

**A CEQA LEVEL OF
PRELIMINARY DRAINAGE REPORT
FOR:**

**LILAC HILLS RANCH
IMPLEMENTING TM
TM 5572 RPL-3**

San Diego County, California

PREPARED FOR:

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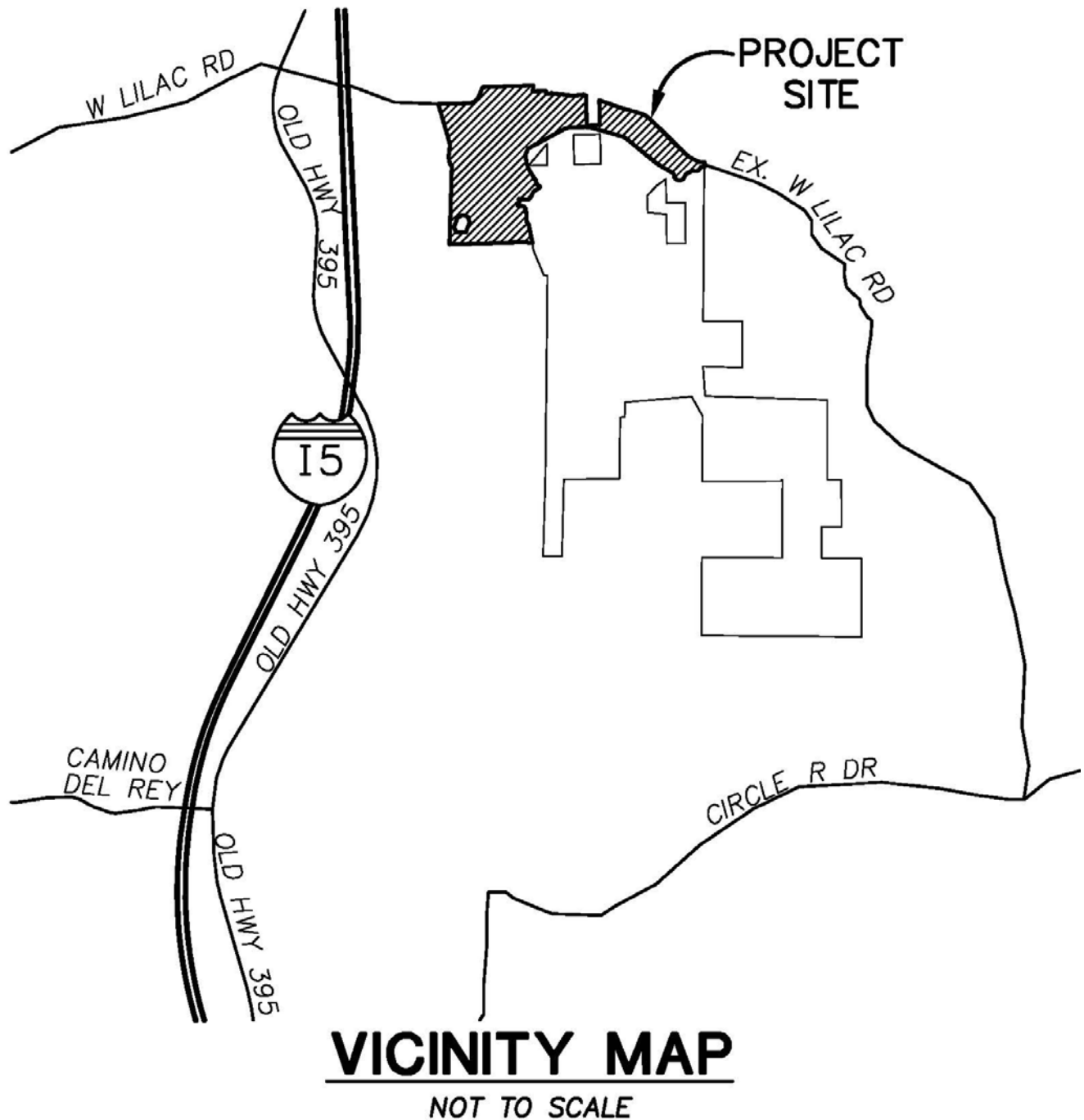
TABLE OF CONTENTS

	PAGE
DISCUSSION	5-13
PURPOSE OF PROJECT	5
VICINITY MAP	5
DESCRIPTION OF WATERSHED	7
METHODOLOGY	9-14
SUMMARY	15
DECLARATION OF RESPONSIBLE CHARGE	17
100-YEAR HYDROLOGY CALCULATIONS	19-130
PRE-DEVELOPMENT CONDITIONS	19-38
POST-DEVELOPMENT CONDITIONS	39-130
100-YEAR HYDROGRAPH CALCULATIONS	131-158
PRE-DEVELOPMENT CONDITIONS	131-144
POST-DEVELOPMENT CONDITIONS	145-158
APPENDIX	159
HYDROLOGIC SOILS GROUP MAP	
RUNOFF COEFFICIENT	
100-YEAR, 6-HOUR PRECIPITATION	
RUNOFF CURVE NUMBERS	
HYDROLOGY MAPS	161
ADDENDUM FOR PERMEABLE PAVERS	163-165

DISCUSSION

PURPOSE FOR PROJECT

The purpose of this project is to subdivide 115 acres of rural land into a master-planned community with residential, parks and extensive open spaces. The project site situated on the northeasterly upstream of a much larger watershed that drains southwesterly into San Luis Rey River.



DESCRIPTION OF WATERSHED

The project is located on the east side of Interstate 15, southerly of W. Lilac Road in the County of San Diego, State of California.

This project is the first implementing portion of a 1746 lot master-planned community – Lilac Hills Ranch. The project proposes the construction of 350 dwelling units with paved roadways and parks and a sewer treatment plant on the northerly tip of the future master-planned community. The implementing TM consists of 114.9 Acres within the project boundary and approximately 11.0 acres outside of the project boundary that includes approximately the additional grading for the construction of the access road, sewer treatment plant and a detention basin. The total project disturbance footprint is approximately 125.9 acres. For purposes of comparison, only the areas with the disturbance footprint is modeled and analyzed.

The project site is situated within the northerly sub drainage basin – one of three sub basins that flows through the overall master-planned project boundary. The northerly sub drainage basin is approximately 395 acres. Under the pre-development conditions, the runoff from this sub-basin flows into a series of natural channels in a general northeasterly to southwesterly direction. These natural channels confluence into a major natural channel approximately 1300' southerly of the southerly project tip. This confluence point is designated as the project final discharge point.

The overall grading design of the project will follow the existing landform to minimize both on-site and off-site runoff diversion. Under the proposed conditions, the northerly portion of the site, adjacent to the existing W. Lilac Road, drains into a proposed underground storm drainage system that conveys the runoff westerly along the proposed Street Z then southerly along the proposed extension of W. Lilac Road to a proposed detention basin located just southerly of the project boundary. The southerly tip of the westerly half of the project drains to a low point located in the proposed street, then the runoff is conveyed onto the easterly natural terrain via a proposed storm drain, the runoff then flows southerly in the natural channel then confluent with the mitigated runoff from the detention basin before leaving the project southerly boundary at the final discharge point.

The purpose of this report is to determine the peak runoff rates under the post-development conditions and to size the preliminary storm drain pipes. The runoff volume will also be analyzed to size the detention basin to mitigate the anticipated increase in discharge volume.

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 isopleth 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

PEAK DISCHARGE RATE

DIS-CHARGE POINT	PRE-DEVELOPMENT CONDITIONS						DIS-CHARGE POINT	POST-DEVELOPMENT CONDITIONS						PROPOSED MITIGATION
	C	Tc (Min)	I (in)	A (Ac)	V (fps)	Q (cfs)		C	Tc (Min)	I (in)	A (Ac)	V (fps)	Q (cfs)	
Node 118	0.30	27.8	3.04	395.5	7.3	384.7	Node 1132	0.30	19.5	4.5	391	7.5*	482.9*	Runoff is directed into a proposed detention with a restricted outlet structure such that the discharge from the detention basin is at or less than that of the pre-development conditions.

*unmitigated velocity and runoff rate

RUNOFF VOLUME

	BASIN 100
PRE-DEV (Ac-Ft)	141.1
POST-DEV(Ac-Ft)	150.5
DETENTION VOL(Ac-Ft)	9.4
DESIGN VOL (Ac-Ft)	12.5

The proposed detention pond for each sub-basin is adequately size to store all the excessive runoff volume. Their outlet structures will restrict the peak runoff rate exiting these ponds at or below that of under the pre-development conditions. Based on the minimum volume requirement –a detention pond in the volume of 12.5 Ac-Ft is proposed for the development. The proposed detention basin has adequate storage volume to hold the entire excess runoff from the proposed development, the outlet structure will be designed to release no more than 78 cfs to from the detention basin such that the total peak discharge from the entire project site at the final discharge point is less than that of the pre-development conditions. The proposed development will not adversely affect the 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 6-30-14

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 *****

* LILAC HILLS RANCH *
* IMPLEMENTATION TM *
* PRE-DEVELOPMENT, 100-YEAR STORM *

FILE NAME: 1037EX.DAT
TIME/DATE OF STUDY: 09:50 02/17/2012

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

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

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.*

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+-----+

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*****
FLOW PROCESS FROM NODE      101.00 TO NODE      102.00 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) =      60.00
UPSTREAM ELEVATION(FEET) =    1042.00
DOWNSTREAM ELEVATION(FEET) =    1038.00
ELEVATION DIFFERENCE(FEET) =      4.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =      5.482
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.690
SUBAREA RUNOFF(CFS) =      0.31
TOTAL AREA(ACRES) =      0.10    TOTAL RUNOFF(CFS) =      0.31

*****
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) =    1038.00  DOWNSTREAM(FEET) =    826.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  2700.00  CHANNEL SLOPE =  0.0785
CHANNEL BASE(FEET) =    15.00  "Z" FACTOR =    2.000
MANNING'S FACTOR = 0.060  MAXIMUM DEPTH(FEET) =    2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.488
LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    43.46
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    4.60
AVERAGE FLOW DEPTH(FEET) =    0.58  TRAVEL TIME(MIN.) =    9.79
Tc(MIN.) = 15.27
SUBAREA AREA(ACRES) =    57.80    SUBAREA RUNOFF(CFS) =    77.82
AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
TOTAL AREA(ACRES) =    57.90    PEAK FLOW RATE(CFS) =    77.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.83  FLOW VELOCITY(FEET/SEC.) =    5.66
LONGEST FLOWPATH FROM NODE      101.00 TO NODE      103.00 =  2760.00 FEET.

*****
FLOW PROCESS FROM NODE      103.00 TO NODE      103.00 IS CODE =    1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) = 15.27
RAINFALL INTENSITY(INCH/HR) =  4.49
TOTAL STREAM AREA(ACRES) =    57.90
PEAK FLOW RATE(CFS) AT CONFLUENCE =    77.98

*****
FLOW PROCESS FROM NODE      104.00 TO NODE      105.00 IS CODE =   21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====

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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) = 60.00
 UPSTREAM ELEVATION(FEET) = 928.00
 DOWNSTREAM ELEVATION(FEET) = 927.00
 ELEVATION DIFFERENCE(FEET) = 1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 8.702
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.450
 SUBAREA RUNOFF(CFS) = 0.23
 TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.23

FLOW PROCESS FROM NODE 105.00 TO NODE 103.00 IS CODE = 51

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

ELEVATION DATA: UPSTREAM(FEET) = 927.00 DOWNSTREAM(FEET) = 826.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1200.00 CHANNEL SLOPE = 0.0842
 CHANNEL BASE(FEET) = 14.00 "Z" FACTOR = 5.000
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.502
 LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 81
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.84
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.08
 AVERAGE FLOW DEPTH(FEET) = 0.31 TRAVEL TIME(MIN.) = 6.50
 Tc(MIN.) = 15.20
 SUBAREA AREA(ACRES) = 20.70 SUBAREA RUNOFF(CFS) = 27.96
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
 TOTAL AREA(ACRES) = 20.80 PEAK FLOW RATE(CFS) = 28.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 3.87
 LONGEST FLOWPATH FROM NODE 104.00 TO NODE 103.00 = 1260.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 15.20
 RAINFALL INTENSITY(INCH/HR) = 4.50
 TOTAL STREAM AREA(ACRES) = 20.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 28.12

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	77.98	15.27	4.488	57.90
2	28.12	15.20	4.502	20.80

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	105.74	15.20	4.502
2	106.02	15.27	4.488

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 106.02 Tc(MIN.) = 15.27

TOTAL AREA(ACRES) = 78.70

LONGEST FLOWPATH FROM NODE 101.00 TO NODE 103.00 = 2760.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 106.00 IS CODE = 51

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

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

ELEVATION DATA: UPSTREAM(FEET) = 826.00 DOWNSTREAM(FEET) = 794.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 780.00 CHANNEL SLOPE = 0.0410

CHANNEL BASE(FEET) = 24.00 "Z" FACTOR = 2.500

MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 2.00

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.017

LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000

SOIL CLASSIFICATION IS "C"

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

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 113.67

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.54

AVERAGE FLOW DEPTH(FEET) = 0.95 TRAVEL TIME(MIN.) = 2.86

Tc(MIN.) = 18.13

SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 15.31

AREA-AVERAGE RUNOFF COEFFICIENT = 0.300

TOTAL AREA(ACRES) = 91.40 PEAK FLOW RATE(CFS) = 110.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.93 FLOW VELOCITY(FEET/SEC.) = 4.48

LONGEST FLOWPATH FROM NODE 101.00 TO NODE 106.00 = 3540.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 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.) = 18.13

RAINFALL INTENSITY(INCH/HR) = 4.02

TOTAL STREAM AREA(ACRES) = 91.40

PEAK FLOW RATE(CFS) AT CONFLUENCE = 110.20

FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 21

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

LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000

SOIL CLASSIFICATION IS "C"

