.00 TO NODE 228.00 = 3204.00 FEET.

*****
FLOW PROCESS FROM NODE 228.00 TO NODE 228.00 IS CODE = 10
-----
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
=====
*****

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FLOW PROCESS FROM NODE      201.00 TO NODE      202.00 IS CODE =  21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  81
INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
UPSTREAM ELEVATION(FEET) =    1528.50
DOWNSTREAM ELEVATION(FEET) =    1525.00
ELEVATION DIFFERENCE(FEET) =      3.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.323
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.856
SUBAREA RUNOFF(CFS) =      0.27
TOTAL AREA(ACRES) =      0.10    TOTAL RUNOFF(CFS) =      0.27

*****
FLOW PROCESS FROM NODE      202.00 TO NODE      203.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    1525.00  DOWNSTREAM(FEET) =    1202.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1712.00  CHANNEL SLOPE =    0.1887
CHANNEL BASE(FEET) =    20.00  "Z" FACTOR =    8.000
MANNING'S FACTOR =  0.045  MAXIMUM DEPTH(FEET) =    2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.272
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    16.59
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    4.34
AVERAGE FLOW DEPTH(FEET) =    0.18  TRAVEL TIME(MIN.) =    6.57
Tc(MIN.) =  11.90
SUBAREA AREA(ACRES) =    19.50    SUBAREA RUNOFF(CFS) =    30.84
AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
TOTAL AREA(ACRES) =    19.60    PEAK FLOW RATE(CFS) =    31.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.26  FLOW VELOCITY(FEET/SEC.) =    5.48
LONGEST FLOWPATH FROM NODE      201.00 TO NODE      203.00 =  1762.00 FEET.

*****
FLOW PROCESS FROM NODE      203.00 TO NODE      203.00 IS CODE =   1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  11.90
RAINFALL INTENSITY(INCH/HR) =    5.27
TOTAL STREAM AREA(ACRES) =    19.60
PEAK FLOW RATE(CFS) AT CONFLUENCE =    31.00

*****
FLOW PROCESS FROM NODE      204.00 TO NODE      205.00 IS CODE =  21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000

```

```

SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1447.00
DOWNSTREAM ELEVATION(FEET) = 1435.00
ELEVATION DIFFERENCE(FEET) = 12.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.727
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.28
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.28

*****
FLOW PROCESS FROM NODE 205.00 TO NODE 203.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1435.00 DOWNSTREAM(FEET) = 1202.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 551.00 CHANNEL SLOPE = 0.4229
CHANNEL BASE(FEET) = 15.00 "Z" FACTOR = 4.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.169
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.47
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.45
AVERAGE FLOW DEPTH(FEET) = 0.07 TRAVEL TIME(MIN.) = 2.66
Tc(MIN.) = 7.39
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 6.24
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 3.00 PEAK FLOW RATE(CFS) = 6.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.09 FLOW VELOCITY(FEET/SEC.) = 4.44
LONGEST FLOWPATH FROM NODE 204.00 TO NODE 203.00 = 601.00 FEET.

*****
FLOW PROCESS FROM NODE 203.00 TO NODE 203.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 7.39
RAINFALL INTENSITY(INCH/HR) = 7.17
TOTAL STREAM AREA(ACRES) = 3.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.45

** CONFLUENCE DATA **

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STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	31.00	11.90	5.272	19.60
2	6.45	7.39	7.169	3.00

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

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** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)
    1        25.70      7.39      7.169
    2        35.75     11.90      5.272

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      35.75   Tc(MIN.) =    11.90
TOTAL AREA(ACRES) =      22.60
LONGEST FLOWPATH FROM NODE      201.00 TO NODE      203.00 = 1762.00 FEET.

*****
FLOW PROCESS FROM NODE      203.00 TO NODE      206.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1202.00 DOWNSTREAM(FEET) = 1178.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 208.00 CHANNEL SLOPE = 0.1154
CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 5.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.088
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.04
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.14
AVERAGE FLOW DEPTH(FEET) = 0.33 TRAVEL TIME(MIN.) = 0.67
Tc(MIN.) = 12.57
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 2.59
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 24.30 PEAK FLOW RATE(CFS) = 37.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.33 FLOW VELOCITY(FEET/SEC.) = 5.14
LONGEST FLOWPATH FROM NODE      201.00 TO NODE      206.00 = 1970.00 FEET.

*****
FLOW PROCESS FROM NODE      206.00 TO NODE      206.00 IS CODE = 10
-----
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
=====

*****
FLOW PROCESS FROM NODE      207.00 TO NODE      208.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1587.50
DOWNSTREAM ELEVATION(FEET) = 1580.00
ELEVATION DIFFERENCE(FEET) = 7.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.727
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.

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SUBAREA RUNOFF(CFS) =      0.28
TOTAL AREA(ACRES) =      0.10    TOTAL RUNOFF(CFS) =      0.28
*****
FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  1580.00  DOWNSTREAM(FEET) =  1390.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  863.00  CHANNEL SLOPE =  0.2202
CHANNEL BASE(FEET) =  20.00  "Z" FACTOR =  5.000
MANNING'S FACTOR = 0.045  MAXIMUM DEPTH(FEET) =  2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.499
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.56
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  2.24
AVERAGE FLOW DEPTH(FEET) =  0.06  TRAVEL TIME(MIN.) =  6.42
Tc(MIN.) =  11.15
SUBAREA AREA(ACRES) =      2.60    SUBAREA RUNOFF(CFS) =      4.29
AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
TOTAL AREA(ACRES) =      2.70    PEAK FLOW RATE(CFS) =      4.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.08  FLOW VELOCITY(FEET/SEC.) =  2.76
LONGEST FLOWPATH FROM NODE    207.00 TO NODE    209.00 =  913.00 FEET.
*****
FLOW PROCESS FROM NODE    209.00 TO NODE    209.00 IS CODE =  1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  11.15
RAINFALL INTENSITY(INCH/HR) =  5.50
TOTAL STREAM AREA(ACRES) =      2.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.45
*****
FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  81
INITIAL SUBAREA FLOW-LENGTH(FEET) =  50.00
UPSTREAM ELEVATION(FEET) =  1544.00
DOWNSTREAM ELEVATION(FEET) =  1540.00
ELEVATION DIFFERENCE(FEET) =  4.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =  5.092
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.114
SUBAREA RUNOFF(CFS) =      0.27
TOTAL AREA(ACRES) =      0.10    TOTAL RUNOFF(CFS) =      0.27
*****
FLOW PROCESS FROM NODE    211.00 TO NODE    209.00 IS CODE =  51

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-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1540.00 DOWNSTREAM(FEET) = 1390.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1151.00 CHANNEL SLOPE = 0.1303
CHANNEL BASE(FEET) = 18.00 "Z" FACTOR = 6.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.630
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.50
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.39
AVERAGE FLOW DEPTH(FEET) = 0.16 TRAVEL TIME(MIN.) = 5.65
Tc(MIN.) = 10.74
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 19.42
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 11.60 PEAK FLOW RATE(CFS) = 19.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.23 FLOW VELOCITY(FEET/SEC.) = 4.32
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 209.00 = 1201.00 FEET.

*****
FLOW PROCESS FROM NODE 209.00 TO NODE 209.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 10.74
RAINFALL INTENSITY(INCH/HR) = 5.63
TOTAL STREAM AREA(ACRES) = 11.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 19.59

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 4.45 11.15 5.499 2.70
2 19.59 10.74 5.630 11.60

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

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 23.89 10.74 5.630
2 23.59 11.15 5.499

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 23.89 Tc(MIN.) = 10.74
TOTAL AREA(ACRES) = 14.30
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 209.00 = 1201.00 FEET.