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 60.00

UPSTREAM ELEVATION(FEET) = 958.00

DOWNSTREAM ELEVATION(FEET) = 956.00

```

ELEVATION DIFFERENCE(FEET) =      2.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =      7.467
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =      7.120
SUBAREA RUNOFF(CFS) =      0.21
TOTAL AREA(ACRES) =      0.10    TOTAL RUNOFF(CFS) =      0.21

*****
FLOW PROCESS FROM NODE      108.00 TO NODE      106.00 IS CODE =   51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =      956.00  DOWNSTREAM(FEET) =      794.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1030.00    CHANNEL SLOPE =      0.1573
CHANNEL BASE(FEET) =      6.00    "Z" FACTOR =      1.500
MANNING'S FACTOR = 0.060    MAXIMUM DEPTH(FEET) =      2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =      5.370
LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =      81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      8.18
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =      4.19
AVERAGE FLOW DEPTH(FEET) =      0.30    TRAVEL TIME(MIN.) =      4.09
Tc(MIN.) = 11.56
SUBAREA AREA(ACRES) =      9.70    SUBAREA RUNOFF(CFS) =      15.63
AREA-AVERAGE RUNOFF COEFFICIENT =      0.300
TOTAL AREA(ACRES) =      9.80    PEAK FLOW RATE(CFS) =      15.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =      0.45    FLOW VELOCITY(FEET/SEC.) =      5.29
LONGEST FLOWPATH FROM NODE      107.00 TO NODE      106.00 = 1090.00 FEET.

*****
FLOW PROCESS FROM NODE      106.00 TO NODE      106.00 IS CODE =    1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS =      2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) = 11.56
RAINFALL INTENSITY(INCH/HR) =      5.37
TOTAL STREAM AREA(ACRES) =      9.80
PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.79

** CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)      (INCH/HOUR)      (ACRE)
    1      110.20      18.13          4.017          91.40
    2       15.79      11.56          5.370           9.80

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       98.23      11.56          5.370
    2      122.01      18.13          4.017

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 122.01 Tc(MIN.) = 18.13

TOTAL AREA(ACRES) = 101.20

LONGEST FLOWPATH FROM NODE 101.00 TO NODE 106.00 = 3540.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 109.00 IS CODE = 51

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

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

ELEVATION DATA: UPSTREAM(FEET) = 794.00 DOWNSTREAM(FEET) = 786.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 144.00 CHANNEL SLOPE = 0.0556

CHANNEL BASE(FEET) = 5.00 "Z" FACTOR = 2.000

MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 5.00

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.968

TURF FAIR COVER RUNOFF COEFFICIENT = .3000

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 77

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 122.43

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.90

AVERAGE FLOW DEPTH(FEET) = 1.98 TRAVEL TIME(MIN.) = 0.35

Tc(MIN.) = 18.48

SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.83

AREA-AVERAGE RUNOFF COEFFICIENT = 0.300

TOTAL AREA(ACRES) = 101.90 PEAK FLOW RATE(CFS) = 122.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.98 FLOW VELOCITY(FEET/SEC.) = 6.88

LONGEST FLOWPATH FROM NODE 101.00 TO NODE 109.00 = 3684.00 FEET.

FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

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

LEGUMES(STRAIGHT ROW) GOOD 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) = 989.00

DOWNSTREAM ELEVATION(FEET) = 988.00

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 111.00 TO NODE 112.00 IS CODE = 51

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

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

ELEVATION DATA: UPSTREAM(FEET) = 988.00 DOWNSTREAM(FEET) = 842.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1340.00 CHANNEL SLOPE = 0.1090
 CHANNEL BASE(FEET) = 16.00 "Z" FACTOR = 2.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.183
 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) = 17.32
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.40
 AVERAGE FLOW DEPTH(FEET) = 0.20 TRAVEL TIME(MIN.) = 4.13
 Tc(MIN.) = 12.21
 SUBAREA AREA(ACRES) = 18.20 SUBAREA RUNOFF(CFS) = 33.96
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.360
 TOTAL AREA(ACRES) = 18.30 PEAK FLOW RATE(CFS) = 34.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29 FLOW VELOCITY(FEET/SEC.) = 7.03
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1390.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 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.) = 12.21
 RAINFALL INTENSITY(INCH/HR) = 5.18
 TOTAL STREAM AREA(ACRES) = 18.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 34.12

FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 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) = 978.00
 DOWNSTREAM ELEVATION(FEET) = 977.00
 ELEVATION DIFFERENCE(FEET) = 1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.476
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.114
 SUBAREA RUNOFF(CFS) = 0.26
 TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.26

FLOW PROCESS FROM NODE 114.00 TO NODE 112.00 IS CODE = 51

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

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

=====
 ELEVATION DATA: UPSTREAM(FEET) = 977.00 DOWNSTREAM(FEET) = 842.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1870.00 CHANNEL SLOPE = 0.0722
 CHANNEL BASE(FEET) = 24.00 "Z" FACTOR = 10.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.441

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) = 17.00
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.87
 AVERAGE FLOW DEPTH(FEET) = 0.17 TRAVEL TIME(MIN.) = 8.04
 Tc(MIN.) = 15.52
 SUBAREA AREA(ACRES) = 19.90 SUBAREA RUNOFF(CFS) = 31.82
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.360
 TOTAL AREA(ACRES) = 20.00 PEAK FLOW RATE(CFS) = 31.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25 FLOW VELOCITY(FEET/SEC.) = 4.89
 LONGEST FLOWPATH FROM NODE 113.00 TO NODE 112.00 = 1920.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 15.52
 RAINFALL INTENSITY(INCH/HR) = 4.44
 TOTAL STREAM AREA(ACRES) = 20.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 31.98

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	34.12	12.21	5.183	18.30
2	31.98	15.52	4.441	20.00

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	59.28	12.21	5.183
2	61.21	15.52	4.441

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 61.21 Tc(MIN.) = 15.52
 TOTAL AREA(ACRES) = 38.30
 LONGEST FLOWPATH FROM NODE 113.00 TO NODE 112.00 = 1920.00 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) = 842.00 DOWNSTREAM(FEET) = 786.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 875.00 CHANNEL SLOPE = 0.0640
 CHANNEL BASE(FEET) = 4.00 "Z" FACTOR = 2.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.200
 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) = 68.85
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.37
 AVERAGE FLOW DEPTH(FEET) = 1.08 TRAVEL TIME(MIN.) = 1.41
 Tc(MIN.) = 16.93
 SUBAREA AREA(ACRES) = 10.10 SUBAREA RUNOFF(CFS) = 15.27
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.360
 TOTAL AREA(ACRES) = 48.40 PEAK FLOW RATE(CFS) = 73.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 1.11 FLOW VELOCITY(FEET/SEC.) = 10.58
 LONGEST FLOWPATH FROM NODE 113.00 TO NODE 109.00 = 2795.00 FEET.

FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE = 11

>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	73.15	16.93	4.200	48.40

LONGEST FLOWPATH FROM NODE 113.00 TO NODE 109.00 = 2795.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	122.01	18.48	3.968	101.90

LONGEST FLOWPATH FROM NODE 101.00 TO NODE 109.00 = 3684.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	184.91	16.93	4.200
2	191.13	18.48	3.968

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 191.13 Tc(MIN.) = 18.48
 TOTAL AREA(ACRES) = 150.30

FLOW PROCESS FROM NODE 109.00 TO NODE 109.00 IS CODE = 12

>>>>>CLEAR MEMORY BANK # 1 <<<<<

FLOW PROCESS FROM NODE 109.00 TO NODE 115.00 IS CODE = 51

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

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

ELEVATION DATA: UPSTREAM(FEET) = 786.00 DOWNSTREAM(FEET) = 772.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 526.00 CHANNEL SLOPE = 0.0266
 CHANNEL BASE(FEET) = 6.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 5.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.762
 LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000

SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 81
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 194.92
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.49
 AVERAGE FLOW DEPTH(FEET) = 2.58 TRAVEL TIME(MIN.) = 1.60
 Tc(MIN.) = 20.08
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 7.56
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.319
 TOTAL AREA(ACRES) = 157.00 PEAK FLOW RATE(CFS) = 191.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 2.55 FLOW VELOCITY(FEET/SEC.) = 5.48
 LONGEST FLOWPATH FROM NODE 101.00 TO NODE 115.00 = 4210.00 FEET.

FLOW PROCESS FROM NODE 115.00 TO NODE 115.00 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.) = 20.08
 RAINFALL INTENSITY(INCH/HR) = 3.76
 TOTAL STREAM AREA(ACRES) = 157.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 191.13

FLOW PROCESS FROM NODE 116.00 TO NODE 117.00 IS CODE = 21

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

=====

LEGUMES(STRAIGHT ROW) GOOD 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) = 895.50
 DOWNSTREAM ELEVATION(FEET) = 894.00
 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 117.00 TO NODE 115.00 IS CODE = 51

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 894.00 DOWNSTREAM(FEET) = 772.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1089
 CHANNEL BASE(FEET) = 6.00 "Z" FACTOR = 2.000
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 5.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.152
 LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 81
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.47
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.54
 AVERAGE FLOW DEPTH(FEET) = 0.32 TRAVEL TIME(MIN.) = 5.27

Tc(MIN.) = 12.33
 SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 14.07
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
 TOTAL AREA(ACRES) = 9.20 PEAK FLOW RATE(CFS) = 14.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 4.44
 LONGEST FLOWPATH FROM NODE 116.00 TO NODE 115.00 = 1170.00 FEET.

FLOW PROCESS FROM NODE 115.00 TO NODE 115.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 12.33
 RAINFALL INTENSITY(INCH/HR) = 5.15
 TOTAL STREAM AREA(ACRES) = 9.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 14.22

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	191.13	20.08	3.762	157.00
2	14.22	12.33	5.152	9.20

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	131.60	12.33	5.152
2	201.52	20.08	3.762

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 201.52 Tc(MIN.) = 20.08
 TOTAL AREA(ACRES) = 166.20
 LONGEST FLOWPATH FROM NODE 101.00 TO NODE 115.00 = 4210.00 FEET.

FLOW PROCESS FROM NODE 115.00 TO NODE 118.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 772.00 DOWNSTREAM(FEET) = 636.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1966.00 CHANNEL SLOPE = 0.0692
 CHANNEL BASE(FEET) = 24.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 5.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.269
 LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 81
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 221.20
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.71
 AVERAGE FLOW DEPTH(FEET) = 1.19 TRAVEL TIME(MIN.) = 4.88
 Tc(MIN.) = 24.96

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SUBAREA AREA(ACRES) =    40.10      SUBAREA RUNOFF(CFS) =    39.33
AREA-AVERAGE RUNOFF COEFFICIENT =  0.314
TOTAL AREA(ACRES) =    206.30      PEAK FLOW RATE(CFS) =    211.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.16    FLOW VELOCITY(FEET/SEC.) =  6.62
LONGEST FLOWPATH FROM NODE    101.00 TO NODE    118.00 =  6176.00 FEET.

*****
FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =  10
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>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
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*****
FLOW PROCESS FROM NODE    119.00 TO NODE    120.00 IS CODE =  21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
LEGUMES(STRAIGHT ROW) GOOD 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) =    935.50
DOWNSTREAM ELEVATION(FEET) =    934.00
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    120.00 TO NODE    118.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    934.00    DOWNSTREAM(FEET) =    636.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  2105.00    CHANNEL SLOPE =  0.1416
CHANNEL BASE(FEET) =    14.00    "Z" FACTOR =  2.000
MANNING'S FACTOR = 0.060    MAXIMUM DEPTH(FEET) =  5.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.449
LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    19.24
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  4.17
AVERAGE FLOW DEPTH(FEET) =  0.32    TRAVEL TIME(MIN.) =  8.42
Tc(MIN.) = 15.48
SUBAREA AREA(ACRES) =    26.90      SUBAREA RUNOFF(CFS) =    35.90
AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
TOTAL AREA(ACRES) =    27.00      PEAK FLOW RATE(CFS) =    36.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.46    FLOW VELOCITY(FEET/SEC.) =  5.24
LONGEST FLOWPATH FROM NODE    119.00 TO NODE    118.00 =  2155.00 FEET.

*****
FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =  10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<
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*****
FLOW PROCESS FROM NODE      121.00 TO NODE      122.00 IS CODE =  21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
LEGUMES(STRAIGHT ROW) GOOD 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) =    937.00
DOWNSTREAM ELEVATION(FEET) =    936.00
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      122.00 TO NODE      123.00 IS CODE =  51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    936.00  DOWNSTREAM(FEET) =    800.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1182.00  CHANNEL SLOPE =  0.1151
CHANNEL BASE(FEET) =    40.00  "Z" FACTOR =  3.000
MANNING'S FACTOR = 0.020  MAXIMUM DEPTH(FEET) =  5.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.991
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) =    10.70
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  4.04
AVERAGE FLOW DEPTH(FEET) =  0.07  TRAVEL TIME(MIN.) =  4.87
Tc(MIN.) = 12.95
SUBAREA AREA(ACRES) =    11.60  SUBAREA RUNOFF(CFS) =    20.84
AREA-AVERAGE RUNOFF COEFFICIENT =  0.359
TOTAL AREA(ACRES) =    11.70  PEAK FLOW RATE(CFS) =    20.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.10  FLOW VELOCITY(FEET/SEC.) =  5.41
LONGEST FLOWPATH FROM NODE      121.00 TO NODE      123.00 = 1232.00 FEET.

*****
FLOW PROCESS FROM NODE      123.00 TO NODE      123.00 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.) = 12.95
RAINFALL INTENSITY(INCH/HR) =  4.99
TOTAL STREAM AREA(ACRES) =    11.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =    20.99

*****
FLOW PROCESS FROM NODE      124.00 TO NODE      125.00 IS CODE =  21

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>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 71
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 1015.00
DOWNSTREAM ELEVATION(FEET) = 1014.00
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 125.00 TO NODE 123.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1014.00 DOWNSTREAM(FEET) = 800.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 2690.00 CHANNEL SLOPE = 0.0796
CHANNEL BASE(FEET) = 12.00 "Z" FACTOR = 10.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 5.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.793
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) = 35.61
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.82
AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 11.74
Tc(MIN.) = 19.82
SUBAREA AREA(ACRES) = 49.80 SUBAREA RUNOFF(CFS) = 68.00
AREA-AVERAGE RUNOFF COEFFICIENT = 0.360
TOTAL AREA(ACRES) = 49.90 PEAK FLOW RATE(CFS) = 68.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.75 FLOW VELOCITY(FEET/SEC.) = 4.64
LONGEST FLOWPATH FROM NODE 124.00 TO NODE 123.00 = 2740.00 FEET.

*****
FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 19.82
RAINFALL INTENSITY(INCH/HR) = 3.79
TOTAL STREAM AREA(ACRES) = 49.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 68.11

** CONFLUENCE DATA **

```

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	20.99	12.95	4.991	11.70
2	68.11	19.82	3.793	49.90

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	65.50	12.95	4.991
2	84.07	19.82	3.793

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 84.07 Tc(MIN.) = 19.82
TOTAL AREA(ACRES) = 61.60
LONGEST FLOWPATH FROM NODE 124.00 TO NODE 123.00 = 2740.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 126.00 IS CODE = 51

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

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

ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 787.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 542.00 CHANNEL SLOPE = 0.0240
CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 5.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.554
LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 81
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 86.25
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.29
AVERAGE FLOW DEPTH(FEET) = 1.54 TRAVEL TIME(MIN.) = 2.10
Tc(MIN.) = 21.93
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 4.37
AREA-AVERAGE RUNOFF COEFFICIENT = 0.356
TOTAL AREA(ACRES) = 65.70 PEAK FLOW RATE(CFS) = 84.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.51 FLOW VELOCITY(FEET/SEC.) = 4.26
LONGEST FLOWPATH FROM NODE 124.00 TO NODE 126.00 = 3282.00 FEET.

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 21.93
RAINFALL INTENSITY(INCH/HR) = 3.55
TOTAL STREAM AREA(ACRES) = 65.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 84.07

FLOW PROCESS FROM NODE 127.00 TO NODE 128.00 IS CODE = 21

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

LEGUMES(STRAIGHT ROW) GOOD 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) = 898.00
 DOWNSTREAM ELEVATION(FEET) = 896.00
 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 128.00 TO NODE 126.00 IS CODE = 51

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

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

ELEVATION DATA: UPSTREAM(FEET) = 896.00 DOWNSTREAM(FEET) = 787.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1470.00 CHANNEL SLOPE = 0.0741
 CHANNEL BASE(FEET) = 25.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 5.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.208
 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) = 13.00
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.34
 AVERAGE FLOW DEPTH(FEET) = 0.22 TRAVEL TIME(MIN.) = 10.46
 Tc(MIN.) = 16.88
 SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 24.08
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.360
 TOTAL AREA(ACRES) = 16.00 PEAK FLOW RATE(CFS) = 24.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 FLOW VELOCITY(FEET/SEC.) = 3.01
 LONGEST FLOWPATH FROM NODE 127.00 TO NODE 126.00 = 1520.00 FEET.

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

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

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 16.88
 RAINFALL INTENSITY(INCH/HR) = 4.21
 TOTAL STREAM AREA(ACRES) = 16.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 24.21

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	84.07	21.93	3.554	65.70
2	24.21	16.88	4.208	16.00

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	95.22	16.88	4.208
2	104.52	21.93	3.554

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 104.52 Tc(MIN.) = 21.93

TOTAL AREA(ACRES) = 81.70

LONGEST FLOWPATH FROM NODE 124.00 TO NODE 126.00 = 3282.00 FEET.

FLOW PROCESS FROM NODE 126.00 TO NODE 129.00 IS CODE = 51

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

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

ELEVATION DATA: UPSTREAM(FEET) = 787.00 DOWNSTREAM(FEET) = 720.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 1205.00 CHANNEL SLOPE = 0.0556

CHANNEL BASE(FEET) = 25.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 5.00

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.178

CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 71

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 111.10

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.84

AVERAGE FLOW DEPTH(FEET) = 0.83 TRAVEL TIME(MIN.) = 4.15

Tc(MIN.) = 26.07

SUBAREA AREA(ACRES) = 13.80 SUBAREA RUNOFF(CFS) = 13.16

AREA-AVERAGE RUNOFF COEFFICIENT = 0.349

TOTAL AREA(ACRES) = 95.50 PEAK FLOW RATE(CFS) = 105.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.81 FLOW VELOCITY(FEET/SEC.) = 4.75

LONGEST FLOWPATH FROM NODE 124.00 TO NODE 129.00 = 4487.00 FEET.

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 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.) = 26.07

RAINFALL INTENSITY(INCH/HR) = 3.18

TOTAL STREAM AREA(ACRES) = 95.50

PEAK FLOW RATE(CFS) AT CONFLUENCE = 105.80

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 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) = 963.00

DOWNSTREAM ELEVATION(FEET) = 962.00

ELEVATION DIFFERENCE(FEET) = 1.00

SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.476

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.114

SUBAREA RUNOFF(CFS) = 0.26
 TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.26

FLOW PROCESS FROM NODE 131.00 TO NODE 129.00 IS CODE = 51

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

ELEVATION DATA: UPSTREAM(Feet) = 962.00 DOWNSTREAM(Feet) = 720.00
 CHANNEL LENGTH THRU SUBAREA(Feet) = 3400.00 CHANNEL SLOPE = 0.0712
 CHANNEL BASE(Feet) = 18.00 "Z" FACTOR = 5.000
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(Feet) = 5.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.416
 LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 81
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.22
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(Feet/Sec.) = 3.58
 AVERAGE FLOW DEPTH(Feet) = 0.45 TRAVEL TIME(Min.) = 15.84
 Tc(Min.) = 23.32
 SUBAREA AREA(ACRES) = 55.60 SUBAREA RUNOFF(CFS) = 56.97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
 TOTAL AREA(ACRES) = 55.70 PEAK FLOW RATE(CFS) = 57.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(Feet) = 0.62 FLOW VELOCITY(Feet/Sec.) = 4.36
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 129.00 = 3450.00 FEET.

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(Min.) = 23.32
 RAINFALL INTENSITY(INCH/HR) = 3.42
 TOTAL STREAM AREA(ACRES) = 55.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 57.10

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (Min.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	105.80	26.07	3.178	95.50
2	57.10	23.32	3.416	55.70

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	155.54	23.32	3.416
2	158.93	26.07	3.178

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 158.93 Tc(Min.) = 26.07
 TOTAL AREA(ACRES) = 151.20


```

LONGEST FLOWPATH FROM NODE    124.00 TO NODE    129.00 =  4487.00 FEET.

*****
FLOW PROCESS FROM NODE    129.00 TO NODE    118.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   720.00  DOWNSTREAM(FEET) =   636.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   770.00  CHANNEL SLOPE =   0.1091
CHANNEL BASE(FEET) =   12.00  "Z" FACTOR =   6.000
MANNING'S FACTOR =   0.060  MAXIMUM DEPTH(FEET) =   5.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =   3.048
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  71
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =   163.95
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.35
AVERAGE FLOW DEPTH(FEET) =   1.17  TRAVEL TIME(MIN.) =   1.75
Tc(MIN.) =  27.82
SUBAREA AREA(ACRES) =   11.00  SUBAREA RUNOFF(CFS) =   10.06
AREA-AVERAGE RUNOFF COEFFICIENT =   0.329
TOTAL AREA(ACRES) =   162.20  PEAK FLOW RATE(CFS) =   162.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =   1.17  FLOW VELOCITY(FEET/SEC.) =   7.30
LONGEST FLOWPATH FROM NODE    124.00 TO NODE    118.00 =  5257.00 FEET.

*****
FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 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      162.48    27.82      3.048      162.20
LONGEST FLOWPATH FROM NODE    124.00 TO NODE    118.00 =  5257.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM    RUNOFF    Tc    INTENSITY    AREA
NUMBER    (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
  1      211.84    24.96      3.269      206.30
LONGEST FLOWPATH FROM NODE    101.00 TO NODE    118.00 =  6176.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM    RUNOFF    Tc    INTENSITY
NUMBER    (CFS)    (MIN.)    (INCH/HOUR)
  1      357.61    24.96      3.269
  2      360.00    27.82      3.048

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =   360.00  Tc(MIN.) =   27.82
TOTAL AREA(ACRES) =   368.50

*****
FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =  11
-----
>>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<

```

```

=====
** MAIN STREAM CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)
    1      360.00      27.82      3.048      368.50
LONGEST FLOWPATH FROM NODE      101.00 TO NODE      118.00 = 6176.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)
    1      36.03      15.48      4.449      27.00
LONGEST FLOWPATH FROM NODE      119.00 TO NODE      118.00 = 2155.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)
    1      236.35      15.48      4.449
    2      384.69      27.82      3.048

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 384.69 Tc(MIN.) = 27.82
TOTAL AREA(ACRES) = 395.50

*****
FLOW PROCESS FROM NODE      118.00 TO NODE      118.00 IS CODE = 12
-----
>>>>>CLEAR MEMORY BANK # 1 <<<<<
=====

*****
FLOW PROCESS FROM NODE      118.00 TO NODE      118.00 IS CODE = 12
-----
>>>>>CLEAR MEMORY BANK # 2 <<<<<
=====

```

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 1982-2012 Advanced Engineering Software (aes)
Ver. 19.0 Release Date: 06/01/2012 License ID 1503

Analysis prepared by:

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TEL: 858-587-8070, FAX: 858-587-8750

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

* LILAC HILLS RANCH *
* IMPLEMENTATION TM *
* POST-DEVELOPMENT, 100-YEAR STORM *

FILE NAME: 1037I1P.DAT
TIME/DATE OF STUDY: 10:23 01/23/2013

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	0.020/0.020/0.020	0.50	1.50	0.0313	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.50 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)*(Velocity) Constraint = 5.0 (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<<<<
=====

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 84
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
 UPSTREAM ELEVATION(FEET) = 978.00
 DOWNSTREAM ELEVATION(FEET) = 977.00
 ELEVATION DIFFERENCE(FEET) = 1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.657
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.515
 SUBAREA RUNOFF(CFS) = 0.46
 TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.46

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) = 977.00 DOWNSTREAM(FEET) = 894.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1432.00 CHANNEL SLOPE = 0.0580
 CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 5.000
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.216
 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) = 13.97
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.71
 AVERAGE FLOW DEPTH(FEET) = 0.18 TRAVEL TIME(MIN.) = 6.44
 Tc(MIN.) = 12.09
 SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 24.60
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.361
 TOTAL AREA(ACRES) = 13.2 PEAK FLOW RATE(CFS) = 24.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.25 FLOW VELOCITY(FEET/SEC.) = 4.59
 LONGEST FLOWPATH FROM NODE 101.00 TO NODE 103.00 = 1482.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 891.00 DOWNSTREAM(FEET) = 890.00
 FLOW LENGTH(FEET) = 52.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.60
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 24.88
 PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 12.18
 LONGEST FLOWPATH FROM NODE 101.00 TO NODE 104.00 = 1534.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 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.) = 12.18
RAINFALL INTENSITY(INCH/HR) = 5.19
TOTAL STREAM AREA(ACRES) = 13.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 24.88

*****
FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 925.90
DOWNSTREAM ELEVATION(FEET) = 925.00
ELEVATION DIFFERENCE(FEET) = 0.90
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.859
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.325
SUBAREA RUNOFF(CFS) = 0.45
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.45

*****
FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 922.00 DOWNSTREAM ELEVATION(FEET) = 912.00
STREET LENGTH(FEET) = 825.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.99
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 11.68
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.69
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.97
STREET FLOW TRAVEL TIME(MIN.) = 5.11 Tc(MIN.) = 10.97
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.556
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 6.90

```

TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 7.20

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 14.80
FLOW VELOCITY(FEET/SEC.) = 3.12 DEPTH*VELOCITY(FT*FT/SEC.) = 1.32
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 107.00 = 875.00 FEET.

FLOW PROCESS FROM NODE 107.00 TO NODE 104.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 906.00 DOWNSTREAM(FEET) = 890.00
FLOW LENGTH(FEET) = 231.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.66
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.20
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 11.27
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 104.00 = 1106.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 1

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

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 11.27
RAINFALL INTENSITY(INCH/HR) = 5.46
TOTAL STREAM AREA(ACRES) = 2.40
PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.20

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	24.88	12.18	5.194	13.20
2	7.20	11.27	5.459	2.40

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	30.24	11.27	5.459
2	31.73	12.18	5.194

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 31.73 Tc(MIN.) = 12.18
TOTAL AREA(ACRES) = 15.6
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 104.00 = 1534.00 FEET.

```

FLOW PROCESS FROM NODE      104.00 TO NODE      108.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  890.00  DOWNSTREAM(FEET) =  886.00
FLOW LENGTH(FEET) =  98.00  MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  15.07
ESTIMATED PIPE DIAMETER(INCH) =  24.00  NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =  31.73
PIPE TRAVEL TIME(MIN.) =  0.11  Tc(MIN.) =  12.28
LONGEST FLOWPATH FROM NODE      101.00 TO NODE      108.00 =  1632.00 FEET.

*****
FLOW PROCESS FROM NODE      108.00 TO NODE      108.00 IS CODE =  1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  12.28
RAINFALL INTENSITY(INCH/HR) =  5.16
TOTAL STREAM AREA(ACRES) =  15.60
PEAK FLOW RATE(CFS) AT CONFLUENCE =  31.73

*****
FLOW PROCESS FROM NODE      109.00 TO NODE      110.00 IS CODE =  21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  84
INITIAL SUBAREA FLOW-LENGTH(FEET) =  50.00
UPSTREAM ELEVATION(FEET) =  904.30
DOWNSTREAM ELEVATION(FEET) =  904.00
ELEVATION DIFFERENCE(FEET) =  0.30
SUBAREA OVERLAND TIME OF FLOW(MIN.) =  8.451
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.573
SUBAREA RUNOFF(CFS) =  0.35
TOTAL AREA(ACRES) =  0.10  TOTAL RUNOFF(CFS) =  0.35

*****
FLOW PROCESS FROM NODE      110.00 TO NODE      111.00 IS CODE =  62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION #  1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) =  896.00  DOWNSTREAM ELEVATION(FEET) =  892.00
STREET LENGTH(FEET) =  390.00  CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) =  30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.020
OUTSIDE STREET CROSSFALL(DECIMAL) =  0.020

```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.58
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.33
 HALFSTREET FLOOD WIDTH(FEET) = 10.04
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.29
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.75
 STREET FLOW TRAVEL TIME(MIN.) = 2.84 Tc(MIN.) = 11.29
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.453
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 84
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
 SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 4.42
 TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 4.71

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.93
 FLOW VELOCITY(FEET/SEC.) = 2.63 DEPTH*VELOCITY(FT*FT/SEC.) = 1.01
 LONGEST FLOWPATH FROM NODE 109.00 TO NODE 111.00 = 440.00 FEET.

FLOW PROCESS FROM NODE 111.00 TO NODE 108.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 886.50 DOWNSTREAM(FEET) = 886.00
 FLOW LENGTH(FEET) = 34.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 6.42
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 4.71
 PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 11.38
 LONGEST FLOWPATH FROM NODE 109.00 TO NODE 108.00 = 474.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 1

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

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 11.38
 RAINFALL INTENSITY(INCH/HR) = 5.43
 TOTAL STREAM AREA(ACRES) = 1.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.71

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
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1	31.73	12.28	5.164	15.60
2	4.71	11.38	5.425	1.60

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/HOUR)
1	34.92	11.38	5.425
2	36.22	12.28	5.164

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 36.22 Tc(MIN.) = 12.28

TOTAL AREA(ACRES) = 17.2

LONGEST FLOWPATH FROM NODE 101.00 TO NODE 108.00 = 1632.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 112.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 886.00 DOWNSTREAM(FEET) = 876.00

FLOW LENGTH(FEET) = 206.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 16.59

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 36.22

PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 12.49

LONGEST FLOWPATH FROM NODE 101.00 TO NODE 112.00 = 1838.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 3

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 12.49

RAINFALL INTENSITY(INCH/HR) = 5.11

TOTAL STREAM AREA(ACRES) = 17.20

PEAK FLOW RATE(CFS) AT CONFLUENCE = 36.22

FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 21

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

=====

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 84

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00

UPSTREAM ELEVATION(FEET) = 903.80

DOWNSTREAM ELEVATION(FEET) = 903.00

ELEVATION DIFFERENCE(FEET) = 0.80

SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.094

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.117
 SUBAREA RUNOFF(CFS) = 0.44
 TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.44

FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 896.00 DOWNSTREAM ELEVATION(FEET) = 882.00
 STREET LENGTH(FEET) = 380.00 CURB HEIGHT(INCHES) = 6.0
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.28
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.30
 HALFSTREET FLOOD WIDTH(FEET) = 8.44
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.95
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.16
 STREET FLOW TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 7.70
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.981
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 84
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
 SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 5.65
 TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 6.03

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.98
 FLOW VELOCITY(FEET/SEC.) = 4.56 DEPTH*VELOCITY(FT*FT/SEC.) = 1.58
 LONGEST FLOWPATH FROM NODE 113.00 TO NODE 115.00 = 430.00 FEET.

FLOW PROCESS FROM NODE 115.00 TO NODE 112.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 876.50 DOWNSTREAM(FEET) = 876.00
 FLOW LENGTH(FEET) = 21.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.17
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 6.03
 PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 7.74

```

LONGEST FLOWPATH FROM NODE    113.00 TO NODE    112.00 =    451.00 FEET.

*****
FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =    1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS =    3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM    2 ARE:
TIME OF CONCENTRATION(MIN.) =    7.74
RAINFALL INTENSITY(INCH/HR) =    6.96
TOTAL STREAM AREA(ACRES) =    1.60
PEAK FLOW RATE(CFS) AT CONFLUENCE =    6.03

*****
FLOW PROCESS FROM NODE    116.00 TO NODE    117.00 IS CODE =    21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =    84
INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
UPSTREAM ELEVATION(FEET) =    912.00
DOWNSTREAM ELEVATION(FEET) =    911.00
ELEVATION DIFFERENCE(FEET) =    1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.657
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =    8.515
SUBAREA RUNOFF(CFS) =    0.46
TOTAL AREA(ACRES) =    0.10    TOTAL RUNOFF(CFS) =    0.46

*****
FLOW PROCESS FROM NODE    117.00 TO NODE    118.00 IS CODE =    62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION #    1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) =    911.00    DOWNSTREAM ELEVATION(FEET) =    883.00
STREET LENGTH(FEET) =    444.00    CURB HEIGHT(INCHES) =    6.0
STREET HALFWIDTH(FEET) =    30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =    20.00
INSIDE STREET CROSSFALL(DECIMAL) =    0.020
OUTSIDE STREET CROSSFALL(DECIMAL) =    0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =    1
STREET PARKWAY CROSSFALL(DECIMAL) =    0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) =    0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =    0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    3.23
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) =    0.27
HALFSTREET FLOOD WIDTH(FEET) =    7.38
AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.88
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.34
STREET FLOW TRAVEL TIME(MIN.) =    1.52    Tc(MIN.) =    7.17

```

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.306
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 84
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 5.52
 TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 5.92

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 9.70
 FLOW VELOCITY(FEET/SEC.) = 5.59 DEPTH*VELOCITY(FT*FT/SEC.) = 1.79
 LONGEST FLOWPATH FROM NODE 116.00 TO NODE 118.00 = 494.00 FEET.

FLOW PROCESS FROM NODE 118.00 TO NODE 112.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 878.00 DOWNSTREAM(FEET) = 876.00
 FLOW LENGTH(FEET) = 25.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.63
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 5.92
 PIPE TRAVEL TIME(MIN.) = 0.03 Tc(MIN.) = 7.21
 LONGEST FLOWPATH FROM NODE 116.00 TO NODE 112.00 = 519.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 1

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

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
 TIME OF CONCENTRATION(MIN.) = 7.21
 RAINFALL INTENSITY(INCH/HR) = 7.28
 TOTAL STREAM AREA(ACRES) = 1.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.92

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	36.22	12.49	5.109	17.20
2	6.03	7.74	6.956	1.60
3	5.92	7.21	7.284	1.50

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	36.93	7.21	7.284
2	38.28	7.74	6.956

3 44.80 12.49 5.109

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 44.80 Tc(MIN.) = 12.49

TOTAL AREA(ACRES) = 20.3

LONGEST FLOWPATH FROM NODE 101.00 TO NODE 112.00 = 1838.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 119.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 876.00 DOWNSTREAM(FEET) = 875.50

FLOW LENGTH(FEET) = 23.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.9 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 12.93

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 44.80

PIPE TRAVEL TIME(MIN.) = 0.03 Tc(MIN.) = 12.52

LONGEST FLOWPATH FROM NODE 101.00 TO NODE 119.00 = 1861.00 FEET.

FLOW PROCESS FROM NODE 119.00 TO NODE 119.00 IS CODE = 10

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

=====

FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

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

=====

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 84

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00

UPSTREAM ELEVATION(FEET) = 990.00

DOWNSTREAM ELEVATION(FEET) = 989.00

ELEVATION DIFFERENCE(FEET) = 1.00

SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.657

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.515

SUBAREA RUNOFF(CFS) = 0.46

TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.46

FLOW PROCESS FROM NODE 121.00 TO NODE 123.00 IS CODE = 51

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 989.00 DOWNSTREAM(FEET) = 910.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 50.00 CHANNEL SLOPE = 1.5800

CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 10.000

MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 2.00

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.401

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) = 17.28
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.96
 AVERAGE FLOW DEPTH(FEET) = 0.12 TRAVEL TIME(MIN.) = 0.12
 Tc(MIN.) = 5.78
 SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 33.57
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.362
 TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 34.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.17 FLOW VELOCITY(FEET/SEC.) = 9.18
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 123.00 = 100.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 889.00

FLOW LENGTH(FEET) = 124.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 23.05

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 34.02

PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 5.87

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 124.00 = 224.00 FEET.

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 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.) = 5.87

RAINFALL INTENSITY(INCH/HR) = 8.32

TOTAL STREAM AREA(ACRES) = 11.20

PEAK FLOW RATE(CFS) AT CONFLUENCE = 34.02

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 21

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

=====

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 84

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00

UPSTREAM ELEVATION(FEET) = 919.20

DOWNSTREAM ELEVATION(FEET) = 918.70

ELEVATION DIFFERENCE(FEET) = 0.50

SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.128

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.337

SUBAREA RUNOFF(CFS) = 0.40

TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.40

```

*****
FLOW PROCESS FROM NODE      126.00 TO NODE      124.00 IS CODE =  62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION #  1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) =  916.00  DOWNSTREAM ELEVATION(FEET) =  894.00
STREET LENGTH(FEET) =  422.00  CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) =  30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.020
OUTSIDE STREET CROSSFALL(DECIMAL) =  0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =  0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =  0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.37
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) =  0.28
HALFSTREET FLOOD WIDTH(FEET) =   7.91
AVERAGE FLOW VELOCITY(FEET/SEC.) =   4.53
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =   1.29
STREET FLOW TRAVEL TIME(MIN.) =  1.55  Tc(MIN.) =   8.68
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.461
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  84
AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
SUBAREA AREA(ACRES) =   1.70  SUBAREA RUNOFF(CFS) =   5.93
TOTAL AREA(ACRES) =   1.8  PEAK FLOW RATE(CFS) =   6.28

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.33  HALFSTREET FLOOD WIDTH(FEET) =  10.43
FLOW VELOCITY(FEET/SEC.) =  5.21  DEPTH*VELOCITY(FT*FT/SEC.) =  1.74
LONGEST FLOWPATH FROM NODE      125.00 TO NODE      124.00 =  472.00 FEET.

*****
FLOW PROCESS FROM NODE      124.00 TO NODE      124.00 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.) =   8.68
RAINFALL INTENSITY(INCH/HR) =   6.46
TOTAL STREAM AREA(ACRES) =   1.80
PEAK FLOW RATE(CFS) AT CONFLUENCE =   6.28

** CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)
    1         34.02         5.87         8.318         11.20

```

2 6.28 8.68 6.461 1.80

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	38.27	5.87	8.318
2	32.71	8.68	6.461

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 38.27 Tc(MIN.) = 5.87

TOTAL AREA(ACRES) = 13.0

LONGEST FLOWPATH FROM NODE 125.00 TO NODE 124.00 = 472.00 FEET.

FLOW PROCESS FROM NODE 124.00 TO NODE 127.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 889.00 DOWNSTREAM(FEET) = 888.60

FLOW LENGTH(FEET) = 36.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 9.49

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 38.27

PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 5.93

LONGEST FLOWPATH FROM NODE 125.00 TO NODE 127.00 = 508.00 FEET.

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 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.) = 5.93

RAINFALL INTENSITY(INCH/HR) = 8.26

TOTAL STREAM AREA(ACRES) = 13.00

PEAK FLOW RATE(CFS) AT CONFLUENCE = 38.27

FLOW PROCESS FROM NODE 128.00 TO NODE 129.00 IS CODE = 21

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

=====

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 84

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00

UPSTREAM ELEVATION(FEET) = 919.70

DOWNSTREAM ELEVATION(FEET) = 919.00

ELEVATION DIFFERENCE(FEET) = 0.70

SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.371

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.887


```

SUBAREA RUNOFF(CFS) =      0.43
TOTAL AREA(ACRES) =      0.10    TOTAL RUNOFF(CFS) =      0.43
*****
FLOW PROCESS FROM NODE      129.00 TO NODE      127.00 IS CODE =  62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION #  1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) =  916.00  DOWNSTREAM ELEVATION(FEET) =  894.00
STREET LENGTH(FEET) =  422.00    CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) =  30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.020
OUTSIDE STREET CROSSFALL(DECIMAL) =  0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) =  0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =  0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =  6.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =  4.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =  1.11
    STREET FLOW TRAVEL TIME(MIN.) =  1.66    Tc(MIN.) =  8.03
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.794
    RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
    SOIL CLASSIFICATION IS "C"
    S.C.S. CURVE NUMBER (AMC II) =  84
    AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
    SUBAREA AREA(ACRES) =  1.10    SUBAREA RUNOFF(CFS) =  4.04
    TOTAL AREA(ACRES) =  1.2    PEAK FLOW RATE(CFS) =  4.40

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30    HALFSTREET FLOOD WIDTH(FEET) =  8.90
FLOW VELOCITY(FEET/SEC.) =  4.83    DEPTH*VELOCITY(FT*FT/SEC.) =  1.47
LONGEST FLOWPATH FROM NODE      128.00 TO NODE      127.00 =  472.00 FEET.

*****
FLOW PROCESS FROM NODE      127.00 TO NODE      127.00 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.) =  8.03
RAINFALL INTENSITY(INCH/HR) =  6.79
TOTAL STREAM AREA(ACRES) =  1.20
PEAK FLOW RATE(CFS) AT CONFLUENCE =  4.40

** CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA

```

NUMBER	(CFS)	(MIN.)	(INCH/HOUR)	(ACRE)
1	38.27	5.93	8.261	13.00
2	4.40	8.03	6.794	1.20

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	41.52	5.93	8.261
2	35.88	8.03	6.794

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 41.52 Tc(MIN.) = 5.93

TOTAL AREA(ACRES) = 14.2

LONGEST FLOWPATH FROM NODE 125.00 TO NODE 127.00 = 508.00 FEET.

FLOW PROCESS FROM NODE 127.00 TO NODE 130.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 888.60 DOWNSTREAM(FEET) = 879.00

FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 14.73

ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 41.52

PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 6.26

LONGEST FLOWPATH FROM NODE 125.00 TO NODE 130.00 = 804.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<

=====

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 21

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

=====

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 84

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00

UPSTREAM ELEVATION(FEET) = 890.00

DOWNSTREAM ELEVATION(FEET) = 889.50

ELEVATION DIFFERENCE(FEET) = 0.50

SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.128

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.337

SUBAREA RUNOFF(CFS) = 0.40

TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.40

```

FLOW PROCESS FROM NODE    132.00 TO NODE    133.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 889.00  DOWNSTREAM ELEVATION(FEET) = 886.00
STREET LENGTH(FEET) = 327.00  CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.70
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.34
HALFSTREET FLOOD WIDTH(FEET) = 10.51
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.21
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.74
STREET FLOW TRAVEL TIME(MIN.) = 2.47  Tc(MIN.) = 9.59
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.057
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
SUBAREA AREA(ACRES) = 1.40  SUBAREA RUNOFF(CFS) = 4.58
TOTAL AREA(ACRES) = 1.5  PEAK FLOW RATE(CFS) = 4.91

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.40  HALFSTREET FLOOD WIDTH(FEET) = 13.48
FLOW VELOCITY(FEET/SEC.) = 2.54  DEPTH*VELOCITY(FT*FT/SEC.) = 1.00
LONGEST FLOWPATH FROM NODE    131.00 TO NODE    133.00 = 377.00 FEET.

*****
FLOW PROCESS FROM NODE    133.00 TO NODE    134.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 881.00  DOWNSTREAM(FEET) = 880.50
FLOW LENGTH(FEET) = 37.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.28
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.91
PIPE TRAVEL TIME(MIN.) = 0.10  Tc(MIN.) = 9.69
LONGEST FLOWPATH FROM NODE    131.00 TO NODE    134.00 = 414.00 FEET.