*****
FLOW PROCESS FROM NODE 209.00 TO NODE 212.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1390.00 DOWNSTREAM(FEET) = 1388.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 90.00 CHANNEL SLOPE = 0.0222
CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 5.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 23.89
FLOW VELOCITY(FEET/SEC.) = 2.60 FLOW DEPTH(FEET) = 0.42
TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 11.32
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 1291.00 FEET.

*****
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 11.32
RAINFALL INTENSITY(INCH/HR) = 5.44
TOTAL STREAM AREA(ACRES) = 14.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 23.89

*****
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1579.50
DOWNSTREAM ELEVATION(FEET) = 1555.00
ELEVATION DIFFERENCE(FEET) = 24.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 4.727
WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) = 0.28
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.28

*****
FLOW PROCESS FROM NODE 214.00 TO NODE 212.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1555.00 DOWNSTREAM(FEET) = 1388.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 645.00 CHANNEL SLOPE = 0.2589
CHANNEL BASE(FEET) = 1.00 "Z" FACTOR = 4.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.205
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.26
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.13
AVERAGE FLOW DEPTH(FEET) = 0.18 TRAVEL TIME(MIN.) = 2.60

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Tc(MIN.) = 7.33
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.95
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.23 FLOW VELOCITY(FEET/SEC.) = 4.84
LONGEST FLOWPATH FROM NODE 213.00 TO NODE 212.00 = 695.00 FEET.

*****
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 7.33
RAINFALL INTENSITY(INCH/HR) = 7.21
TOTAL STREAM AREA(ACRES) = 1.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.16

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 23.89 11.32 5.443 14.30
2 2.16 7.33 7.205 1.00

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

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 20.21 7.33 7.205
2 25.52 11.32 5.443

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 25.52 Tc(MIN.) = 11.32
TOTAL AREA(ACRES) = 15.30
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 1291.00 FEET.

*****
FLOW PROCESS FROM NODE 212.00 TO NODE 215.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1384.00 DOWNSTREAM(FEET) = 1382.00
FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.03
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 25.52
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 11.38
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 1341.00 FEET.

*****
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 1
-----

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>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 11.38
RAINFALL INTENSITY(INCH/HR) = 5.42
TOTAL STREAM AREA(ACRES) = 15.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 25.52

*****
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 76
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1400.00
DOWNSTREAM ELEVATION(FEET) = 1399.50
ELEVATION DIFFERENCE(FEET) = 0.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 9.419
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.129
SUBAREA RUNOFF(CFS) = 0.22
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.22

*****
FLOW PROCESS FROM NODE 217.00 TO NODE 2171.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1399.50 DOWNSTREAM(FEET) = 1397.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 220.00 CHANNEL SLOPE = 0.0114
CHANNEL BASE(FEET) = 1.00 "Z" FACTOR = 12.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.119
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 76
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.78
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.21
AVERAGE FLOW DEPTH(FEET) = 0.19 TRAVEL TIME(MIN.) = 3.03
Tc(MIN.) = 12.45
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.11
AREA-AVERAGE RUNOFF COEFFICIENT = 0.360
TOTAL AREA(ACRES) = 0.70 PEAK FLOW RATE(CFS) = 1.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.24 FLOW VELOCITY(FEET/SEC.) = 1.39
LONGEST FLOWPATH FROM NODE 216.00 TO NODE 2171.00 = 270.00 FEET.

*****
FLOW PROCESS FROM NODE 2171.00 TO NODE 215.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1397.00 DOWNSTREAM(FEET) = 1382.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 463.00 CHANNEL SLOPE = 0.0324

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CHANNEL BASE(Feet) = 1.00 "Z" FACTOR = 20.000
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(Feet) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.606
RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 76
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.04
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(Feet/Sec.) = 3.48
AVERAGE FLOW DEPTH(Feet) = 0.15 TRAVEL TIME(Min.) = 2.22
Tc(Min.) = 14.67
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.49
AREA-AVERAGE RUNOFF COEFFICIENT = 0.360
TOTAL AREA(ACRES) = 1.60 PEAK FLOW RATE(CFS) = 2.65

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(Feet) = 0.16 FLOW VELOCITY(Feet/Sec.) = 3.74
LONGEST FLOWPATH FROM NODE 216.00 TO NODE 215.00 = 733.00 FEET.

*****
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(Min.) = 14.67
RAINFALL INTENSITY(INCH/HR) = 4.61
TOTAL STREAM AREA(ACRES) = 1.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.65

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (Min.) (INCH/HOUR) (ACRE)
1 25.52 11.38 5.425 15.30
2 2.65 14.67 4.606 1.60

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

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (Min.) (INCH/HOUR)
1 27.58 11.38 5.425
2 24.32 14.67 4.606

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 27.58 Tc(Min.) = 11.38
TOTAL AREA(ACRES) = 16.90
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 1341.00 FEET.

*****
FLOW PROCESS FROM NODE 215.00 TO NODE 206.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(Feet) = 1382.00 DOWNSTREAM(Feet) = 1178.00
CHANNEL LENGTH THRU SUBAREA(Feet) = 1113.00 CHANNEL SLOPE = 0.1833
CHANNEL BASE(Feet) = 35.00 "Z" FACTOR = 12.000

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MANNING'S FACTOR = 0.045    MAXIMUM DEPTH(FEET) =    2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.451
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    31.78
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  4.54
AVERAGE FLOW DEPTH(FEET) =  0.19    TRAVEL TIME(MIN.) =  4.09
Tc(MIN.) = 15.47
SUBAREA AREA(ACRES) =    6.30    SUBAREA RUNOFF(CFS) =    8.41
AREA-AVERAGE RUNOFF COEFFICIENT =  0.304
TOTAL AREA(ACRES) =    23.20    PEAK FLOW RATE(CFS) =    31.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.19    FLOW VELOCITY(FEET/SEC.) =  4.49
LONGEST FLOWPATH FROM NODE    210.00 TO NODE    206.00 = 2454.00 FEET.

*****
FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE = 11
-----
>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
=====

** MAIN STREAM CONFLUENCE DATA **
STREAM    RUNOFF    Tc    INTENSITY    AREA
NUMBER    (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
  1        31.41    15.47        4.451        23.20
LONGEST FLOWPATH FROM NODE    210.00 TO NODE    206.00 = 2454.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM    RUNOFF    Tc    INTENSITY    AREA
NUMBER    (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
  1        37.09    12.57        5.088        24.30
LONGEST FLOWPATH FROM NODE    201.00 TO NODE    206.00 = 1970.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM    RUNOFF    Tc    INTENSITY
NUMBER    (CFS)    (MIN.)    (INCH/HOUR)
  1        62.62    12.57        5.088
  2        63.86    15.47        4.451

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =    63.86    Tc(MIN.) =  15.47
TOTAL AREA(ACRES) =    47.50

*****
FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE = 12
-----
>>>>>CLEAR MEMORY BANK # 1 <<<<<
=====

*****
FLOW PROCESS FROM NODE    206.00 TO NODE    218.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1178.00    DOWNSTREAM(FEET) = 1126.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 512.00    CHANNEL SLOPE = 0.1016
CHANNEL BASE(FEET) = 25.00    "Z" FACTOR = 10.000

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MANNING'S FACTOR = 0.045    MAXIMUM DEPTH(FEET) =    2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.184
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    67.87
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  5.47
AVERAGE FLOW DEPTH(FEET) =  0.42    TRAVEL TIME(MIN.) =  1.56
Tc(MIN.) = 17.03
SUBAREA AREA(ACRES) =    6.40    SUBAREA RUNOFF(CFS) =    8.03
AREA-AVERAGE RUNOFF COEFFICIENT =  0.302
TOTAL AREA(ACRES) =    53.90    PEAK FLOW RATE(CFS) =    68.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.42    FLOW VELOCITY(FEET/SEC.) =  5.48
LONGEST FLOWPATH FROM NODE    210.00 TO NODE    218.00 = 2966.00 FEET.

*****
FLOW PROCESS FROM NODE    218.00 TO NODE    219.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1122.70    DOWNSTREAM(FEET) = 1122.00
FLOW LENGTH(FEET) =  70.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.63
ESTIMATED PIPE DIAMETER(INCH) = 39.00    NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =    68.05
PIPE TRAVEL TIME(MIN.) =  0.11    Tc(MIN.) = 17.14
LONGEST FLOWPATH FROM NODE    210.00 TO NODE    219.00 = 3036.00 FEET.

*****
FLOW PROCESS FROM NODE    219.00 TO NODE    220.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1122.00    DOWNSTREAM(FEET) = 1118.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  94.00    CHANNEL SLOPE = 0.0426
CHANNEL BASE(FEET) = 10.00    "Z" FACTOR = 4.000
MANNING'S FACTOR = 0.045    MAXIMUM DEPTH(FEET) =  2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.122
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    68.17
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  5.43
AVERAGE FLOW DEPTH(FEET) =  0.92    TRAVEL TIME(MIN.) =  0.29
Tc(MIN.) = 17.43
SUBAREA AREA(ACRES) =    0.20    SUBAREA RUNOFF(CFS) =    0.25
AREA-AVERAGE RUNOFF COEFFICIENT =  0.302
TOTAL AREA(ACRES) =    54.10    PEAK FLOW RATE(CFS) =    68.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.92    FLOW VELOCITY(FEET/SEC.) =  5.42
LONGEST FLOWPATH FROM NODE    210.00 TO NODE    220.00 = 3130.00 FEET.

*****
FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 IS CODE = 10

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

*****
FLOW PROCESS FROM NODE      221.00 TO NODE      222.00 IS CODE =  21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1390.00
DOWNSTREAM ELEVATION(FEET) = 1389.00
ELEVATION DIFFERENCE(FEET) = 1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 8.082
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.765
SUBAREA RUNOFF(CFS) = 0.20
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.20

*****
FLOW PROCESS FROM NODE      222.00 TO NODE      223.00 IS CODE =  51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1389.00 DOWNSTREAM(FEET) = 1129.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1114.00 CHANNEL SLOPE = 0.2334
CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 10.000
MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.534
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.96
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.67
AVERAGE FLOW DEPTH(FEET) = 0.07 TRAVEL TIME(MIN.) = 6.95
Tc(MIN.) = 15.03
SUBAREA AREA(ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 7.21
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 5.40 PEAK FLOW RATE(CFS) = 7.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.10 FLOW VELOCITY(FEET/SEC.) = 3.42
LONGEST FLOWPATH FROM NODE      221.00 TO NODE      223.00 = 1164.00 FEET.

*****
FLOW PROCESS FROM NODE      223.00 TO NODE      224.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1125.00 DOWNSTREAM(FEET) = 1122.00
FLOW LENGTH(FEET) = 45.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.56
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.34

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PIPE TRAVEL TIME(MIN.) = 0.06    Tc(MIN.) = 15.09
LONGEST FLOWPATH FROM NODE    221.00 TO NODE    224.00 = 1209.00 FEET.

*****
FLOW PROCESS FROM NODE    224.00 TO NODE    220.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1122.00  DOWNSTREAM(FEET) = 1118.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 132.00  CHANNEL SLOPE = 0.0303
CHANNEL BASE(FEET) = 20.00  "Z" FACTOR = 12.000
MANNING'S FACTOR = 0.045  MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.297
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.41
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.77
AVERAGE FLOW DEPTH(FEET) = 0.19  TRAVEL TIME(MIN.) = 1.24
Tc(MIN.) = 16.33
SUBAREA AREA(ACRES) = 0.10  SUBAREA RUNOFF(CFS) = 0.13
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 5.50  PEAK FLOW RATE(CFS) = 7.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.19  FLOW VELOCITY(FEET/SEC.) = 1.76
LONGEST FLOWPATH FROM NODE    221.00 TO NODE    220.00 = 1341.00 FEET.

*****
FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 IS CODE = 11
-----
>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
=====

** MAIN STREAM CONFLUENCE DATA **
STREAM    RUNOFF    Tc    INTENSITY    AREA
NUMBER    (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
1          7.34    16.33    4.297    5.50
LONGEST FLOWPATH FROM NODE    221.00 TO NODE    220.00 = 1341.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM    RUNOFF    Tc    INTENSITY    AREA
NUMBER    (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
1          68.05    17.43    4.122    54.10
LONGEST FLOWPATH FROM NODE    210.00 TO NODE    220.00 = 3130.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM    RUNOFF    Tc    INTENSITY
NUMBER    (CFS)    (MIN.)    (INCH/HOUR)
1          71.13    16.33    4.297
2          75.10    17.43    4.122

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 75.10  Tc(MIN.) = 17.43
TOTAL AREA(ACRES) = 59.60

*****
FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 IS CODE = 12
-----

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>>>>>CLEAR MEMORY BANK # 1 <<<<<
=====
*****
FLOW PROCESS FROM NODE      220.00 TO NODE      228.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  1118.00  DOWNSTREAM(FEET) =  1112.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  302.00  CHANNEL SLOPE =  0.0199
CHANNEL BASE(FEET) =  20.00  "Z" FACTOR =  6.000
MANNING'S FACTOR = 0.045  MAXIMUM DEPTH(FEET) =  2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.923
CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =  75.62
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  3.62
AVERAGE FLOW DEPTH(FEET) =  0.83  TRAVEL TIME(MIN.) =  1.39
Tc(MIN.) =  18.81
SUBAREA AREA(ACRES) =  0.90  SUBAREA RUNOFF(CFS) =  1.06
AREA-AVERAGE RUNOFF COEFFICIENT =  0.302
TOTAL AREA(ACRES) =  60.50  PEAK FLOW RATE(CFS) =  75.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.83  FLOW VELOCITY(FEET/SEC.) =  3.63
LONGEST FLOWPATH FROM NODE      210.00 TO NODE      228.00 =  3432.00 FEET.

*****
FLOW PROCESS FROM NODE      228.00 TO NODE      228.00 IS CODE =  11
-----
>>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
=====

** MAIN STREAM CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)      (ACRE)
    1         75.10      18.81         3.923         60.50
LONGEST FLOWPATH FROM NODE      210.00 TO NODE      228.00 =  3432.00 FEET.