*****
FLOW PROCESS FROM NODE    134.00 TO NODE    134.00 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.) = 9.69
RAINFALL INTENSITY(INCH/HR) = 6.02
TOTAL STREAM AREA(ACRES) = 1.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.91

*****
FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 889.00
DOWNSTREAM ELEVATION(FEET) = 888.50
ELEVATION DIFFERENCE(FEET) = 0.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.128
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.337
SUBAREA RUNOFF(CFS) = 0.40
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.40

*****
FLOW PROCESS FROM NODE 136.00 TO NODE 134.00 IS CODE = 62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 888.00 DOWNSTREAM ELEVATION(FEET) = 886.00
STREET LENGTH(FEET) = 331.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.92
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.27
HALFSTREET FLOOD WIDTH(FEET) = 7.24
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.50
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.41
STREET FLOW TRAVEL TIME(MIN.) = 3.69 Tc(MIN.) = 10.82
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.606
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
AREA-AVERAGE RUNOFF COEFFICIENT = 0.540

```

SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 3.03
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 3.33

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 9.30
FLOW VELOCITY(FEET/SEC.) = 1.69 DEPTH*VELOCITY(FT*FT/SEC.) = 0.53
LONGEST FLOWPATH FROM NODE 135.00 TO NODE 134.00 = 381.00 FEET.

FLOW PROCESS FROM NODE 134.00 TO NODE 134.00 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.) = 10.82
RAINFALL INTENSITY(INCH/HR) = 5.61
TOTAL STREAM AREA(ACRES) = 1.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.33

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	4.91	9.69	6.017	1.50
2	3.33	10.82	5.606	1.10

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	7.89	9.69	6.017
2	7.90	10.82	5.606

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 7.90 Tc(MIN.) = 10.82
TOTAL AREA(ACRES) = 2.6
LONGEST FLOWPATH FROM NODE 131.00 TO NODE 134.00 = 414.00 FEET.

FLOW PROCESS FROM NODE 134.00 TO NODE 130.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 880.50 DOWNSTREAM(FEET) = 879.00
FLOW LENGTH(FEET) = 43.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.10
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.90
PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 10.89
LONGEST FLOWPATH FROM NODE 131.00 TO NODE 130.00 = 457.00 FEET.

```

*****
FLOW PROCESS FROM NODE      130.00 TO NODE      130.00 IS CODE =  11
-----
>>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
=====

** MAIN STREAM CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)
   1         7.90      10.89      5.582        2.60
LONGEST FLOWPATH FROM NODE      131.00 TO NODE      130.00 =      457.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)
   1        41.52       6.26      7.973       14.20
LONGEST FLOWPATH FROM NODE      125.00 TO NODE      130.00 =      804.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)
   1        46.07       6.26      7.973
   2        36.97      10.89      5.582

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      46.07   Tc(MIN.) =      6.26
TOTAL AREA(ACRES) =      16.8

*****
FLOW PROCESS FROM NODE      130.00 TO NODE      130.00 IS CODE =  12
-----
>>>>>CLEAR MEMORY BANK # 2 <<<<<
=====

*****
FLOW PROCESS FROM NODE      130.00 TO NODE      119.00 IS CODE =  31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   879.00  DOWNSTREAM(FEET) =   875.50
FLOW LENGTH(FEET) =   120.00  MANNING'S N =   0.013
DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   14.32
ESTIMATED PIPE DIAMETER(INCH) =   27.00  NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =      46.07
PIPE TRAVEL TIME(MIN.) =    0.14   Tc(MIN.) =    6.40
LONGEST FLOWPATH FROM NODE      125.00 TO NODE      119.00 =      924.00 FEET.

*****
FLOW PROCESS FROM NODE      119.00 TO NODE      119.00 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	46.07	6.40	7.861	16.80

LONGEST FLOWPATH FROM NODE 125.00 TO NODE 119.00 = 924.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	44.80	12.52	5.101	20.30

LONGEST FLOWPATH FROM NODE 101.00 TO NODE 119.00 = 1861.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	68.98	6.40	7.861
2	74.69	12.52	5.101

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 74.69 Tc(MIN.) = 12.52
TOTAL AREA(ACRES) = 37.1

FLOW PROCESS FROM NODE 119.00 TO NODE 119.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<
=====

FLOW PROCESS FROM NODE 119.00 TO NODE 137.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 875.50 DOWNSTREAM(FEET) = 866.00
FLOW LENGTH(FEET) = 206.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.25
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 74.69
PIPE TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 12.70
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 137.00 = 2067.00 FEET.

FLOW PROCESS FROM NODE 137.00 TO NODE 137.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.70
RAINFALL INTENSITY(INCH/HR) = 5.05
TOTAL STREAM AREA(ACRES) = 37.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 74.69

FLOW PROCESS FROM NODE 138.00 TO NODE 139.00 IS CODE = 21

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

```

=====
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 919.40
DOWNSTREAM ELEVATION(FEET) = 918.90
ELEVATION DIFFERENCE(FEET) = 0.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.128
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.337
SUBAREA RUNOFF(CFS) = 0.40
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.40

*****
FLOW PROCESS FROM NODE 139.00 TO NODE 140.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 918.90 DOWNSTREAM ELEVATION(FEET) = 871.00
STREET LENGTH(FEET) = 633.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.73
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.23
HALFSTREET FLOOD WIDTH(FEET) = 5.05
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.63
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.05
STREET FLOW TRAVEL TIME(MIN.) = 2.28 Tc(MIN.) = 9.41
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.134
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 2.65
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 2.98

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 6.78
FLOW VELOCITY(FEET/SEC.) = 5.16 DEPTH*VELOCITY(FT*FT/SEC.) = 1.35
LONGEST FLOWPATH FROM NODE 138.00 TO NODE 140.00 = 683.00 FEET.

*****
FLOW PROCESS FROM NODE 140.00 TO NODE 137.00 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) = 866.50 DOWNSTREAM(FEET) = 866.00
FLOW LENGTH(FEET) = 10.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.77
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.98
PIPE TRAVEL TIME(MIN.) = 0.02 Tc(MIN.) = 9.43
LONGEST FLOWPATH FROM NODE 138.00 TO NODE 137.00 = 693.00 FEET.

*****
FLOW PROCESS FROM NODE 137.00 TO NODE 137.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 9.43
RAINFALL INTENSITY(INCH/HR) = 6.13
TOTAL STREAM AREA(ACRES) = 0.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.98

*****
FLOW PROCESS FROM NODE 141.00 TO NODE 142.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 877.00
DOWNSTREAM ELEVATION(FEET) = 876.50
ELEVATION DIFFERENCE(FEET) = 0.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.128
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.337
SUBAREA RUNOFF(CFS) = 0.40
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.40

*****
FLOW PROCESS FROM NODE 142.00 TO NODE 143.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 876.00 DOWNSTREAM ELEVATION(FEET) = 871.00
STREET LENGTH(FEET) = 115.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

```

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.72
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.24
HALFSTREET FLOOD WIDTH(FEET) = 5.92
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.68
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.90
STREET FLOW TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 7.65
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.010
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 2.65
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 3.03

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.28 HALFSTREET FLOOD WIDTH(FEET) = 7.84
FLOW VELOCITY(FEET/SEC.) = 4.13 DEPTH*VELOCITY(FT*FT/SEC.) = 1.17
LONGEST FLOWPATH FROM NODE 141.00 TO NODE 143.00 = 165.00 FEET.

FLOW PROCESS FROM NODE 143.00 TO NODE 137.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 866.50 DOWNSTREAM(FEET) = 866.00
FLOW LENGTH(FEET) = 34.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.69
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.03
PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 7.75
LONGEST FLOWPATH FROM NODE 141.00 TO NODE 137.00 = 199.00 FEET.

FLOW PROCESS FROM NODE 137.00 TO NODE 137.00 IS CODE = 1

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

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 7.75
RAINFALL INTENSITY(INCH/HR) = 6.95
TOTAL STREAM AREA(ACRES) = 0.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.03

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	74.69	12.70	5.055	37.10
2	2.98	9.43	6.126	0.90
3	3.03	7.75	6.952	0.80

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	51.05	7.75	6.952
2	61.10	9.43	6.126
3	79.35	12.70	5.055

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 79.35 Tc(MIN.) = 12.70
TOTAL AREA(ACRES) = 38.8
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 137.00 = 2067.00 FEET.

FLOW PROCESS FROM NODE 137.00 TO NODE 144.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 866.00 DOWNSTREAM(FEET) = 864.00

FLOW LENGTH(FEET) = 143.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 12.55

ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 79.35

PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 12.89

LONGEST FLOWPATH FROM NODE 101.00 TO NODE 144.00 = 2210.00 FEET.

FLOW PROCESS FROM NODE 144.00 TO NODE 144.00 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.) = 12.89

RAINFALL INTENSITY(INCH/HR) = 5.01

TOTAL STREAM AREA(ACRES) = 38.80

PEAK FLOW RATE(CFS) AT CONFLUENCE = 79.35

FLOW PROCESS FROM NODE 145.00 TO NODE 146.00 IS CODE = 21

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

=====

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 84

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00

UPSTREAM ELEVATION(FEET) = 914.00

DOWNSTREAM ELEVATION(FEET) = 913.50

ELEVATION DIFFERENCE(FEET) = 0.50

SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.128

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.337

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SUBAREA RUNOFF(CFS) =      0.40
TOTAL AREA(ACRES) =      0.10    TOTAL RUNOFF(CFS) =      0.40

*****
FLOW PROCESS FROM NODE      146.00 TO NODE      147.00 IS CODE =  62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION #  1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) =  913.00  DOWNSTREAM ELEVATION(FEET) =  872.00
STREET LENGTH(FEET) =    564.00  CURB HEIGHT(INCHES) =    6.0
STREET HALFWIDTH(FEET) =    30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   20.00
INSIDE STREET CROSSFALL(DECIMAL) =   0.020
OUTSIDE STREET CROSSFALL(DECIMAL) =   0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =   1
STREET PARKWAY CROSSFALL(DECIMAL) =   0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) =   0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.49
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =   0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.44
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.20
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.43
    STREET FLOW TRAVEL TIME(MIN.) =   1.81    Tc(MIN.) =    8.94
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =   6.341
    RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
    SOIL CLASSIFICATION IS "C"
    S.C.S. CURVE NUMBER (AMC II) =   84
    AREA-AVERAGE RUNOFF COEFFICIENT =   0.540
    SUBAREA AREA(ACRES) =    1.80    SUBAREA RUNOFF(CFS) =    6.16
    TOTAL AREA(ACRES) =    1.9    PEAK FLOW RATE(CFS) =    6.51

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.32    HALFSTREET FLOOD WIDTH(FEET) =    9.83
FLOW VELOCITY(FEET/SEC.) =  5.99    DEPTH*VELOCITY(FT*FT/SEC.) =    1.94
LONGEST FLOWPATH FROM NODE      145.00 TO NODE      147.00 =    614.00 FEET.

*****
FLOW PROCESS FROM NODE      147.00 TO NODE      144.00 IS CODE =  31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   867.00  DOWNSTREAM(FEET) =   864.00
FLOW LENGTH(FEET) =    15.00  MANNING'S N =   0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   18.00
ESTIMATED PIPE DIAMETER(INCH) =   18.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =    6.51
PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.95
LONGEST FLOWPATH FROM NODE      145.00 TO NODE      144.00 =    629.00 FEET.

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*****
FLOW PROCESS FROM NODE    144.00 TO NODE    144.00 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.) =    8.95
RAINFALL INTENSITY(INCH/HR) =    6.33
TOTAL STREAM AREA(ACRES) =    1.90
PEAK FLOW RATE(CFS) AT CONFLUENCE =    6.51

** CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)
    1         79.35      12.89      5.007      38.80
    2         6.51       8.95      6.334      1.90

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

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)
    1         69.22      8.95      6.334
    2         84.50      12.89      5.007

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =    84.50    Tc(MIN.) =    12.89
TOTAL AREA(ACRES) =    40.7
LONGEST FLOWPATH FROM NODE    101.00 TO NODE    144.00 =    2210.00 FEET.

*****
FLOW PROCESS FROM NODE    144.00 TO NODE    148.00 IS CODE =    31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    864.00  DOWNSTREAM(FEET) =    845.00
FLOW LENGTH(FEET) =    199.00  MANNING'S N =    0.013
DEPTH OF FLOW IN    27.0 INCH PIPE IS    20.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =    25.94
ESTIMATED PIPE DIAMETER(INCH) =    27.00    NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =    84.50
PIPE TRAVEL TIME(MIN.) =    0.13    Tc(MIN.) =    13.02
LONGEST FLOWPATH FROM NODE    101.00 TO NODE    148.00 =    2409.00 FEET.

*****
FLOW PROCESS FROM NODE    148.00 TO NODE    148.00 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.) =    13.02

```

RAINFALL INTENSITY(INCH/HR) = 4.97
TOTAL STREAM AREA(ACRES) = 40.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 84.50

FLOW PROCESS FROM NODE 149.00 TO NODE 150.00 IS CODE = 21

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

=====

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 919.40
DOWNSTREAM ELEVATION(FEET) = 918.90
ELEVATION DIFFERENCE(FEET) = 0.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.128
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.337
SUBAREA RUNOFF(CFS) = 0.40
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.40

FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 916.00 DOWNSTREAM ELEVATION(FEET) = 896.00
STREET LENGTH(FEET) = 370.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.14
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.30
HALFSTREET FLOOD WIDTH(FEET) = 8.57
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.86
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.45
STREET FLOW TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 8.40
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.601
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 7.49
TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 7.84

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.37

FLOW VELOCITY(FEET/SEC.) = 5.56 DEPTH*VELOCITY(FT*FT/SEC.) = 1.97
LONGEST FLOWPATH FROM NODE 149.00 TO NODE 151.00 = 420.00 FEET.

FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 891.00 DOWNSTREAM(FEET) = 890.00
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.24
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.84
PIPE TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 8.66
LONGEST FLOWPATH FROM NODE 149.00 TO NODE 152.00 = 520.00 FEET.

FLOW PROCESS FROM NODE 152.00 TO NODE 153.00 IS CODE = 51

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 850.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 730.00 CHANNEL SLOPE = 0.0548
CHANNEL BASE(FEET) = 2.00 "Z" FACTOR = 1.000
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.967
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.94
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.54
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 1.15
Tc(MIN.) = 9.82
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 4.19
AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
TOTAL AREA(ACRES) = 3.5 PEAK FLOW RATE(CFS) = 11.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.42 FLOW VELOCITY(FEET/SEC.) = 10.96
LONGEST FLOWPATH FROM NODE 149.00 TO NODE 153.00 = 1250.00 FEET.

FLOW PROCESS FROM NODE 153.00 TO NODE 148.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 846.00 DOWNSTREAM(FEET) = 845.00
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.86
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 11.28
PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 10.06

```

LONGEST FLOWPATH FROM NODE    149.00 TO NODE    148.00 =    1350.00 FEET.
*****
FLOW PROCESS FROM NODE    148.00 TO NODE    148.00 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.) =  10.06
RAINFALL INTENSITY(INCH/HR) =   5.87
TOTAL STREAM AREA(ACRES) =   3.50
PEAK FLOW RATE(CFS) AT CONFLUENCE =    11.28

** CONFLUENCE DATA **
STREAM    RUNOFF      Tc      INTENSITY      AREA
NUMBER    (CFS)      (MIN.)  (INCH/HOUR)    (ACRE)
   1       84.50     13.02      4.975         40.70
   2       11.28     10.06      5.874          3.50

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       82.84     10.06      5.874
   2       94.05     13.02      4.975

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =    94.05   Tc(MIN.) =   13.02
TOTAL AREA(ACRES) =    44.2
LONGEST FLOWPATH FROM NODE    101.00 TO NODE    148.00 =    2409.00 FEET.
*****
FLOW PROCESS FROM NODE    148.00 TO NODE    154.00 IS CODE =   31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  845.00  DOWNSTREAM(FEET) =  821.00
FLOW LENGTH(FEET) =  272.00  MANNING'S N =  0.013
DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  26.24
ESTIMATED PIPE DIAMETER(INCH) =  30.00   NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =    94.05
PIPE TRAVEL TIME(MIN.) =   0.17   Tc(MIN.) =   13.19
LONGEST FLOWPATH FROM NODE    101.00 TO NODE    154.00 =    2681.00 FEET.
*****
FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 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.) = 13.19
 RAINFALL INTENSITY(INCH/HR) = 4.93
 TOTAL STREAM AREA(ACRES) = 44.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 94.05

FLOW PROCESS FROM NODE 155.00 TO NODE 156.00 IS CODE = 21

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

=====
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 98
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
 UPSTREAM ELEVATION(FEET) = 884.00
 DOWNSTREAM ELEVATION(FEET) = 880.00
 ELEVATION DIFFERENCE(FEET) = 4.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 1.464
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) = 0.80
 TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.80

FLOW PROCESS FROM NODE 156.00 TO NODE 157.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

=====
 UPSTREAM ELEVATION(FEET) = 880.00 DOWNSTREAM ELEVATION(FEET) = 828.00
 STREET LENGTH(FEET) = 1237.00 CURB HEIGHT(INCHES) = 6.0
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.01
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.41
 HALFSTREET FLOOD WIDTH(FEET) = 14.18
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.64
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.31
 STREET FLOW TRAVEL TIME(MIN.) = 3.66 Tc(MIN.) = 5.12
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.083
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 84
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.547
 SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 22.07
 TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 22.86

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 18.32
 FLOW VELOCITY(FEET/SEC.) = 6.58 DEPTH*VELOCITY(FT*FT/SEC.) = 3.24
 LONGEST FLOWPATH FROM NODE 155.00 TO NODE 157.00 = 1287.00 FEET.

FLOW PROCESS FROM NODE 157.00 TO NODE 154.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 822.00 DOWNSTREAM(FEET) = 821.00
 FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.77
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 22.86
 PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 5.16
 LONGEST FLOWPATH FROM NODE 155.00 TO NODE 154.00 = 1317.00 FEET.

FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 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.) = 5.16
 RAINFALL INTENSITY(INCH/HR) = 9.04
 TOTAL STREAM AREA(ACRES) = 4.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 22.86

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	94.05	13.19	4.933	44.20
2	22.86	5.16	9.038	4.60

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/HOUR)
1	74.19	5.16	9.038
2	106.52	13.19	4.933

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 106.52 Tc(MIN.) = 13.19
 TOTAL AREA(ACRES) = 48.8
 LONGEST FLOWPATH FROM NODE 101.00 TO NODE 154.00 = 2681.00 FEET.

FLOW PROCESS FROM NODE 154.00 TO NODE 159.00 IS CODE = 31

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

```

>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 821.00 DOWNSTREAM(FEET) = 820.30
FLOW LENGTH(FEET) = 64.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.27
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 106.52
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 13.28
LONGEST FLOWPATH FROM NODE 101.00 TO NODE 159.00 = 2745.00 FEET.

*****
FLOW PROCESS FROM NODE 159.00 TO NODE 159.00 IS CODE = 10
-----
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
=====

*****
FLOW PROCESS FROM NODE 160.00 TO NODE 161.00 IS CODE = 21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 98
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 874.00
DOWNSTREAM ELEVATION(FEET) = 864.00
ELEVATION DIFFERENCE(FEET) = 10.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 1.359
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) = 0.80
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.80

*****
FLOW PROCESS FROM NODE 161.00 TO NODE 162.00 IS CODE = 62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 864.00 DOWNSTREAM ELEVATION(FEET) = 830.00
STREET LENGTH(FEET) = 1028.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.84
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

```

STREET FLOW DEPTH(FEET) = 0.35
 HALFSTREET FLOOD WIDTH(FEET) = 11.13
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.30
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.50
 STREET FLOW TRAVEL TIME(MIN.) = 3.98 Tc(MIN.) = 5.34
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.837
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 98
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.870
 SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 9.99
 TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 10.76

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 14.26
 FLOW VELOCITY(FEET/SEC.) = 5.00 DEPTH*VELOCITY(FT*FT/SEC.) = 2.06
 LONGEST FLOWPATH FROM NODE 160.00 TO NODE 162.00 = 1078.00 FEET.

FLOW PROCESS FROM NODE 162.00 TO NODE 159.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 824.00 DOWNSTREAM(FEET) = 820.30

FLOW LENGTH(FEET) = 98.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.24

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 10.76

PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 5.49

LONGEST FLOWPATH FROM NODE 160.00 TO NODE 159.00 = 1176.00 FEET.

FLOW PROCESS FROM NODE 159.00 TO NODE 159.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<

=====

FLOW PROCESS FROM NODE 163.00 TO NODE 164.00 IS CODE = 21

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

=====

CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 71

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00

UPSTREAM ELEVATION(FEET) = 978.00

DOWNSTREAM ELEVATION(FEET) = 976.00

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      164.00 TO NODE      165.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   976.00  DOWNSTREAM(FEET) =   910.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   433.00  CHANNEL SLOPE =   0.1524
CHANNEL BASE(FEET) =   10.00  "Z" FACTOR =   20.000
MANNING'S FACTOR = 0.060  MAXIMUM DEPTH(FEET) =   2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =   5.677
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =   71
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.62
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.72
AVERAGE FLOW DEPTH(FEET) =   0.08  TRAVEL TIME(MIN.) =   4.19
Tc(MIN.) =   10.61
SUBAREA AREA(ACRES) =       1.60  SUBAREA RUNOFF(CFS) =       2.73
AREA-AVERAGE RUNOFF COEFFICIENT =   0.300
TOTAL AREA(ACRES) =       1.7  PEAK FLOW RATE(CFS) =       2.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.12  FLOW VELOCITY(FEET/SEC.) =   2.00
LONGEST FLOWPATH FROM NODE      163.00 TO NODE      165.00 =       483.00 FEET.

*****
FLOW PROCESS FROM NODE      165.00 TO NODE      166.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   910.00  DOWNSTREAM(FEET) =   898.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   25.00  CHANNEL SLOPE =   0.4800
CHANNEL BASE(FEET) =    3.00  "Z" FACTOR =    0.100
MANNING'S FACTOR = 0.015  MAXIMUM DEPTH(FEET) =   0.50
CHANNEL FLOW THRU SUBAREA(CFS) =       2.90
FLOW VELOCITY(FEET/SEC.) =  12.16  FLOW DEPTH(FEET) =   0.08
TRAVEL TIME(MIN.) =   0.03  Tc(MIN.) =   10.64
LONGEST FLOWPATH FROM NODE      163.00 TO NODE      166.00 =       508.00 FEET.

*****
FLOW PROCESS FROM NODE      166.00 TO NODE      167.00 IS CODE =  62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) =  898.00  DOWNSTREAM ELEVATION(FEET) =  876.00
STREET LENGTH(FEET) =   360.00  CURB HEIGHT(INCHES) =   6.0
STREET HALFWIDTH(FEET) =   30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   20.00
INSIDE STREET CROSSFALL(DECIMAL) =   0.020
OUTSIDE STREET CROSSFALL(DECIMAL) =   0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =   1
STREET PARKWAY CROSSFALL(DECIMAL) =   0.020

```

Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.89
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.32
HALFSTREET FLOOD WIDTH(FEET) = 9.77
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.49
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.77
STREET FLOW TRAVEL TIME(MIN.) = 1.09 Tc(MIN.) = 11.73
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.319
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 98
AREA-AVERAGE RUNOFF COEFFICIENT = 0.547
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 6.02
TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 8.73

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.52
FLOW VELOCITY(FEET/SEC.) = 6.04 DEPTH*VELOCITY(FT*FT/SEC.) = 2.15
LONGEST FLOWPATH FROM NODE 163.00 TO NODE 167.00 = 868.00 FEET.

FLOW PROCESS FROM NODE 167.00 TO NODE 168.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 863.00
FLOW LENGTH(FEET) = 222.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.98
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.73
PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 12.10
LONGEST FLOWPATH FROM NODE 163.00 TO NODE 168.00 = 1090.00 FEET.

FLOW PROCESS FROM NODE 168.00 TO NODE 168.00 IS CODE = 10

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

=====

FLOW PROCESS FROM NODE 169.00 TO NODE 170.00 IS CODE = 21

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

=====

CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 71
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 934.00
DOWNSTREAM ELEVATION(FEET) = 930.00
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 170.00 TO NODE 171.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(Feet) = 930.00 DOWNSTREAM(Feet) = 902.00
CHANNEL LENGTH THRU SUBAREA(Feet) = 274.00 CHANNEL SLOPE = 0.1022
CHANNEL BASE(Feet) = 10.00 "Z" FACTOR = 20.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(Feet) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.323
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 71
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.96
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(Feet/Sec.) = 1.18
AVERAGE FLOW DEPTH(Feet) = 0.07 TRAVEL TIME(Min.) = 3.88
Tc(Min.) = 8.98
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.33
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 1.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(Feet) = 0.09 FLOW VELOCITY(Feet/Sec.) = 1.45
LONGEST FLOWPATH FROM NODE 169.00 TO NODE 171.00 = 324.00 FEET.

FLOW PROCESS FROM NODE 171.00 TO NODE 172.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(Feet) = 900.00 DOWNSTREAM(Feet) = 898.80
FLOW LENGTH(Feet) = 121.00 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.) = 4.07
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1.52
PIPE TRAVEL TIME(Min.) = 0.50 Tc(Min.) = 9.47
LONGEST FLOWPATH FROM NODE 169.00 TO NODE 172.00 = 445.00 FEET.

FLOW PROCESS FROM NODE 172.00 TO NODE 172.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(Min.) = 9.47
RAINFALL INTENSITY(INCH/HR) = 6.11
TOTAL STREAM AREA(ACRES) = 0.80

```

PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.52

*****
FLOW PROCESS FROM NODE      173.00 TO NODE      174.00 IS CODE =  21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  71
INITIAL SUBAREA FLOW-LENGTH(FEET) =      50.00
UPSTREAM ELEVATION(FEET) =      940.00
DOWNSTREAM ELEVATION(FEET) =      938.00
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      174.00 TO NODE      172.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =      938.00  DOWNSTREAM(FEET) =      908.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  863.00  CHANNEL SLOPE =  0.0348
CHANNEL BASE(FEET) =       2.00  "Z" FACTOR =  1.000
MANNING'S FACTOR = 0.015  MAXIMUM DEPTH(FEET) =  2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.381
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  71
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.75
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  5.91
AVERAGE FLOW DEPTH(FEET) =  0.21  TRAVEL TIME(MIN.) =  2.43
Tc(MIN.) =      8.85
SUBAREA AREA(ACRES) =       2.60  SUBAREA RUNOFF(CFS) =       4.98
AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
TOTAL AREA(ACRES) =       2.7  PEAK FLOW RATE(CFS) =       5.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.31  FLOW VELOCITY(FEET/SEC.) =  7.27
LONGEST FLOWPATH FROM NODE      173.00 TO NODE      172.00 =      913.00 FEET.

*****
FLOW PROCESS FROM NODE      172.00 TO NODE      172.00 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.) =      8.85
RAINFALL INTENSITY(INCH/HR) =  6.38
TOTAL STREAM AREA(ACRES) =       2.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.17

```


** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	1.52	9.47	6.108	0.80
2	5.17	8.85	6.381	2.70

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	6.59	8.85	6.381
2	6.46	9.47	6.108

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 6.59 Tc(MIN.) = 8.85

TOTAL AREA(ACRES) = 3.5

LONGEST FLOWPATH FROM NODE 173.00 TO NODE 172.00 = 913.00 FEET.

FLOW PROCESS FROM NODE 172.00 TO NODE 175.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 898.80 DOWNSTREAM(FEET) = 897.60

FLOW LENGTH(FEET) = 112.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 6.19

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 6.59

PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 9.15

LONGEST FLOWPATH FROM NODE 173.00 TO NODE 175.00 = 1025.00 FEET.

FLOW PROCESS FROM NODE 175.00 TO NODE 175.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 9.15

RAINFALL INTENSITY(INCH/HR) = 6.24

TOTAL STREAM AREA(ACRES) = 3.50

PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.59

FLOW PROCESS FROM NODE 176.00 TO NODE 177.00 IS CODE = 21

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

=====

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 84

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00

```

UPSTREAM ELEVATION(FEET) = 930.70
DOWNSTREAM ELEVATION(FEET) = 930.00
ELEVATION DIFFERENCE(FEET) = 0.70
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.371
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.887
SUBAREA RUNOFF(CFS) = 0.43
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.43

*****
FLOW PROCESS FROM NODE 177.00 TO NODE 175.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 928.00 DOWNSTREAM ELEVATION(FEET) = 888.00
STREET LENGTH(FEET) = 1200.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.11
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.31
HALFSTREET FLOOD WIDTH(FEET) = 8.97
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.85
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.18
STREET FLOW TRAVEL TIME(MIN.) = 5.19 Tc(MIN.) = 11.56
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.371
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 13.05
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 13.34

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.68
FLOW VELOCITY(FEET/SEC.) = 4.50 DEPTH*VELOCITY(FT*FT/SEC.) = 1.62
LONGEST FLOWPATH FROM NODE 176.00 TO NODE 175.00 = 1250.00 FEET.

*****
FLOW PROCESS FROM NODE 175.00 TO NODE 175.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 11.56
RAINFALL INTENSITY(INCH/HR) = 5.37

```

TOTAL STREAM AREA(ACRES) = 4.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 13.34

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	6.59	9.15	6.245	3.50
2	13.34	11.56	5.371	4.60

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/HOUR)
1	17.15	9.15	6.245
2	19.01	11.56	5.371

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 19.01 Tc(MIN.) = 11.56
TOTAL AREA(ACRES) = 8.1
LONGEST FLOWPATH FROM NODE 176.00 TO NODE 175.00 = 1250.00 FEET.

FLOW PROCESS FROM NODE 175.00 TO NODE 178.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 888.00 DOWNSTREAM ELEVATION(FEET) = 870.00
STREET LENGTH(FEET) = 395.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.58
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.48
HALFSTREET FLOOD WIDTH(FEET) = 17.93
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.78
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.29
STREET FLOW TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 12.53
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.098
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
AREA-AVERAGE RUNOFF COEFFICIENT = 0.461
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 7.16
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 25.18

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.50 HALFSTREET FLOOD WIDTH(FEET) = 18.73
 FLOW VELOCITY(FEET/SEC.) = 6.96 DEPTH*VELOCITY(FT*FT/SEC.) = 3.48
 LONGEST FLOWPATH FROM NODE 176.00 TO NODE 178.00 = 1645.00 FEET.

FLOW PROCESS FROM NODE 178.00 TO NODE 179.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 865.00 DOWNSTREAM(FEET) = 864.50
 FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.31
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 25.18
 PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 12.63
 LONGEST FLOWPATH FROM NODE 176.00 TO NODE 179.00 = 1695.00 FEET.

FLOW PROCESS FROM NODE 179.00 TO NODE 179.00 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.) = 12.63
 RAINFALL INTENSITY(INCH/HR) = 5.07
 TOTAL STREAM AREA(ACRES) = 10.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 25.18

FLOW PROCESS FROM NODE 180.00 TO NODE 181.00 IS CODE = 21

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

=====

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 84
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
 UPSTREAM ELEVATION(FEET) = 931.00
 DOWNSTREAM ELEVATION(FEET) = 930.50
 ELEVATION DIFFERENCE(FEET) = 0.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.128
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.337
 SUBAREA RUNOFF(CFS) = 0.40
 TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.40

FLOW PROCESS FROM NODE 181.00 TO NODE 179.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 930.00 DOWNSTREAM ELEVATION(FEET) = 870.00
 STREET LENGTH(FEET) = 1399.00 CURB HEIGHT(INCHES) = 6.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.49

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.35

HALFSTREET FLOOD WIDTH(FEET) = 10.98

AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.91

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.70

STREET FLOW TRAVEL TIME(MIN.) = 4.75 Tc(MIN.) = 11.88

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.277

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 84

AREA-AVERAGE RUNOFF COEFFICIENT = 0.540

SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 11.97

TOTAL AREA(ACRES) = 4.3 PEAK FLOW RATE(CFS) = 12.25

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 14.26

FLOW VELOCITY(FEET/SEC.) = 5.70 DEPTH*VELOCITY(FT*FT/SEC.) = 2.34

LONGEST FLOWPATH FROM NODE 180.00 TO NODE 179.00 = 1449.00 FEET.

FLOW PROCESS FROM NODE 179.00 TO NODE 179.00 IS CODE = 1

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

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 11.88

RAINFALL INTENSITY(INCH/HR) = 5.28

TOTAL STREAM AREA(ACRES) = 4.30

PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.25

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	25.18	12.63	5.072	10.70
2	12.25	11.88	5.277	4.30

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	36.45	11.88	5.277

2 36.95 12.63 5.072

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 36.95 Tc(MIN.) = 12.63

TOTAL AREA(ACRES) = 15.0

LONGEST FLOWPATH FROM NODE 176.00 TO NODE 179.00 = 1695.00 FEET.

FLOW PROCESS FROM NODE 179.00 TO NODE 168.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 864.50 DOWNSTREAM(FEET) = 863.00

FLOW LENGTH(FEET) = 0.36 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 87.45

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 36.95

PIPE TRAVEL TIME(MIN.) = 0.00 Tc(MIN.) = 12.63

LONGEST FLOWPATH FROM NODE 176.00 TO NODE 168.00 = 1695.36 FEET.

FLOW PROCESS FROM NODE 168.00 TO NODE 168.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	36.95	12.63	5.072	15.00

LONGEST FLOWPATH FROM NODE 176.00 TO NODE 168.00 = 1695.36 FEET.

** MEMORY BANK # 3 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	8.73	12.10	5.214	3.00

LONGEST FLOWPATH FROM NODE 163.00 TO NODE 168.00 = 1090.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	44.14	12.10	5.214
2	45.44	12.63	5.072

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 45.44 Tc(MIN.) = 12.63

TOTAL AREA(ACRES) = 18.0

FLOW PROCESS FROM NODE 168.00 TO NODE 168.00 IS CODE = 12

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

=====

```

*****
FLOW PROCESS FROM NODE      168.00 TO NODE      182.00 IS CODE =  31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  863.00  DOWNSTREAM(FEET) =  852.00
FLOW LENGTH(FEET) =  748.00  MANNING'S N =  0.013
DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  10.95
ESTIMATED PIPE DIAMETER(INCH) =  30.00  NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =  45.44
PIPE TRAVEL TIME(MIN.) =  1.14  Tc(MIN.) =  13.77
LONGEST FLOWPATH FROM NODE      176.00 TO NODE      182.00 =  2443.36 FEET.

*****
FLOW PROCESS FROM NODE      182.00 TO NODE      182.00 IS CODE =  1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS =  3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  13.77
RAINFALL INTENSITY(INCH/HR) =  4.80
TOTAL STREAM AREA(ACRES) =  18.00
PEAK FLOW RATE(CFS) AT CONFLUENCE =  45.44

*****
FLOW PROCESS FROM NODE      183.00 TO NODE      184.00 IS CODE =  21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  84
INITIAL SUBAREA FLOW-LENGTH(FEET) =  50.00
UPSTREAM ELEVATION(FEET) =  897.30
DOWNSTREAM ELEVATION(FEET) =  896.80
ELEVATION DIFFERENCE(FEET) =  0.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) =  7.128
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.337
SUBAREA RUNOFF(CFS) =  0.40
TOTAL AREA(ACRES) =  0.10  TOTAL RUNOFF(CFS) =  0.40

*****
FLOW PROCESS FROM NODE      184.00 TO NODE      185.00 IS CODE =  62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) =  896.80  DOWNSTREAM ELEVATION(FEET) =  858.00
STREET LENGTH(FEET) =  687.00  CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) =  30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.020
OUTSIDE STREET CROSSFALL(DECIMAL) =  0.020

```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.26
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.40
 HALFSTREET FLOOD WIDTH(FEET) = 13.48
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.34
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.51
 STREET FLOW TRAVEL TIME(MIN.) = 1.81 Tc(MIN.) = 8.93
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.342
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 84
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
 SUBAREA AREA(ACRES) = 6.90 SUBAREA RUNOFF(CFS) = 23.63
 TOTAL AREA(ACRES) = 7.0 PEAK FLOW RATE(CFS) = 23.97

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 17.62
 FLOW VELOCITY(FEET/SEC.) = 7.44 DEPTH*VELOCITY(FT*FT/SEC.) = 3.56
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 687.0 FT WITH ELEVATION-DROP = 38.8 FT, IS 31.7 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 185.00
 LONGEST FLOWPATH FROM NODE 183.00 TO NODE 185.00 = 737.00 FEET.

 FLOW PROCESS FROM NODE 185.00 TO NODE 182.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	852.50	DOWNSTREAM(FEET) =	852.00
FLOW LENGTH(FEET) =	36.00	MANNING'S N =	0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.6 INCHES			
PIPE-FLOW VELOCITY(FEET/SEC.) =	9.16		
ESTIMATED PIPE DIAMETER(INCH) =	24.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	23.97		
PIPE TRAVEL TIME(MIN.) =	0.07	Tc(MIN.) =	9.00
LONGEST FLOWPATH FROM NODE	183.00	TO NODE	182.00 = 773.00 FEET.

 FLOW PROCESS FROM NODE 182.00 TO NODE 182.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS =	3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:	
TIME OF CONCENTRATION(MIN.) =	9.00
RAINFALL INTENSITY(INCH/HR) =	6.31
TOTAL STREAM AREA(ACRES) =	7.00
PEAK FLOW RATE(CFS) AT CONFLUENCE =	23.97

```

FLOW PROCESS FROM NODE      186.00 TO NODE      187.00 IS CODE =  21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 870.00
DOWNSTREAM ELEVATION(FEET) = 869.50
ELEVATION DIFFERENCE(FEET) = 0.50
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.128
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.337
SUBAREA RUNOFF(CFS) = 0.40
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.40

*****
FLOW PROCESS FROM NODE      187.00 TO NODE      188.00 IS CODE =  62
-----
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 869.50 DOWNSTREAM ELEVATION(FEET) = 858.00
STREET LENGTH(FEET) = 750.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.50
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.34
HALFSTREET FLOOD WIDTH(FEET) = 10.51
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.86
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.96
STREET FLOW TRAVEL TIME(MIN.) = 4.37 Tc(MIN.) = 11.50
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.389
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 6.11
TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 6.40

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 13.48
FLOW VELOCITY(FEET/SEC.) = 3.31 DEPTH*VELOCITY(FT*FT/SEC.) = 1.31
LONGEST FLOWPATH FROM NODE 186.00 TO NODE 188.00 = 800.00 FEET.