** MEMORY BANK # 3 CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)      (ACRE)
    1        293.68      24.20         3.335        276.80
LONGEST FLOWPATH FROM NODE      301.00 TO NODE      228.00 =  3204.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)
    1        303.41      18.81         3.923
    2        357.52      24.20         3.335

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =  357.52  Tc(MIN.) =  24.20
TOTAL AREA(ACRES) =  337.30

*****
FLOW PROCESS FROM NODE      228.00 TO NODE      228.00 IS CODE =  12
-----

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>>>>>CLEAR MEMORY BANK # 3 <<<<<

FLOW PROCESS FROM NODE 228.00 TO NODE 233.00 IS CODE = 51

>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1112.00 DOWNSTREAM(FEET) = 1088.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 842.00 CHANNEL SLOPE = 0.0285

CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 6.000

MANNING'S FACTOR = 0.045 MAXIMUM DEPTH(FEET) = 2.00

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.160

CHAPARRAL(NARROWLEAF) FAIR COVER RUNOFF COEFFICIENT = .3000

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 81

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 359.37

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.65

AVERAGE FLOW DEPTH(FEET) = 1.77 TRAVEL TIME(MIN.) = 2.11

Tc(MIN.) = 26.31

SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 3.70

AREA-AVERAGE RUNOFF COEFFICIENT = 0.300

TOTAL AREA(ACRES) = 341.20 PEAK FLOW RATE(CFS) = 357.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.76 FLOW VELOCITY(FEET/SEC.) = 6.65

LONGEST FLOWPATH FROM NODE 210.00 TO NODE 233.00 = 4274.00 FEET.

FLOW EXITS N/W CORNER

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 341.20 TC(MIN.) = 26.31

PEAK FLOW RATE(CFS) = 357.52

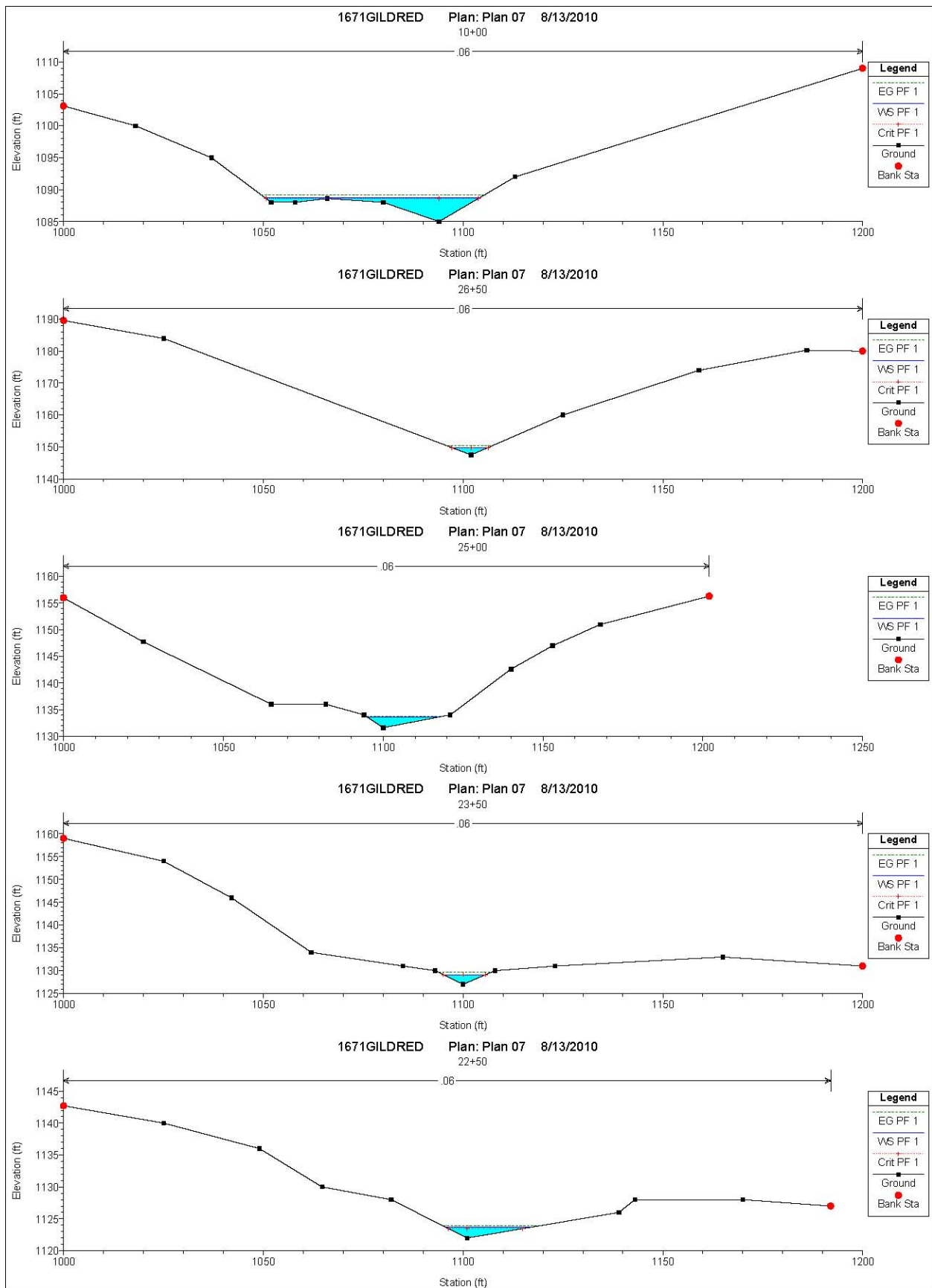
END OF RATIONAL METHOD ANALYSIS

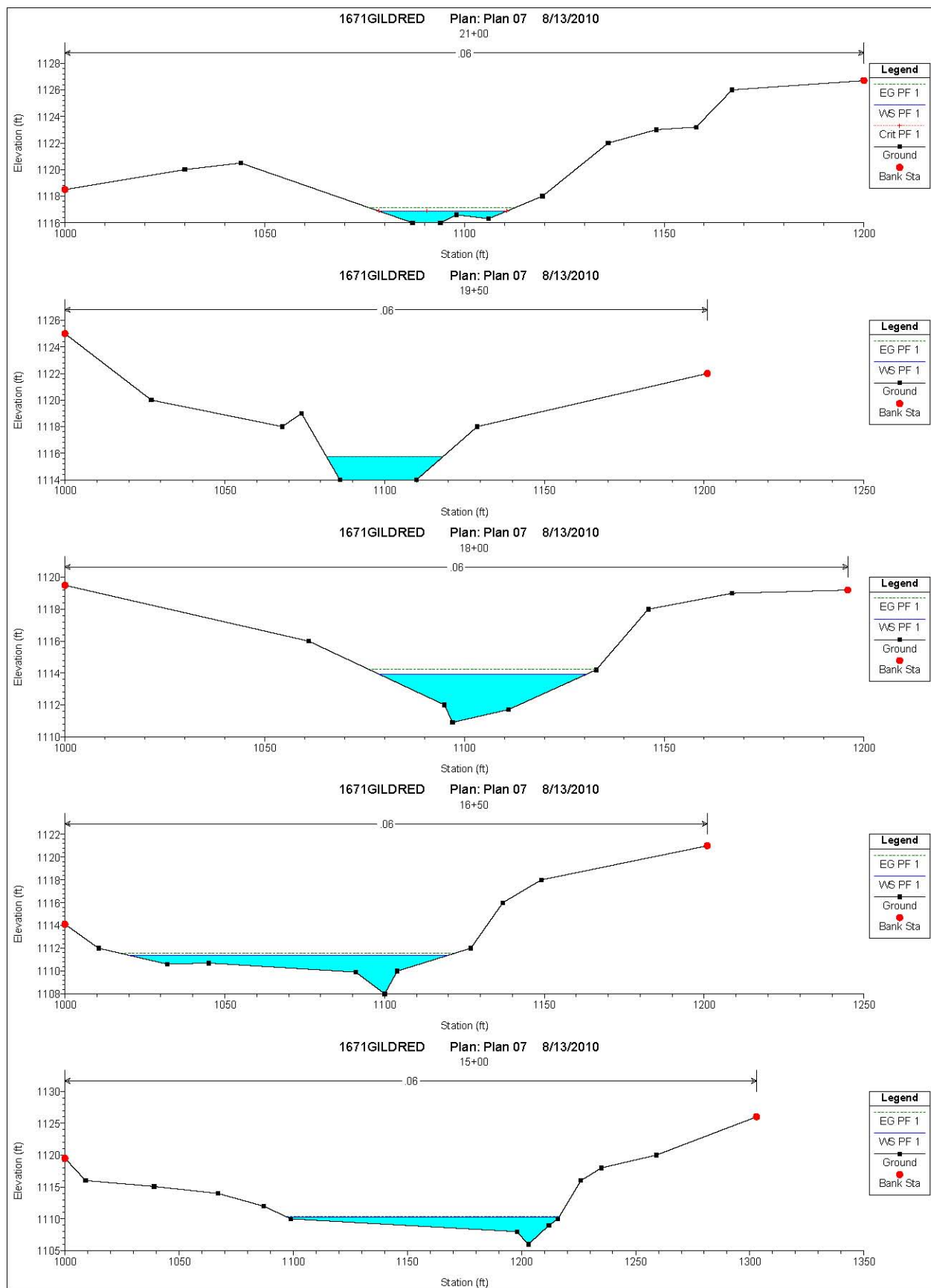
100-YEAR HYDRAULIC CALCULATIONS

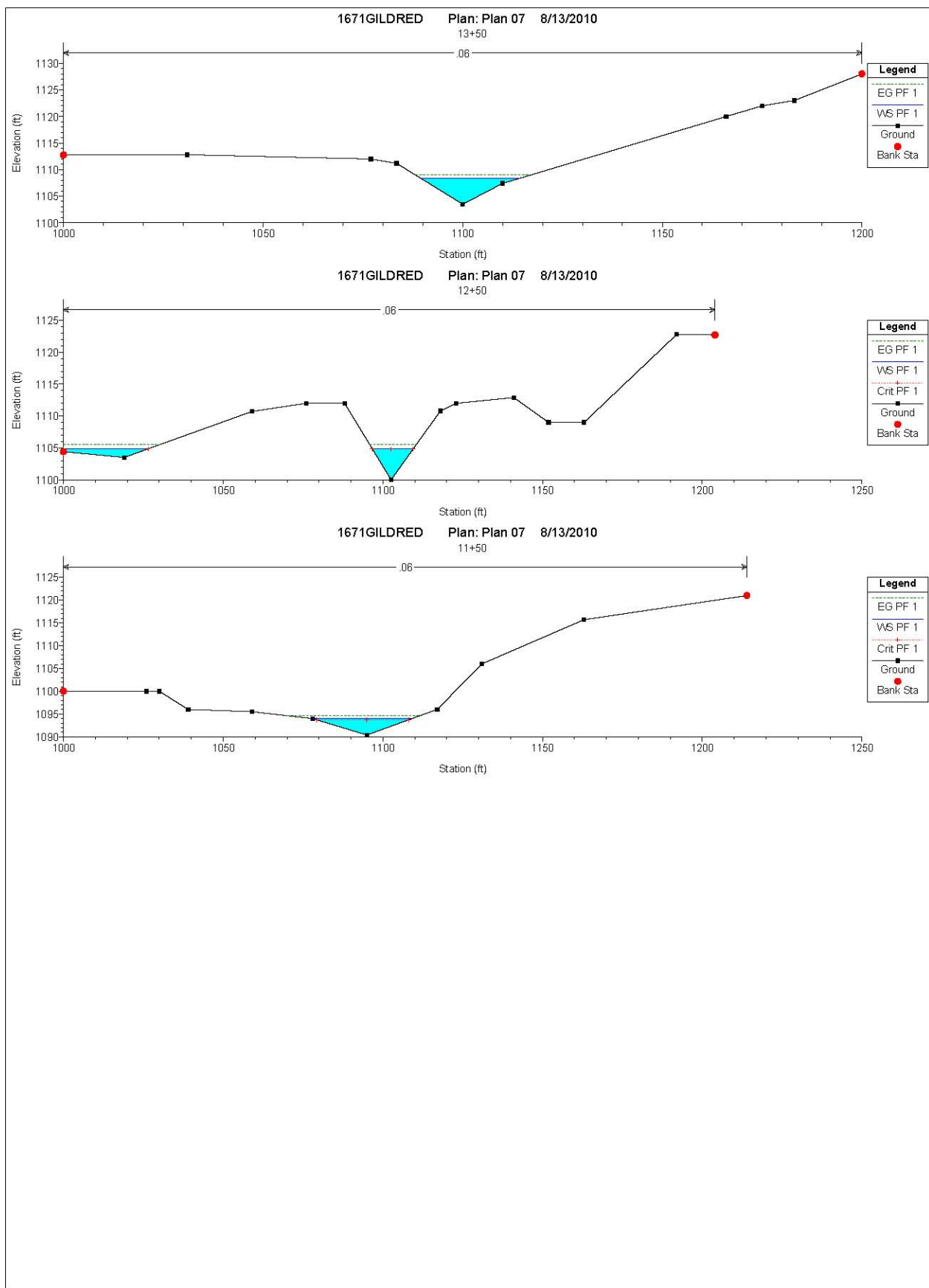
PRE-DEVELOPMENT FLOODING LIMITS:

HEC-RAS Plan: Plan 04 River: 1 Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	2650	PF 1	63.60	1147.50	1149.79	1149.79	1150.38	0.060125	6.15	10.34	9.04	1.01
1	2500	PF 1	64.20	1131.60	1133.56		1133.70	0.015195	2.97	21.62	22.06	0.53
1	2350	PF 1	64.80	1127.00	1129.10	1129.10	1129.64	0.058745	5.89	10.99	10.48	1.01
1	2250	PF 1	65.40	1122.00	1123.65	1123.46	1123.87	0.030950	3.79	17.25	20.90	0.74
1	2100	PF 1	72.20	1116.00	1116.89	1116.89	1117.16	0.066979	4.21	17.16	32.13	1.01
1	1950	PF 1	72.20	1114.00	1115.74		1115.77	0.001918	1.37	52.62	36.45	0.20
1	1800	PF 1	355.40	1110.90	1113.95		1114.25	0.018172	4.42	80.48	52.36	0.63
1	1650	PF 1	355.40	1108.00	1111.37		1111.55	0.017397	3.37	105.36	99.63	0.58
1	1500	PF 1	355.40	1106.00	1110.27		1110.34	0.004474	2.09	170.15	119.06	0.31
1	1350	PF 1	355.40	1103.50	1108.37		1108.98	0.023317	6.25	56.83	24.80	0.73
1	1250	PF 1	355.40	1100.00	1104.85	1104.85	1105.54	0.055219	6.69	53.15	39.30	1.01
1	1150	PF 1	355.40	1090.40	1094.00	1093.74	1094.62	0.031003	6.34	56.05	31.14	0.83
1	1000	PF 1	355.40	1085.00	1088.71	1088.62	1089.20	0.042039	5.59	63.54	53.80	0.91