*****
FLOW PROCESS FROM NODE      188.00 TO NODE      182.00 IS CODE =  31

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-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 852.50 DOWNSTREAM(FEET) = 852.00
FLOW LENGTH(FEET) = 36.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.79
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 6.40
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 11.59
LONGEST FLOWPATH FROM NODE 186.00 TO NODE 182.00 = 836.00 FEET.

*****
FLOW PROCESS FROM NODE 182.00 TO NODE 182.00 IS CODE = 1
-----
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 11.59
RAINFALL INTENSITY(INCH/HR) = 5.36
TOTAL STREAM AREA(ACRES) = 2.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.40

** CONFLUENCE DATA **
STREAM RUNOFF Tc INTENSITY AREA
NUMBER (CFS) (MIN.) (INCH/HOUR) (ACRE)
1 45.44 13.77 4.797 18.00
2 23.97 9.00 6.312 7.00
3 6.40 11.59 5.363 2.20

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

** PEAK FLOW RATE TABLE **
STREAM RUNOFF Tc INTENSITY
NUMBER (CFS) (MIN.) (INCH/HOUR)
1 58.64 9.00 6.312
2 65.00 11.59 5.363
3 69.39 13.77 4.797

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 69.39 Tc(MIN.) = 13.77
TOTAL AREA(ACRES) = 27.2
LONGEST FLOWPATH FROM NODE 176.00 TO NODE 182.00 = 2443.36 FEET.

*****
FLOW PROCESS FROM NODE 182.00 TO NODE 189.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 852.00 DOWNSTREAM(FEET) = 848.50
FLOW LENGTH(FEET) = 46.00 MANNING'S N = 0.013

```

DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.91
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 69.39
 PIPE TRAVEL TIME(MIN.) = 0.03 Tc(MIN.) = 13.80
 LONGEST FLOWPATH FROM NODE 176.00 TO NODE 189.00 = 2489.36 FEET.

FLOW PROCESS FROM NODE 189.00 TO NODE 189.00 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.) = 13.80
 RAINFALL INTENSITY(INCH/HR) = 4.79
 TOTAL STREAM AREA(ACRES) = 27.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 69.39

FLOW PROCESS FROM NODE 190.00 TO NODE 191.00 IS CODE = 21

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

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 84
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
 UPSTREAM ELEVATION(FEET) = 897.30
 DOWNSTREAM ELEVATION(FEET) = 897.00
 ELEVATION DIFFERENCE(FEET) = 0.30
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 8.451
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.573
 SUBAREA RUNOFF(CFS) = 0.35
 TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.35

FLOW PROCESS FROM NODE 191.00 TO NODE 192.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 897.00 DOWNSTREAM ELEVATION(FEET) = 854.00
 STREET LENGTH(FEET) = 656.00 CURB HEIGHT(INCHES) = 6.0
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.02
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.24
 HALFSTREET FLOOD WIDTH(FEET) = 5.78
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.46
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.08
 STREET FLOW TRAVEL TIME(MIN.) = 2.45 Tc(MIN.) = 10.90
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.578
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 84
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
 SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 3.31
 TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 3.61

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.28 HALFSTREET FLOOD WIDTH(FEET) = 7.71
 FLOW VELOCITY(FEET/SEC.) = 5.07 DEPTH*VELOCITY(FT*FT/SEC.) = 1.42
 LONGEST FLOWPATH FROM NODE 190.00 TO NODE 192.00 = 706.00 FEET.

FLOW PROCESS FROM NODE 192.00 TO NODE 189.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 849.00 DOWNSTREAM(FEET) = 848.50
 FLOW LENGTH(FEET) = 42.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.53
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 3.61
 PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 11.03
 LONGEST FLOWPATH FROM NODE 190.00 TO NODE 189.00 = 748.00 FEET.

FLOW PROCESS FROM NODE 189.00 TO NODE 189.00 IS CODE = 1

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

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 11.03
 RAINFALL INTENSITY(INCH/HR) = 5.54
 TOTAL STREAM AREA(ACRES) = 1.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.61

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	69.39	13.80	4.790	27.20
2	3.61	11.03	5.537	1.20

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	63.65	11.03	5.537
2	72.52	13.80	4.790

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 72.52 Tc(MIN.) = 13.80

TOTAL AREA(ACRES) = 28.4

LONGEST FLOWPATH FROM NODE 176.00 TO NODE 189.00 = 2489.36 FEET.

FLOW PROCESS FROM NODE 189.00 TO NODE 159.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 848.50 DOWNSTREAM(FEET) = 820.30

FLOW LENGTH(FEET) = 464.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.48

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 72.52

PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 14.16

LONGEST FLOWPATH FROM NODE 176.00 TO NODE 159.00 = 2953.36 FEET.

FLOW PROCESS FROM NODE 159.00 TO NODE 159.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	72.52	14.16	4.711	28.40

LONGEST FLOWPATH FROM NODE 176.00 TO NODE 159.00 = 2953.36 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	106.52	13.28	4.912	48.80

LONGEST FLOWPATH FROM NODE 101.00 TO NODE 159.00 = 2745.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	174.50	13.28	4.912
2	174.69	14.16	4.711

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 174.69 Tc(MIN.) = 14.16

TOTAL AREA(ACRES) = 77.2

FLOW PROCESS FROM NODE 159.00 TO NODE 159.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<

```

=====
** MAIN STREAM CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)
    1      174.69      14.16      4.711      77.20
LONGEST FLOWPATH FROM NODE      176.00 TO NODE      159.00 =      2953.36 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)
    1      10.76      5.49      8.686      1.40
LONGEST FLOWPATH FROM NODE      160.00 TO NODE      159.00 =      1176.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)
    1      78.43      5.49      8.686
    2      180.53      14.16      4.711

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      180.53      Tc(MIN.) =      14.16
TOTAL AREA(ACRES) =      78.6

*****
FLOW PROCESS FROM NODE      159.00 TO NODE      159.00 IS CODE = 12
-----
>>>>CLEAR MEMORY BANK # 1 <<<<
=====

*****
FLOW PROCESS FROM NODE      159.00 TO NODE      159.00 IS CODE = 12
-----
>>>>CLEAR MEMORY BANK # 2 <<<<
=====

*****
FLOW PROCESS FROM NODE      159.00 TO NODE      193.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 820.30 DOWNSTREAM(FEET) = 807.00
FLOW LENGTH(FEET) = 370.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 34.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.44
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 180.53
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 14.45
LONGEST FLOWPATH FROM NODE      176.00 TO NODE      193.00 =      3323.36 FEET.

*****
FLOW PROCESS FROM NODE      193.00 TO NODE      193.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 3

```

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 14.45
 RAINFALL INTENSITY(INCH/HR) = 4.65
 TOTAL STREAM AREA(ACRES) = 78.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 180.53

FLOW PROCESS FROM NODE 194.00 TO NODE 195.00 IS CODE = 21

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

=====

STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 98
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
 UPSTREAM ELEVATION(FEET) = 872.00
 DOWNSTREAM ELEVATION(FEET) = 866.00
 ELEVATION DIFFERENCE(FEET) = 6.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 1.359
 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) = 0.80
 TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.80

FLOW PROCESS FROM NODE 195.00 TO NODE 196.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 866.00 DOWNSTREAM ELEVATION(FEET) = 813.00
 STREET LENGTH(FEET) = 805.00 CURB HEIGHT(INCHES) = 6.0
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.21
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.27
 HALFSTREET FLOOD WIDTH(FEET) = 7.31
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.92
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.34
 STREET FLOW TRAVEL TIME(MIN.) = 2.73 Tc(MIN.) = 4.09
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 98
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.870

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 4.81
TOTAL AREA(ACRES) = 0.7 PEAK FLOW RATE(CFS) = 5.62

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 9.44
FLOW VELOCITY(FEET/SEC.) = 5.57 DEPTH*VELOCITY(FT*FT/SEC.) = 1.75
LONGEST FLOWPATH FROM NODE 194.00 TO NODE 196.00 = 855.00 FEET.

FLOW PROCESS FROM NODE 196.00 TO NODE 193.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 808.00 DOWNSTREAM(FEET) = 807.00
FLOW LENGTH(FEET) = 20.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.50
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.62
PIPE TRAVEL TIME(MIN.) = 0.03 Tc(MIN.) = 4.12
LONGEST FLOWPATH FROM NODE 194.00 TO NODE 193.00 = 875.00 FEET.

FLOW PROCESS FROM NODE 193.00 TO NODE 193.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 4.12
RAINFALL INTENSITY(INCH/HR) = 9.22
TOTAL STREAM AREA(ACRES) = 0.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.62

FLOW PROCESS FROM NODE 197.00 TO NODE 198.00 IS CODE = 21

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

=====

STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 98
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 854.00
DOWNSTREAM ELEVATION(FEET) = 838.00
ELEVATION DIFFERENCE(FEET) = 16.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 1.359
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) = 0.80
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.80

FLOW PROCESS FROM NODE 198.00 TO NODE 199.00 IS CODE = 62


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-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 838.00  DOWNSTREAM ELEVATION(FEET) = 813.00
STREET LENGTH(FEET) = 553.00  CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.21
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.29
HALFSTREET FLOOD WIDTH(FEET) = 7.97
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.26
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.22
STREET FLOW TRAVEL TIME(MIN.) = 2.17  Tc(MIN.) = 3.52
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 98
AREA-AVERAGE RUNOFF COEFFICIENT = 0.870
SUBAREA AREA(ACRES) = 0.60  SUBAREA RUNOFF(CFS) = 4.81
TOTAL AREA(ACRES) = 0.7  PEAK FLOW RATE(CFS) = 5.62

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.33  HALFSTREET FLOOD WIDTH(FEET) = 10.20
FLOW VELOCITY(FEET/SEC.) = 4.85  DEPTH*VELOCITY(FT*FT/SEC.) = 1.60
LONGEST FLOWPATH FROM NODE 197.00 TO NODE 199.00 = 603.00 FEET.

*****
FLOW PROCESS FROM NODE 199.00 TO NODE 193.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 808.00  DOWNSTREAM(FEET) = 807.00
FLOW LENGTH(FEET) = 15.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.65
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.62
PIPE TRAVEL TIME(MIN.) = 0.02  Tc(MIN.) = 3.55
LONGEST FLOWPATH FROM NODE 197.00 TO NODE 193.00 = 618.00 FEET.

*****
FLOW PROCESS FROM NODE 193.00 TO NODE 193.00 IS CODE = 1
-----

```

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

```
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 3.55
RAINFALL INTENSITY(INCH/HR) = 9.22
TOTAL STREAM AREA(ACRES) = 0.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.62
```

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	180.53	14.45	4.650	78.60
2	5.62	4.12	9.222	0.70
3	5.62	3.55	9.222	0.70

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	54.75	3.55	9.222
2	62.68	4.12	9.222
3	186.19	14.45	4.650

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 186.19 Tc(MIN.) = 14.45
 TOTAL AREA(ACRES) = 80.0
 LONGEST FLOWPATH FROM NODE 176.00 TO NODE 193.00 = 3323.36 FEET.

FLOW PROCESS FROM NODE 193.00 TO NODE 1100.00 IS CODE = 31

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

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

```
=====
ELEVATION DATA: UPSTREAM(FEET) = 807.00 DOWNSTREAM(FEET) = 788.00
FLOW LENGTH(FEET) = 1113.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.67
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 186.19
PIPE TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 15.56
LONGEST FLOWPATH FROM NODE 176.00 TO NODE 1100.00 = 4436.36 FEET.
```

FLOW PROCESS FROM NODE 1100.00 TO NODE 1101.00 IS CODE = 31

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

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

```
=====
ELEVATION DATA: UPSTREAM(FEET) = 788.00 DOWNSTREAM(FEET) = 784.00
FLOW LENGTH(FEET) = 53.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.20
```

```

ESTIMATED PIPE DIAMETER(INCH) = 39.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 186.19
PIPE TRAVEL TIME(MIN.) = 0.03    Tc(MIN.) = 15.60
LONGEST FLOWPATH FROM NODE 176.00 TO NODE 1101.00 = 4489.36 FEET.

```

```

FLOW PROCESS FROM NODE 1101.00 TO NODE 1102.00 IS CODE = 51

```

```

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

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 784.00 DOWNSTREAM(FEET) = 782.20
CHANNEL LENGTH THRU SUBAREA(FEET) = 300.00 CHANNEL SLOPE = 0.0060
CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 30.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.151
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) = 187.94
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.05
AVERAGE FLOW DEPTH(FEET) = 1.28 TRAVEL TIME(MIN.) = 1.64
Tc(MIN.) = 17.24
SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 3.49
AREA-AVERAGE RUNOFF COEFFICIENT = 0.481
TOTAL AREA(ACRES) = 82.8 PEAK FLOW RATE(CFS) = 186.19

```

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.27 FLOW VELOCITY(FEET/SEC.) = 3.05
LONGEST FLOWPATH FROM NODE 176.00 TO NODE 1102.00 = 4789.36 FEET.

```

```

FLOW PROCESS FROM NODE 1102.00 TO NODE 1103.00 IS CODE = 31

```

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 777.00 DOWNSTREAM(FEET) = 762.00
FLOW LENGTH(FEET) = 74.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 42.47
ESTIMATED PIPE DIAMETER(INCH) = 33.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 186.19
PIPE TRAVEL TIME(MIN.) = 0.03    Tc(MIN.) = 17.27
LONGEST FLOWPATH FROM NODE 176.00 TO NODE 1103.00 = 4863.36 FEET.

```

```

FLOW PROCESS FROM NODE 1103.00 TO NODE 1104.00 IS CODE = 51

```

```

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

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 762.00 DOWNSTREAM(FEET) = 730.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 156.00 CHANNEL SLOPE = 0.2051
CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 10.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 186.19

```

```

FLOW VELOCITY(FEET/SEC.) = 8.75 FLOW DEPTH(FEET) = 1.04
TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 17.56
LONGEST FLOWPATH FROM NODE 176.00 TO NODE 1104.00 = 5019.36 FEET.

*****
FLOW PROCESS FROM NODE 1104.00 TO NODE 1104.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====

*****
FLOW PROCESS FROM NODE 1106.00 TO NODE 1107.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 71
INITIAL SUBAREA FLOW-LENGTH(FEET) = 60.00
UPSTREAM ELEVATION(FEET) = 1042.00
DOWNSTREAM ELEVATION(FEET) = 1038.00
ELEVATION DIFFERENCE(FEET) = 4.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.927
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.264
SUBAREA RUNOFF(CFS) = 0.25
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.25

*****
FLOW PROCESS FROM NODE 1107.00 TO NODE 1108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 1038.00 DOWNSTREAM(FEET) = 840.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 2420.00 CHANNEL SLOPE = 0.0818
CHANNEL BASE(FEET) = 15.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 3.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.449
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 71
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.68
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.22
AVERAGE FLOW DEPTH(FEET) = 0.50 TRAVEL TIME(MIN.) = 9.55
Tc(MIN.) = 15.48
SUBAREA AREA(ACRES) = 46.40 SUBAREA RUNOFF(CFS) = 61.92
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 46.5 PEAK FLOW RATE(CFS) = 62.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.71 FLOW VELOCITY(FEET/SEC.) = 5.29
LONGEST FLOWPATH FROM NODE 1106.00 TO NODE 1108.00 = 2480.00 FEET.

*****
FLOW PROCESS FROM NODE 1108.00 TO NODE 1109.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

```

```

>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 840.00 DOWNSTREAM(FEET) = 836.00
FLOW LENGTH(FEET) = 145.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.99
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 62.06
PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 15.64
LONGEST FLOWPATH FROM NODE 1106.00 TO NODE 1109.00 = 2625.00 FEET.

*****
FLOW PROCESS FROM NODE 1109.00 TO NODE 1110.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 836.00 DOWNSTREAM(FEET) = 820.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 599.00 CHANNEL SLOPE = 0.0267
CHANNEL BASE(FEET) = 24.00 "Z" FACTOR = 2.500
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 3.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.935
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 71
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 65.18
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.24
AVERAGE FLOW DEPTH(FEET) = 0.78 TRAVEL TIME(MIN.) = 3.08
Tc(MIN.) = 18.72
SUBAREA AREA(ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 6.26
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 51.8 PEAK FLOW RATE(CFS) = 62.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.75 FLOW VELOCITY(FEET/SEC.) = 3.19
LONGEST FLOWPATH FROM NODE 1106.00 TO NODE 1110.00 = 3224.00 FEET.

*****
FLOW PROCESS FROM NODE 1110.00 TO NODE 1111.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 810.00
FLOW LENGTH(FEET) = 120.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.29
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 62.06
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 18.81
LONGEST FLOWPATH FROM NODE 1106.00 TO NODE 1111.00 = 3344.00 FEET.

*****
FLOW PROCESS FROM NODE 1111.00 TO NODE 1112.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 787.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 381.00 CHANNEL SLOPE = 0.0604
CHANNEL BASE(FEET) = 24.00 "Z" FACTOR = 2.500
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 3.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.731
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 71
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 63.68
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.16
AVERAGE FLOW DEPTH(FEET) = 0.60 TRAVEL TIME(MIN.) = 1.53
Tc(MIN.) = 20.33
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 3.25
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 54.7 PEAK FLOW RATE(CFS) = 62.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.59 FLOW VELOCITY(FEET/SEC.) = 4.11
LONGEST FLOWPATH FROM NODE 1106.00 TO NODE 1112.00 = 3725.00 FEET.

*****
FLOW PROCESS FROM NODE 1112.00 TO NODE 1112.00 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.) = 20.33
RAINFALL INTENSITY(INCH/HR) = 3.73
TOTAL STREAM AREA(ACRES) = 54.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 62.06

*****
FLOW PROCESS FROM NODE 1113.00 TO NODE 1114.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 71
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 940.00
DOWNSTREAM ELEVATION(FEET) = 939.00
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 1114.00 TO NODE 1115.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 939.00 DOWNSTREAM(FEET) = 804.00

```

CHANNEL LENGTH THRU SUBAREA(FEET) = 1333.00 CHANNEL SLOPE = 0.1013
 CHANNEL BASE(FEET) = 20.00 "Z" FACTOR = 2.000
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 3.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.068
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 71
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.59
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.29
 AVERAGE FLOW DEPTH(FEET) = 0.16 TRAVEL TIME(MIN.) = 9.70
 Tc(MIN.) = 17.79
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 13.91
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
 TOTAL AREA(ACRES) = 11.5 PEAK FLOW RATE(CFS) = 14.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.23 FLOW VELOCITY(FEET/SEC.) = 2.93
 LONGEST FLOWPATH FROM NODE 1113.00 TO NODE 1115.00 = 1383.00 FEET.

FLOW PROCESS FROM NODE 1115.00 TO NODE 1112.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 804.00 DOWNSTREAM(FEET) = 787.00

FLOW LENGTH(FEET) = 143.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 18.46

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 14.03

PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 17.91

LONGEST FLOWPATH FROM NODE 1113.00 TO NODE 1112.00 = 1526.00 FEET.