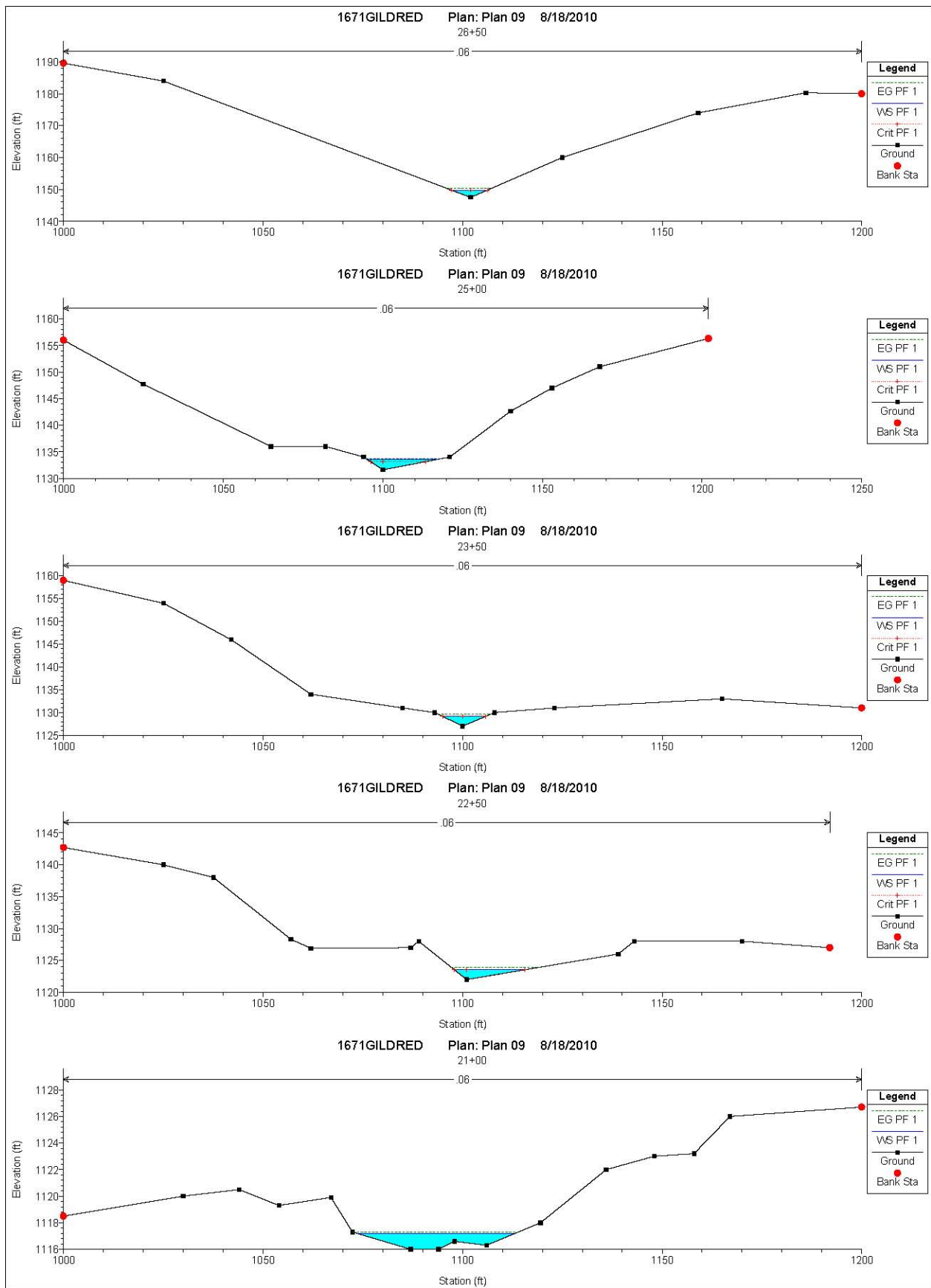


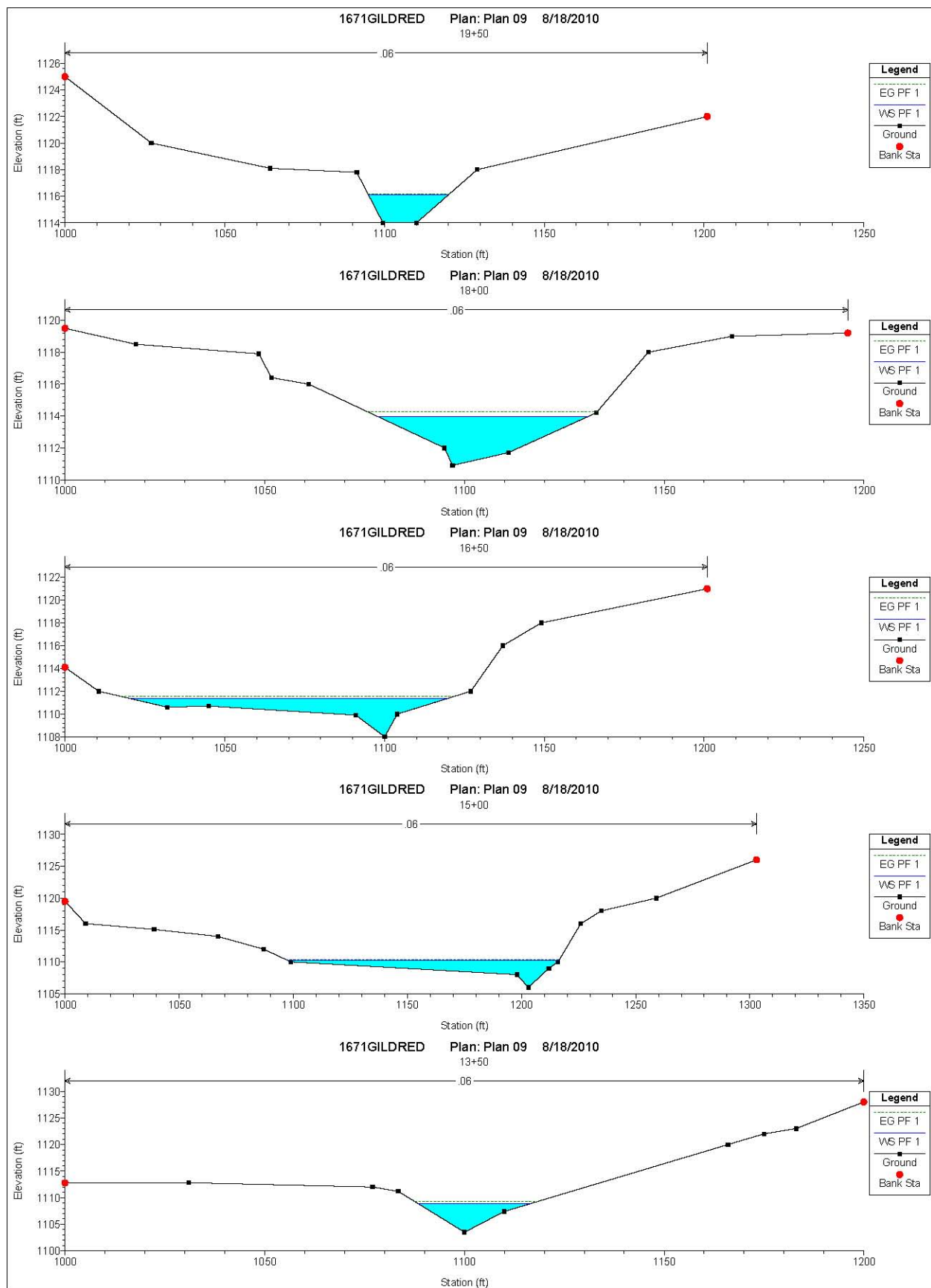


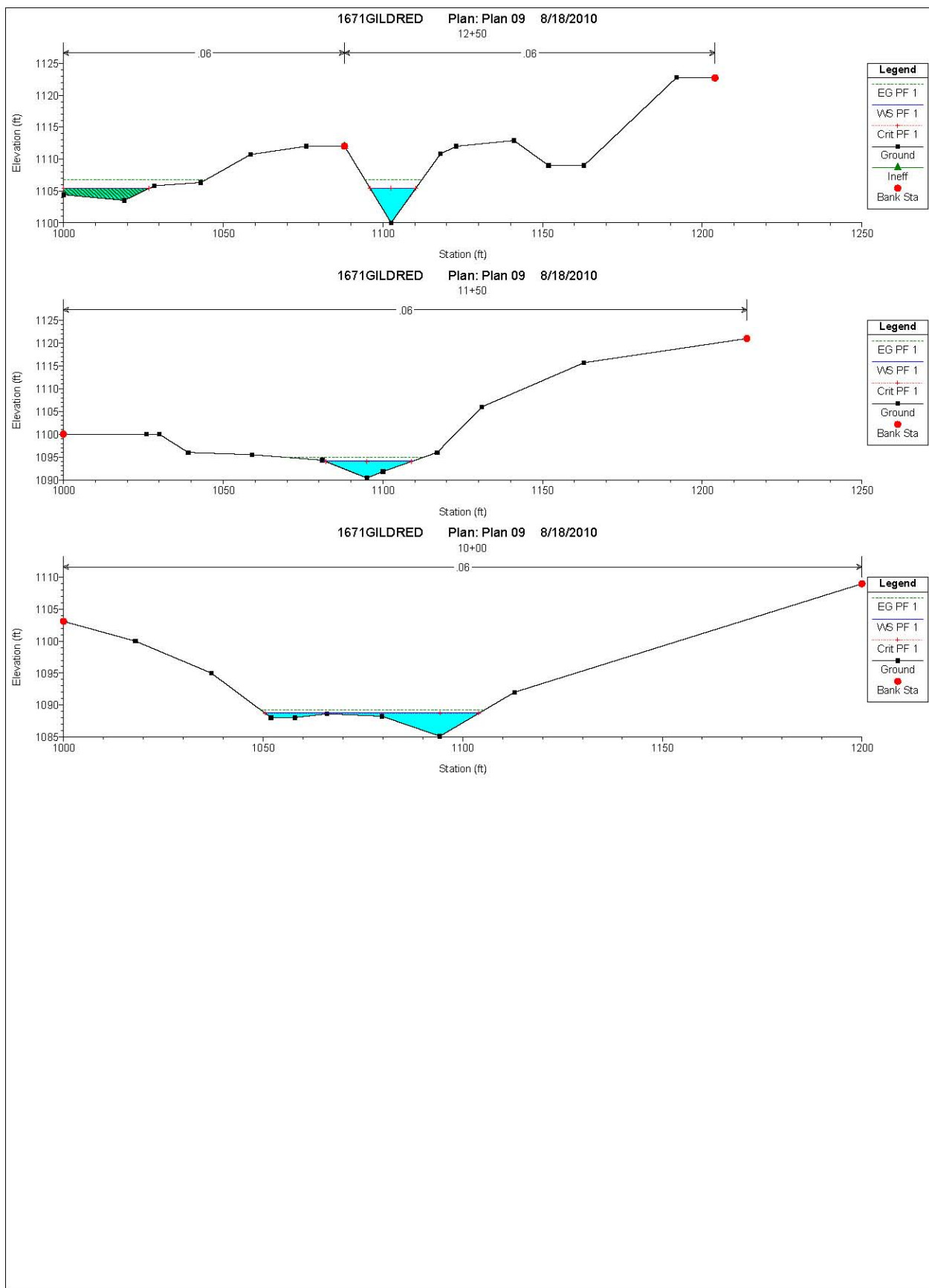
POST-DEVELOPMENT FLOODING LIMITS:

HEC-RAS Plan: Plan 04 River: 1 Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	2650	PF 1	63.90	1147.50	1149.79	1149.79	1150.38	0.060057	6.16	10.38	9.05	1.01
1	2500	PF 1	65.90	1131.60	1133.57	1133.13	1133.71	0.015597	3.02	21.84	22.17	0.54
1	2350	PF 1	68.00	1127.00	1129.17	1129.14	1129.69	0.053689	5.77	11.79	10.86	0.98
1	2250	PF 1	68.00	1122.00	1123.53	1123.53	1123.93	0.061130	5.04	13.49	17.61	1.02
1	2100	PF 1	75.10	1116.00	1117.17		1117.28	0.017802	2.65	28.29	39.13	0.55
1	1950	PF 1	75.10	1114.00	1116.11		1116.17	0.003979	2.01	37.44	25.05	0.29
1	1800	PF 1	357.50	1110.90	1113.96		1114.26	0.017951	4.40	81.21	52.60	0.62
1	1650	PF 1	357.50	1108.00	1111.37		1111.55	0.017802	3.41	104.95	99.52	0.58
1	1500	PF 1	357.50	1106.00	1110.29		1110.36	0.004275	2.06	173.22	119.25	0.30
1	1350	PF 1	357.50	1103.50	1108.85		1109.26	0.014137	5.15	69.44	27.96	0.58
1	1250	PF 1	357.50	1100.00	1105.39	1105.39	1106.74	0.051121	9.32	38.37	41.04	1.00
1	1150	PF 1	357.50	1090.40	1094.21	1094.00	1094.91	0.033103	6.70	53.37	28.43	0.86
1	1000	PF 1	357.50	1085.10	1088.78	1088.70	1089.27	0.042041	5.60	63.85	53.96	0.91







RIPRAP ENERGY DISSIPATER

2006 REGIONAL SUPPLEMENT

200-1.6.3 Quality Requirements

Page 43 - First paragraph, second sentence change "60 days" to "30 days".

200-1.7 Selection of Riprap and Filter Blanket Material

Table 200-1.7

Velocity Meters/Sec (Ft/Sec) (1)	Rock Class (2)	Rip Rap Thic k- Nes s "T"	Filter Blanket Upper Layer(s) (3)			
			Option 1 Sect. 200 (4)	Optio n 2 Sect.4 00 (4)	Option 3 (5)	Lower Layer (6)
2 (6-7)	No. 3 Backing	0.6	5 mm (3/16")	C2	D.G.	----
2.2 (7-8)	No. 2 Backing	1.0	6 mm (1/4")	B3	D.G.	----
2.6 (8-9.5)	Facing	1.4	9.5 mm (3/8")	----	D.G.	----
3 (9.5-11)	Light	2.0	12.5 mm (1/2")	----	25mm (3/4"- 1-1/2")	----
3.5 (11-13)	220 kg (1/4 Ton)	2.7	19 mm (3/4")	----	25mm (3/4"- 1-1/2")	SAND
4 (13-15)	450 kg (1/2 Ton)	3.4	25 mm (1")	----	25mm (3/4"- 1-1/2")	SAND
4.5 (15-17)	900 kg (1 Ton)	4.3	37.5 mm (1-1/2")	----	TYPE B	SAND
5.5 (17-20)	1.8Tonne (2 Ton)	5.4	50 mm (2")	----	TYPE B	SAND

See Section 200-1.6. see also Table 200-1.6 (A)

Practical use of this table is limited to situations where "T" is less than inside diameter.