FLOW PROCESS FROM NODE 1112.00 TO NODE 1112.00 IS CODE = 1

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

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 17.91

RAINFALL INTENSITY(INCH/HR) = 4.05

TOTAL STREAM AREA(ACRES) = 11.50

PEAK FLOW RATE(CFS) AT CONFLUENCE = 14.03

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	62.06	20.33	3.731	54.70
2	14.03	17.91	4.049	11.50

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	68.71	17.91	4.049
2	74.99	20.33	3.731

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 74.99 Tc(MIN.) = 20.33

TOTAL AREA(ACRES) = 66.2

LONGEST FLOWPATH FROM NODE 1106.00 TO NODE 1112.00 = 3725.00 FEET.

FLOW PROCESS FROM NODE 1112.00 TO NODE 1116.00 IS CODE = 51

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

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

ELEVATION DATA: UPSTREAM(FEET) = 787.00 DOWNSTREAM(FEET) = 766.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 748.00 CHANNEL SLOPE = 0.0281

CHANNEL BASE(FEET) = 24.00 "Z" FACTOR = 2.500

MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 4.00

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.362

CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 71

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 77.11

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.50

AVERAGE FLOW DEPTH(FEET) = 0.84 TRAVEL TIME(MIN.) = 3.56

Tc(MIN.) = 23.90

SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 4.24

AREA-AVERAGE RUNOFF COEFFICIENT = 0.300

TOTAL AREA(ACRES) = 70.4 PEAK FLOW RATE(CFS) = 74.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.83 FLOW VELOCITY(FEET/SEC.) = 3.47

LONGEST FLOWPATH FROM NODE 1106.00 TO NODE 1116.00 = 4473.00 FEET.

FLOW PROCESS FROM NODE 1116.00 TO NODE 1116.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<

FLOW PROCESS FROM NODE 1117.00 TO NODE 1118.00 IS CODE = 21

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

CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 71

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00

UPSTREAM ELEVATION(FEET) = 938.00

DOWNSTREAM ELEVATION(FEET) = 934.00

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    1118.00 TO NODE    1119.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    934.00  DOWNSTREAM(FEET) =    804.00
CHANNEL LENGTH THRU SUBAREA(FEET) =    900.00  CHANNEL SLOPE =    0.1444
CHANNEL BASE(FEET) =    18.00  "Z" FACTOR =    2.000
MANNING'S FACTOR = 0.060  MAXIMUM DEPTH(FEET) =    2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =    5.632
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =    71
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      7.56
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =    2.66
AVERAGE FLOW DEPTH(FEET) =    0.16  TRAVEL TIME(MIN.) =    5.65
Tc(MIN.) =    10.74
SUBAREA AREA(ACRES) =      8.20    SUBAREA RUNOFF(CFS) =    13.86
AREA-AVERAGE RUNOFF COEFFICIENT =    0.300
TOTAL AREA(ACRES) =      8.3    PEAK FLOW RATE(CFS) =      14.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =    0.22  FLOW VELOCITY(FEET/SEC.) =    3.39
LONGEST FLOWPATH FROM NODE    1117.00 TO NODE    1119.00 =      950.00 FEET.

*****
FLOW PROCESS FROM NODE    1119.00 TO NODE    1120.00 IS CODE =  31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    804.00  DOWNSTREAM(FEET) =    796.00
FLOW LENGTH(FEET) =    82.00  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.) =    17.16
ESTIMATED PIPE DIAMETER(INCH) =    18.00  NUMBER OF PIPES =    1
PIPE-FLOW(CFS) =      14.02
PIPE TRAVEL TIME(MIN.) =    0.08  Tc(MIN.) =    10.82
LONGEST FLOWPATH FROM NODE    1117.00 TO NODE    1120.00 =    1032.00 FEET.

*****
FLOW PROCESS FROM NODE    1120.00 TO NODE    1116.00 IS CODE =  51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    796.00  DOWNSTREAM(FEET) =    766.00
CHANNEL LENGTH THRU SUBAREA(FEET) =    385.00  CHANNEL SLOPE =    0.0779
CHANNEL BASE(FEET) =    25.00  "Z" FACTOR =    2.000
MANNING'S FACTOR = 0.060  MAXIMUM DEPTH(FEET) =    2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =    4.902
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000

```

SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 71
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.28
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.57
 AVERAGE FLOW DEPTH(FEET) = 0.23 TRAVEL TIME(MIN.) = 2.50
 Tc(MIN.) = 13.32
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 2.50
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
 TOTAL AREA(ACRES) = 10.0 PEAK FLOW RATE(CFS) = 14.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.23 FLOW VELOCITY(FEET/SEC.) = 2.56
 LONGEST FLOWPATH FROM NODE 1117.00 TO NODE 1116.00 = 1417.00 FEET.

 FLOW PROCESS FROM NODE 1116.00 TO NODE 1116.00 IS CODE = 10

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

 FLOW PROCESS FROM NODE 1121.00 TO NODE 1122.00 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) = 916.00
 DOWNSTREAM ELEVATION(FEET) = 914.00
 ELEVATION DIFFERENCE(FEET) = 2.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.934
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.257
 SUBAREA RUNOFF(CFS) = 2.97
 TOTAL AREA(ACRES) = 1.00 TOTAL RUNOFF(CFS) = 2.97

 FLOW PROCESS FROM NODE 1122.00 TO NODE 1123.00 IS CODE = 62

 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<
 =====

UPSTREAM ELEVATION(FEET) = 914.00 DOWNSTREAM ELEVATION(FEET) = 825.00
 STREET LENGTH(FEET) = 1736.00 CURB HEIGHT(INCHES) = 6.0
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.98

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.45
 HALFSTREET FLOOD WIDTH(FEET) = 16.05
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.67
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.98
 STREET FLOW TRAVEL TIME(MIN.) = 4.34 Tc(MIN.) = 10.27
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 84
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.523
 SUBAREA AREA(ACRES) = 9.60 SUBAREA RUNOFF(CFS) = 30.05
 TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 32.13

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.53 HALFSTREET FLOOD WIDTH(FEET) = 21.55
 FLOW VELOCITY(FEET/SEC.) = 7.68 DEPTH*VELOCITY(FT*FT/SEC.) = 4.06
 *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 1736.0 FT WITH ELEVATION-DROP = 89.0 FT, IS 43.2 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 1123.00
 LONGEST FLOWPATH FROM NODE 1121.00 TO NODE 1123.00 = 1786.00 FEET.

FLOW PROCESS FROM NODE 1123.00 TO NODE 1124.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 819.60
 FLOW LENGTH(FEET) = 35.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.35
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 32.13
 PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 10.33
 LONGEST FLOWPATH FROM NODE 1121.00 TO NODE 1124.00 = 1821.00 FEET.

FLOW PROCESS FROM NODE 1124.00 TO NODE 1124.00 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.) = 10.33
 RAINFALL INTENSITY(INCH/HR) = 5.77
 TOTAL STREAM AREA(ACRES) = 10.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 32.13

FLOW PROCESS FROM NODE 1125.00 TO NODE 1126.00 IS CODE = 21

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

=====

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 84

```

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 930.30
DOWNSTREAM ELEVATION(FEET) = 929.20
ELEVATION DIFFERENCE(FEET) = 1.10
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.480
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.692
SUBAREA RUNOFF(CFS) = 0.47
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.47

*****
FLOW PROCESS FROM NODE 1126.00 TO NODE 1124.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 929.20 DOWNSTREAM ELEVATION(FEET) = 825.00
STREET LENGTH(FEET) = 1940.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.52
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.44
HALFSTREET FLOOD WIDTH(FEET) = 15.74
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.75
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.98
STREET FLOW TRAVEL TIME(MIN.) = 4.79 Tc(MIN.) = 10.27
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.796
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 33.18
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 33.49

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.53 HALFSTREET FLOOD WIDTH(FEET) = 21.86
FLOW VELOCITY(FEET/SEC.) = 7.87 DEPTH*VELOCITY(FT*FT/SEC.) = 4.19
*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
AND L = 1940.0 FT WITH ELEVATION-DROP = 104.2 FT, IS 48.2 CFS,
WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 1124.00
LONGEST FLOWPATH FROM NODE 1125.00 TO NODE 1124.00 = 1990.00 FEET.

*****
FLOW PROCESS FROM NODE 1124.00 TO NODE 1124.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

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TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 10.27
 RAINFALL INTENSITY(INCH/HR) = 5.80
 TOTAL STREAM AREA(ACRES) = 10.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 33.49

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	32.13	10.33	5.773	10.60
2	33.49	10.27	5.796	10.70

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	65.43	10.27	5.796
2	65.49	10.33	5.773

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 65.49 Tc(MIN.) = 10.33
 TOTAL AREA(ACRES) = 21.3
 LONGEST FLOWPATH FROM NODE 1125.00 TO NODE 1124.00 = 1990.00 FEET.

FLOW PROCESS FROM NODE 1124.00 TO NODE 1127.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 819.60 DOWNSTREAM(FEET) = 790.00
 FLOW LENGTH(FEET) = 80.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 41.33
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 65.49
 PIPE TRAVEL TIME(MIN.) = 0.03 Tc(MIN.) = 10.37
 LONGEST FLOWPATH FROM NODE 1125.00 TO NODE 1127.00 = 2070.00 FEET.

FLOW PROCESS FROM NODE 1127.00 TO NODE 1116.00 IS CODE = 51

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 766.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 354.00 CHANNEL SLOPE = 0.0678
 CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 3.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.416
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 71
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 66.87

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.66
 AVERAGE FLOW DEPTH(FEET) = 0.99 TRAVEL TIME(MIN.) = 1.04
 Tc(MIN.) = 11.41
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 2.76
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.514
 TOTAL AREA(ACRES) = 23.0 PEAK FLOW RATE(CFS) = 65.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 5.63
 LONGEST FLOWPATH FROM NODE 1125.00 TO NODE 1116.00 = 2424.00 FEET.

FLOW PROCESS FROM NODE 1116.00 TO NODE 1116.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<

=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	65.49	11.41	5.416	23.00

LONGEST FLOWPATH FROM NODE 1125.00 TO NODE 1116.00 = 2424.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	74.99	23.90	3.362	70.40

LONGEST FLOWPATH FROM NODE 1106.00 TO NODE 1116.00 = 4473.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	101.29	11.41	5.416
2	115.64	23.90	3.362

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 115.64 Tc(MIN.) = 23.90
 TOTAL AREA(ACRES) = 93.4

FLOW PROCESS FROM NODE 1116.00 TO NODE 1116.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	115.64	23.90	3.362	93.40

LONGEST FLOWPATH FROM NODE 1106.00 TO NODE 1116.00 = 4473.00 FEET.

** MEMORY BANK # 3 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	14.71	13.32	4.902	10.00

LONGEST FLOWPATH FROM NODE 1117.00 TO NODE 1116.00 = 1417.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	79.16	13.32	4.902
2	125.73	23.90	3.362

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 125.73 Tc(MIN.) = 23.90
 TOTAL AREA(ACRES) = 103.4

 FLOW PROCESS FROM NODE 1116.00 TO NODE 1116.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<<

 FLOW PROCESS FROM NODE 1116.00 TO NODE 1116.00 IS CODE = 12

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

 FLOW PROCESS FROM NODE 1116.00 TO NODE 1104.00 IS CODE = 51

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) =	766.00	DOWNSTREAM(FEET) =	730.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	684.00	CHANNEL SLOPE =	0.0526
CHANNEL BASE(FEET) =	25.00	"Z" FACTOR =	2.000
MANNING'S FACTOR =	0.060	MAXIMUM DEPTH(FEET) =	4.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) =	3.175		
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT =	.3000		
SOIL CLASSIFICATION IS "C"			
S.C.S. CURVE NUMBER (AMC II) =	71		
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =	129.49		
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =	5.15		
AVERAGE FLOW DEPTH(FEET) =	0.94	TRAVEL TIME(MIN.) =	2.21
Tc(MIN.) =	26.11		
SUBAREA AREA(ACRES) =	7.90	SUBAREA RUNOFF(CFS) =	7.53
AREA-AVERAGE RUNOFF COEFFICIENT =	0.344		
TOTAL AREA(ACRES) =	111.3	PEAK FLOW RATE(CFS) =	125.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.92 FLOW VELOCITY(FEET/SEC.) = 5.09
 LONGEST FLOWPATH FROM NODE 1106.00 TO NODE 1104.00 = 5157.00 FEET.

 FLOW PROCESS FROM NODE 1104.00 TO NODE 1104.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

 FLOW PROCESS FROM NODE 1128.00 TO NODE 1129.00 IS CODE = 21

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>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 71
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 892.00
DOWNSTREAM ELEVATION(FEET) = 886.00
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!
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 1129.00 TO NODE 1130.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 886.00 DOWNSTREAM(FEET) = 800.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 578.00 CHANNEL SLOPE = 0.1488
CHANNEL BASE(FEET) = 28.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 2.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.738
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 71
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.76
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.69
AVERAGE FLOW DEPTH(FEET) = 0.08 TRAVEL TIME(MIN.) = 5.71
Tc(MIN.) = 10.43
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 6.54
AREA-AVERAGE RUNOFF COEFFICIENT = 0.300
TOTAL AREA(ACRES) = 3.9 PEAK FLOW RATE(CFS) = 6.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.11 FLOW VELOCITY(FEET/SEC.) = 2.17
LONGEST FLOWPATH FROM NODE 1128.00 TO NODE 1130.00 = 628.00 FEET.

*****
FLOW PROCESS FROM NODE 1130.00 TO NODE 1131.00 IS CODE = 31
-----
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 780.00
FLOW LENGTH(FEET) = 158.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.42
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 6.71
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 10.61
LONGEST FLOWPATH FROM NODE 1128.00 TO NODE 1131.00 = 786.00 FEET.

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*****
FLOW PROCESS FROM NODE    1131.00 TO NODE    1104.00 IS CODE =  51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    780.00  DOWNSTREAM(FEET) =    730.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   580.00  CHANNEL SLOPE =   0.0862
CHANNEL BASE(FEET) =   24.00  "Z" FACTOR =   2.500
MANNING'S FACTOR = 0.060  MAXIMUM DEPTH(FEET) =   4.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =   4.544
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =   71
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =         9.32
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.21
AVERAGE FLOW DEPTH(FEET) =   0.17  TRAVEL TIME(MIN.) =   4.37
Tc(MIN.) =   14.98
SUBAREA AREA(ACRES) =     3.80      SUBAREA RUNOFF(CFS) =     5.18
AREA-AVERAGE RUNOFF COEFFICIENT =   0.300
TOTAL AREA(ACRES) =     7.7      PEAK FLOW RATE(CFS) =     10.50

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =   0.19  FLOW VELOCITY(FEET/SEC.) =   2.31
LONGEST FLOWPATH FROM NODE    1128.00 TO NODE    1104.00 =    1366.00 FEET.

*****
FLOW PROCESS FROM NODE    1104.00 TO NODE    1104.00 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        10.50      14.98        4.544        7.70
LONGEST FLOWPATH FROM NODE    1128.00 TO NODE    1104.00 =    1366.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)
   1        186.19      17.56        4.101        82.80
LONGEST FLOWPATH FROM NODE    176.00 TO NODE    1104.00 =    5019.36 FEET.

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)
   1        169.30      14.98        4.544
   2        195.67      17.56        4.101

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     195.67  Tc(MIN.) =     17.56
TOTAL AREA(ACRES) =     90.5

*****
FLOW PROCESS FROM NODE    1104.00 TO NODE    1104.00 IS CODE =  11

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>>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
=====

** MAIN STREAM CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
    1        195.67      17.56        4.101        90.50
LONGEST FLOWPATH FROM NODE      176.00 TO NODE      1104.00 =      5019.36 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
    1        125.73      26.11        3.175        111.30
LONGEST FLOWPATH FROM NODE      1106.00 TO NODE      1104.00 =      5157.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF      Tc      INTENSITY
NUMBER      (CFS)      (MIN.)    (INCH/HOUR)
    1        280.24      17.56        4.101
    2        277.24      26.11        3.175

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      280.24    Tc(MIN.) =      17.56
TOTAL AREA(ACRES) =      201.8

*****
FLOW PROCESS FROM NODE      1104.00 TO NODE      1104.00 IS CODE = 12
-----
>>>>>CLEAR MEMORY BANK # 1 <<<<<
=====

*****
FLOW PROCESS FROM NODE      1104.00 TO NODE      1104.00 IS CODE = 12
-----
>>>>>CLEAR MEMORY BANK # 2 <<<<<
=====

*****
FLOW PROCESS FROM NODE      1104.00 TO NODE      1132.00 IS CODE = 51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =      730.00    DOWNSTREAM(FEET) =      636.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1083.00    CHANNEL SLOPE = 0.0868
CHANNEL BASE(FEET) = 15.00    "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.060    MAXIMUM DEPTH(FEET) = 5.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.827
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 71
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      284.71
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.08
AVERAGE FLOW DEPTH(FEET) = 1.70    TRAVEL TIME(MIN.) = 1.99
Tc(MIN.) = 19.55
SUBAREA AREA(ACRES) =      7.80    SUBAREA RUNOFF(CFS) =      8.95

```

AREA-AVERAGE RUNOFF COEFFICIENT = 0.395
TOTAL AREA(ACRES) = 209.6 PEAK FLOW RATE(CFS) = 316.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.81 FLOW VELOCITY(FEET/SEC.) = 9.39
LONGEST FLOWPATH FROM NODE 1106.00 TO NODE 1132.00 = 6240.00 FEET.

FLOW PROCESS FROM NODE 1132.00 TO NODE 1132.00 IS CODE = 10

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

=====

FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 21

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

=====

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 84

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00

UPSTREAM ELEVATION(FEET) = 901.30

DOWNSTREAM ELEVATION(FEET) = 900.80

ELEVATION DIFFERENCE(FEET) = 0.50

SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.128

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.337

SUBAREA RUNOFF(CFS) = 0.40

TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.40

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 900.00 DOWNSTREAM ELEVATION(FEET) = 896.00

STREET LENGTH(FEET) = 315.00 CURB HEIGHT(INCHES) = 6.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.06

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.30

HALFSTREET FLOOD WIDTH(FEET) = 8.71

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.36

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.71

STREET FLOW TRAVEL TIME(MIN.) = 2.23 Tc(MIN.) = 9.35

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.156

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 84
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
 SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 3.32
 TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 3.66

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.13
 FLOW VELOCITY(FEET/SEC.) = 2.69 DEPTH*VELOCITY(FT*FT/SEC.) = 0.94
 LONGEST FLOWPATH FROM NODE 201.00 TO NODE 203.00 = 365.00 FEET.

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 891.00 DOWNSTREAM(FEET) = 890.70
 FLOW LENGTH(FEET) = 24.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.65
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 3.66
 PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 9.43
 LONGEST FLOWPATH FROM NODE 201.00 TO NODE 204.00 = 389.00 FEET.

FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 9.43
 RAINFALL INTENSITY(INCH/HR) = 6.13
 TOTAL STREAM AREA(ACRES) = 1.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.66

FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 21

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

=====

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 84
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
 UPSTREAM ELEVATION(FEET) = 925.00
 DOWNSTREAM ELEVATION(FEET) = 924.50
 ELEVATION DIFFERENCE(FEET) = 0.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.128
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.337
 SUBAREA RUNOFF(CFS) = 0.40
 TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.40

FLOW PROCESS FROM NODE 206.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 924.50 DOWNSTREAM ELEVATION(FEET) = 896.00
STREET LENGTH(FEET) = 785.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.68
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 11.52
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.62
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.65
STREET FLOW TRAVEL TIME(MIN.) = 2.83 Tc(MIN.) = 9.96
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.912
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 12.45
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 12.77

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 14.96
FLOW VELOCITY(FEET/SEC.) = 5.42 DEPTH*VELOCITY(FT*FT/SEC.) = 2.31
LONGEST FLOWPATH FROM NODE 205.00 TO NODE 204.00 = 835.00 FEET.

FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 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.) = 9.96
RAINFALL INTENSITY(INCH/HR) = 5.91
TOTAL STREAM AREA(ACRES) = 4.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.77

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	3.66	9.43	6.126	1.10
2	12.77	9.96	5.912	4.00

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	15.74	9.43	6.126
2	16.30	9.96	5.912

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 16.30 Tc(MIN.) = 9.96
TOTAL AREA(ACRES) = 5.1
LONGEST FLOWPATH FROM NODE 205.00 TO NODE 204.00 = 835.00 FEET.

FLOW PROCESS FROM NODE 204.00 TO NODE 207.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 890.70 DOWNSTREAM(FEET) = 888.00
FLOW LENGTH(FEET) = 205.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.16
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 16.30
PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 10.38
LONGEST FLOWPATH FROM NODE 205.00 TO NODE 207.00 = 1040.00 FEET.

FLOW PROCESS FROM NODE 207.00 TO NODE 207.00 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.) = 10.38
RAINFALL INTENSITY(INCH/HR) = 5.76
TOTAL STREAM AREA(ACRES) = 5.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 16.30

FLOW PROCESS FROM NODE 208.00 TO NODE 209.00 IS CODE = 21

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

=====

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 901.00
DOWNSTREAM ELEVATION(FEET) = 900.00
ELEVATION DIFFERENCE(FEET) = 1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.657
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.515
SUBAREA RUNOFF(CFS) = 0.46