- (1) Average velocity in pipe or bottom velocity in energy dissipater, whichever is greater.
- (2) If desired rip rap and filter blanket class is not available, use next larger class.
- (3) Filter blanket thickness = 0.3 Meter (1 Foot) or "T", whichever is less.
- (4) Standard Specifications for Public Works Construction.
- (5) D.G. = Disintegrated Granite, 1mm to 10mm.

P.B. = Processed Miscellaneous Base.

LOCATION	V	RIPRAP TYPE
NODE 2271-2274	7.3 FPS	4'X10'X1' NO. 2 BACKING ROCK CLASS OVER ¼" FILTER BLANKET , D-40 TYPE 2
NODE 218-219	10.6 FPS	8'X14'X2' LIGHT ROCK CLASS OVER ½" FILTER BLANKET, D-40 TYPE 2
NODE 223-224	12.6 FPS	4'X10'X2.7' ¼ TON ROCK CLASS OVER ¾" FILTER BLANKET OVER 6" SAND, D-40 TYPE 2
NODE 212-215	14.0 FPS	4'X10'X3.4' ½ TON ROCK CLASS OVER 1" FITLER BLANKET OVER 6" SAND, D-40 TYPE 2



LEGEND

NODE

TRIBUTARY AREA
BOUNDARY

SUB-AREA INFORMATION

DIRECTION OF FLOW

SUBDIVISION BOUNDARY

CONFLUENT FLOWRATE

102

UPSTREAM
NODE

UPSTREAM
ELEVATION

FLOW LENGTH
(FT)

Tc (MIN)

DOWNSTREAM
NODE

DOWNSTREAM
ELEVATION

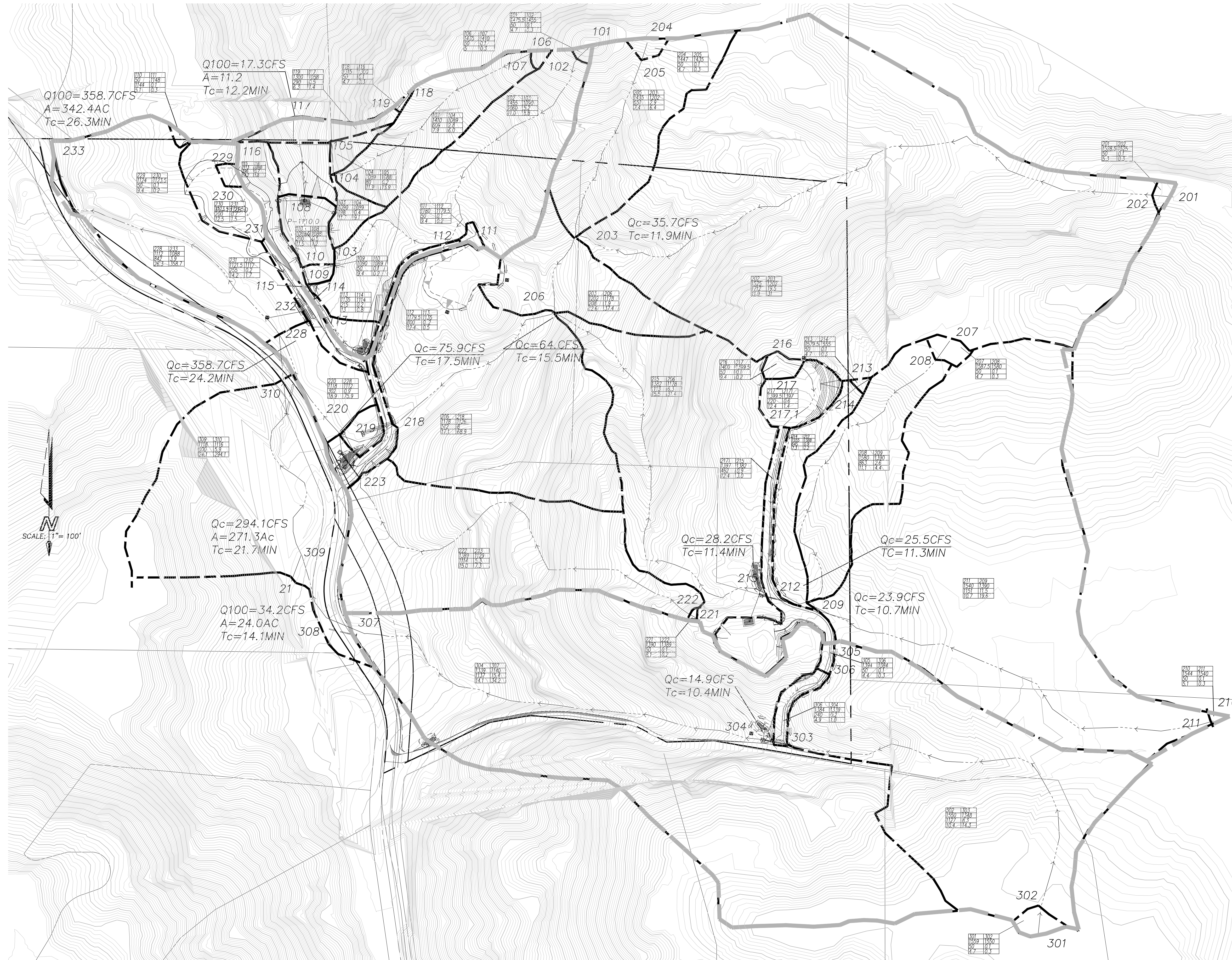
SUBAREA
(AC)

CUMULATIVE
FLOWRATE
(CFS)

Qc

PRE-DEV. HYDROLOGY MAP
GILDRED TPM
COUNTY OF SAN DIEGO





LEGEND

NODE

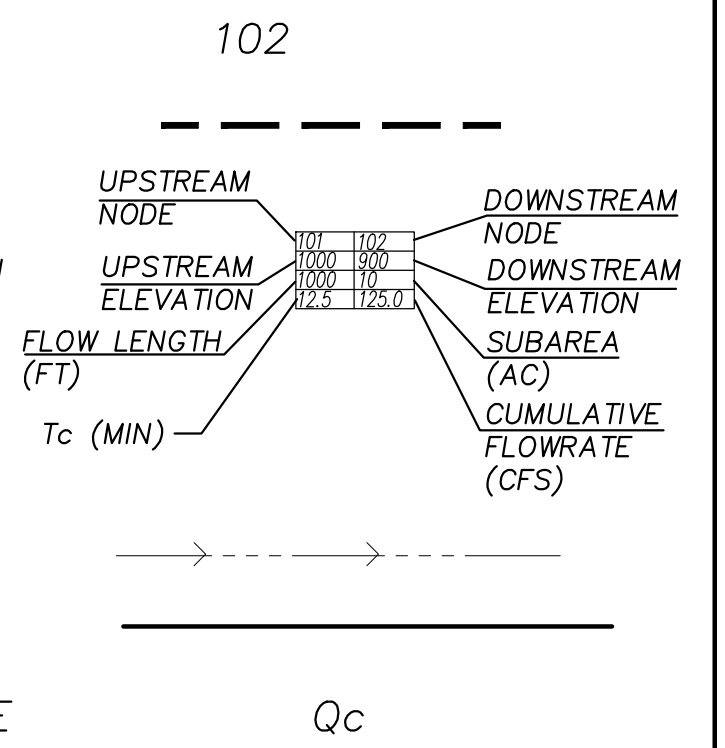
TRIBUTARY AREA
BOUNDARY

SUB-AREA INFORMATION

DIRECTION OF FLOW

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CONFLUENT FLOWRATE



POST-DEV. HYDROLOGY MAP
GILDRED TPM
COUNTY OF SAN DIEGO