```

TOTAL AREA(ACRES) =      0.10    TOTAL RUNOFF(CFS) =      0.46
*****
FLOW PROCESS FROM NODE      209.00 TO NODE      207.00 IS CODE =  62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION #  1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) =  900.00  DOWNSTREAM ELEVATION(FEET) =  892.00
STREET LENGTH(FEET) =    273.00  CURB HEIGHT(INCHES) =    6.0
STREET HALFWIDTH(FEET) =    30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   20.00
INSIDE STREET CROSSFALL(DECIMAL) =   0.020
OUTSIDE STREET CROSSFALL(DECIMAL) =   0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =   1
STREET PARKWAY CROSSFALL(DECIMAL) =   0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =   0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.80
    STREET FLOW TRAVEL TIME(MIN.) =   1.45    Tc(MIN.) =    7.10
    100 YEAR RAINFALL INTENSITY(INCH/HOUR) =   7.353
    RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
    SOIL CLASSIFICATION IS "C"
    S.C.S. CURVE NUMBER (AMC II) =   84
    AREA-AVERAGE RUNOFF COEFFICIENT =   0.540
    SUBAREA AREA(ACRES) =    0.60    SUBAREA RUNOFF(CFS) =    2.38
    TOTAL AREA(ACRES) =    0.7    PEAK FLOW RATE(CFS) =    2.78

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29    HALFSTREET FLOOD WIDTH(FEET) =    8.24
FLOW VELOCITY(FEET/SEC.) =  3.49    DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
LONGEST FLOWPATH FROM NODE      208.00 TO NODE      207.00 =    323.00 FEET.

*****
FLOW PROCESS FROM NODE      207.00 TO NODE      207.00 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.) =    7.10
RAINFALL INTENSITY(INCH/HR) =    7.35
TOTAL STREAM AREA(ACRES) =    0.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =    2.78

** CONFLUENCE DATA **
STREAM      RUNOFF      Tc      INTENSITY      AREA
NUMBER      (CFS)      (MIN.)  (INCH/HOUR)  (ACRE)

```

1	16.30	10.38	5.757	5.10
2	2.78	7.10	7.353	0.70

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	15.54	7.10	7.353
2	18.48	10.38	5.757

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 18.48 Tc(MIN.) = 10.38

TOTAL AREA(ACRES) = 5.8

LONGEST FLOWPATH FROM NODE 205.00 TO NODE 207.00 = 1040.00 FEET.

FLOW PROCESS FROM NODE 207.00 TO NODE 210.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 888.00 DOWNSTREAM(FEET) = 887.50

FLOW LENGTH(FEET) = 25.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 9.95

ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 18.48

PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 10.42

LONGEST FLOWPATH FROM NODE 205.00 TO NODE 210.00 = 1065.00 FEET.

FLOW PROCESS FROM NODE 210.00 TO NODE 210.00 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.) = 10.42

RAINFALL INTENSITY(INCH/HR) = 5.74

TOTAL STREAM AREA(ACRES) = 5.80

PEAK FLOW RATE(CFS) AT CONFLUENCE = 18.48

FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 21

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

=====

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 84

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00

UPSTREAM ELEVATION(FEET) = 917.20

DOWNSTREAM ELEVATION(FEET) = 916.50

ELEVATION DIFFERENCE(FEET) = 0.70

SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.371

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 7.887
 SUBAREA RUNOFF(CFS) = 0.43
 TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.43

FLOW PROCESS FROM NODE 212.00 TO NODE 210.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 916.50 DOWNSTREAM ELEVATION(FEET) = 892.00
 STREET LENGTH(FEET) = 695.00 CURB HEIGHT(INCHES) = 6.0
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.28
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.30
 HALFSTREET FLOOD WIDTH(FEET) = 8.51
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.89
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.15
 STREET FLOW TRAVEL TIME(MIN.) = 2.97 Tc(MIN.) = 9.35
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 6.160
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 84
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 5.66
 TOTAL AREA(ACRES) = 1.8 PEAK FLOW RATE(CFS) = 5.99

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.05
 FLOW VELOCITY(FEET/SEC.) = 4.47 DEPTH*VELOCITY(FT*FT/SEC.) = 1.55
 LONGEST FLOWPATH FROM NODE 211.00 TO NODE 210.00 = 745.00 FEET.

FLOW PROCESS FROM NODE 210.00 TO NODE 210.00 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.) = 9.35
 RAINFALL INTENSITY(INCH/HR) = 6.16
 TOTAL STREAM AREA(ACRES) = 1.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.99

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	18.48	10.42	5.742	5.80
2	5.99	9.35	6.160	1.80

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	23.21	9.35	6.160
2	24.06	10.42	5.742

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 24.06 Tc(MIN.) = 10.42

TOTAL AREA(ACRES) = 7.6

LONGEST FLOWPATH FROM NODE 205.00 TO NODE 210.00 = 1065.00 FEET.

FLOW PROCESS FROM NODE 210.00 TO NODE 213.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 887.50 DOWNSTREAM(FEET) = 864.00

FLOW LENGTH(FEET) = 58.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 33.43

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 24.06

PIPE TRAVEL TIME(MIN.) = 0.03 Tc(MIN.) = 10.45

LONGEST FLOWPATH FROM NODE 205.00 TO NODE 213.00 = 1123.00 FEET.

FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 51

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 864.00 DOWNSTREAM(FEET) = 720.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 2276.00 CHANNEL SLOPE = 0.0633

CHANNEL BASE(FEET) = 38.00 "Z" FACTOR = 2.000

MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 3.00

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.486

CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 71

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 43.95

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.12

AVERAGE FLOW DEPTH(FEET) = 0.36 TRAVEL TIME(MIN.) = 12.14

Tc(MIN.) = 22.59

SUBAREA AREA(ACRES) = 35.30 SUBAREA RUNOFF(CFS) = 36.92

AREA-AVERAGE RUNOFF COEFFICIENT = 0.343

TOTAL AREA(ACRES) = 42.9 PEAK FLOW RATE(CFS) = 51.22

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.40    FLOW VELOCITY(FEET/SEC.) = 3.30
LONGEST FLOWPATH FROM NODE    205.00 TO NODE    214.00 = 3399.00 FEET.

*****
FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<
=====

*****
FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84
INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00
UPSTREAM ELEVATION(FEET) = 926.10
DOWNSTREAM ELEVATION(FEET) = 925.00
ELEVATION DIFFERENCE(FEET) = 1.10
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 5.480
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.692
SUBAREA RUNOFF(CFS) = 0.47
TOTAL AREA(ACRES) = 0.10    TOTAL RUNOFF(CFS) = 0.47

*****
FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 925.00    DOWNSTREAM ELEVATION(FEET) = 890.00
STREET LENGTH(FEET) = 1353.00    CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.91
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.46
HALFSTREET FLOOD WIDTH(FEET) = 16.60
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.84
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.22
STREET FLOW TRAVEL TIME(MIN.) = 4.66    Tc(MIN.) = 10.14
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.845
RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 84

```

AREA-AVERAGE RUNOFF COEFFICIENT = 0.540
 SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 26.20
 TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 26.51

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.55 HALFSTREET FLOOD WIDTH(FEET) = 23.89
 FLOW VELOCITY(FEET/SEC.) = 5.62 DEPTH*VELOCITY(FT*FT/SEC.) = 3.10

*NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
 AND L = 1353.0 FT WITH ELEVATION-DROP = 35.0 FT, IS 33.5 CFS,
 WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE 217.00
 LONGEST FLOWPATH FROM NODE 215.00 TO NODE 217.00 = 1403.00 FEET.

FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 884.00 DOWNSTREAM(FEET) = 883.60

FLOW LENGTH(FEET) = 36.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 8.75

ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 26.51

PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 10.21

LONGEST FLOWPATH FROM NODE 215.00 TO NODE 218.00 = 1439.00 FEET.

FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 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.) = 10.21

RAINFALL INTENSITY(INCH/HR) = 5.82

TOTAL STREAM AREA(ACRES) = 8.40

PEAK FLOW RATE(CFS) AT CONFLUENCE = 26.51

FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 21

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

=====

STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 98

INITIAL SUBAREA FLOW-LENGTH(FEET) = 50.00

UPSTREAM ELEVATION(FEET) = 912.00

DOWNSTREAM ELEVATION(FEET) = 910.00

ELEVATION DIFFERENCE(FEET) = 2.00

SUBAREA OVERLAND TIME OF FLOW(MIN.) = 1.844

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 9.222

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

SUBAREA RUNOFF(CFS) = 0.80

TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.80

FLOW PROCESS FROM NODE 220.00 TO NODE 218.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 910.00 DOWNSTREAM ELEVATION(FEET) = 890.00

STREET LENGTH(FEET) = 873.00 CURB HEIGHT(INCHES) = 6.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.05

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.35

HALFSTREET FLOOD WIDTH(FEET) = 11.29

AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.63

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.28

STREET FLOW TRAVEL TIME(MIN.) = 4.01 Tc(MIN.) = 5.85

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 8.329

RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400

SOIL CLASSIFICATION IS "C"

S.C.S. CURVE NUMBER (AMC II) = 84

AREA-AVERAGE RUNOFF COEFFICIENT = 0.557

SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 8.10

TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 8.82

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 14.18

FLOW VELOCITY(FEET/SEC.) = 4.14 DEPTH*VELOCITY(FT*FT/SEC.) = 1.70

LONGEST FLOWPATH FROM NODE 219.00 TO NODE 218.00 = 923.00 FEET.

FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 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.) = 5.85

RAINFALL INTENSITY(INCH/HR) = 8.33

TOTAL STREAM AREA(ACRES) = 1.90

PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.82

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	26.51	10.21	5.819	8.40
2	8.82	5.85	8.329	1.90

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	24.03	5.85	8.329
2	32.67	10.21	5.819

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 32.67 Tc(MIN.) = 10.21
TOTAL AREA(ACRES) = 10.3
LONGEST FLOWPATH FROM NODE 215.00 TO NODE 218.00 = 1439.00 FEET.

FLOW PROCESS FROM NODE 218.00 TO NODE 221.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 883.60 DOWNSTREAM(FEET) = 872.00
FLOW LENGTH(FEET) = 179.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.87
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 32.67
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 10.38
LONGEST FLOWPATH FROM NODE 215.00 TO NODE 221.00 = 1618.00 FEET.

FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 872.00 DOWNSTREAM(FEET) = 802.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 651.00 CHANNEL SLOPE = 0.1075
CHANNEL BASE(FEET) = 32.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 3.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.905
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 71
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.16
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.70
AVERAGE FLOW DEPTH(FEET) = 0.32 TRAVEL TIME(MIN.) = 2.93
Tc(MIN.) = 13.30
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 10.89
AREA-AVERAGE RUNOFF COEFFICIENT = 0.442
TOTAL AREA(ACRES) = 17.7 PEAK FLOW RATE(CFS) = 38.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 3.72
LONGEST FLOWPATH FROM NODE 215.00 TO NODE 222.00 = 2269.00 FEET.

```

FLOW PROCESS FROM NODE      222.00 TO NODE      222.00 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.) =   13.30
RAINFALL INTENSITY(INCH/HR) =   4.91
TOTAL STREAM AREA(ACRES) =   17.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =          38.34

*****
FLOW PROCESS FROM NODE      223.00 TO NODE      224.00 IS CODE =   21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =   71
INITIAL SUBAREA FLOW-LENGTH(FEET) =   50.00
UPSTREAM ELEVATION(FEET) =  1016.00
DOWNSTREAM ELEVATION(FEET) =  1014.00
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      224.00 TO NODE      222.00 IS CODE =   51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =  1014.00  DOWNSTREAM(FEET) =   802.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 2690.00  CHANNEL SLOPE =  0.0788
CHANNEL BASE(FEET) =   12.00  "Z" FACTOR =  10.000
MANNING'S FACTOR = 0.060  MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.045
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) =          37.63
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.89
AVERAGE FLOW DEPTH(FEET) =   0.55  TRAVEL TIME(MIN.) =  11.53
Tc(MIN.) =   17.94
SUBAREA AREA(ACRES) =   48.80  SUBAREA RUNOFF(CFS) =   71.06
AREA-AVERAGE RUNOFF COEFFICIENT =  0.360
TOTAL AREA(ACRES) =   48.9  PEAK FLOW RATE(CFS) =          71.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.77  FLOW VELOCITY(FEET/SEC.) =   4.66
LONGEST FLOWPATH FROM NODE      223.00 TO NODE      222.00 =  2740.00 FEET.

*****
FLOW PROCESS FROM NODE      222.00 TO NODE      222.00 IS CODE =   1
-----

```

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

```
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 17.94
RAINFALL INTENSITY(INCH/HR) = 4.04
TOTAL STREAM AREA(ACRES) = 48.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 71.18
```

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	38.34	13.30	4.905	17.70
2	71.18	17.94	4.045	48.90

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	91.12	13.30	4.905
2	102.79	17.94	4.045

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 102.79 Tc(MIN.) = 17.94
 TOTAL AREA(ACRES) = 66.6
 LONGEST FLOWPATH FROM NODE 223.00 TO NODE 222.00 = 2740.00 FEET.

FLOW PROCESS FROM NODE 222.00 TO NODE 225.00 IS CODE = 51

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

ELEVATION DATA: UPSTREAM(FEET) = 802.00 DOWNSTREAM(FEET) = 788.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 542.00 CHANNEL SLOPE = 0.0258
 CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 3.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.788
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) = 71
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 105.18
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.70
 AVERAGE FLOW DEPTH(FEET) = 1.68 TRAVEL TIME(MIN.) = 1.92
 Tc(MIN.) = 19.86
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 4.77
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.377
 TOTAL AREA(ACRES) = 70.8 PEAK FLOW RATE(CFS) = 102.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.66 FLOW VELOCITY(FEET/SEC.) = 4.65
 LONGEST FLOWPATH FROM NODE 223.00 TO NODE 225.00 = 3282.00 FEET.

```

FLOW PROCESS FROM NODE      225.00 TO NODE      225.00 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.) =   19.86
RAINFALL INTENSITY(INCH/HR) =    3.79
TOTAL STREAM AREA(ACRES) =    70.80
PEAK FLOW RATE(CFS) AT CONFLUENCE =   102.79

*****
FLOW PROCESS FROM NODE      226.00 TO NODE      227.00 IS CODE =   21
-----
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
=====
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =   71
INITIAL SUBAREA FLOW-LENGTH(FEET) =   50.00
UPSTREAM ELEVATION(FEET) =   954.00
DOWNSTREAM ELEVATION(FEET) =   950.00
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      227.00 TO NODE      225.00 IS CODE =   51
-----
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =   950.00  DOWNSTREAM(FEET) =   788.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1895.00  CHANNEL SLOPE =   0.0855
CHANNEL BASE(FEET) =   10.00  "Z" FACTOR =   3.000
MANNING'S FACTOR = 0.060  MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =   4.725
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) =   14.70
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.51
AVERAGE FLOW DEPTH(FEET) =   0.38  TRAVEL TIME(MIN.) =   9.01
Tc(MIN.) =   14.10
SUBAREA AREA(ACRES) =   16.00  SUBAREA RUNOFF(CFS) =   27.21
AREA-AVERAGE RUNOFF COEFFICIENT =   0.360
TOTAL AREA(ACRES) =   16.1  PEAK FLOW RATE(CFS) =   27.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =   0.54  FLOW VELOCITY(FEET/SEC.) =   4.37
LONGEST FLOWPATH FROM NODE      226.00 TO NODE      225.00 =   1945.00 FEET.

*****
FLOW PROCESS FROM NODE      225.00 TO NODE      225.00 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.) = 14.10
RAINFALL INTENSITY(INCH/HR) = 4.72
TOTAL STREAM AREA(ACRES) = 16.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 27.36
```

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	102.79	19.86	3.788	70.80
2	27.36	14.10	4.725	16.10

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	109.77	14.10	4.725
2	124.72	19.86	3.788

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 124.72 Tc(MIN.) = 19.86
 TOTAL AREA(ACRES) = 86.9
 LONGEST FLOWPATH FROM NODE 223.00 TO NODE 225.00 = 3282.00 FEET.

FLOW PROCESS FROM NODE 225.00 TO NODE 214.00 IS CODE = 51

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

```
=====
ELEVATION DATA: UPSTREAM(FEET) = 788.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1205.00 CHANNEL SLOPE = 0.0564
CHANNEL BASE(FEET) = 25.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 4.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.376
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 71
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 131.77
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.17
AVERAGE FLOW DEPTH(FEET) = 0.92 TRAVEL TIME(MIN.) = 3.89
Tc(MIN.) = 23.75
SUBAREA AREA(ACRES) = 13.90 SUBAREA RUNOFF(CFS) = 14.08
AREA-AVERAGE RUNOFF COEFFICIENT = 0.363
TOTAL AREA(ACRES) = 100.8 PEAK FLOW RATE(CFS) = 124.72
```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.89 FLOW VELOCITY(FEET/SEC.) = 5.08
 LONGEST FLOWPATH FROM NODE 223.00 TO NODE 214.00 = 4487.00 FEET.

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	124.72	23.75	3.376	100.80

LONGEST FLOWPATH FROM NODE 223.00 TO NODE 214.00 = 4487.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	51.22	22.59	3.486	42.90

LONGEST FLOWPATH FROM NODE 205.00 TO NODE 214.00 = 3399.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	169.88	22.59	3.486
2	174.32	23.75	3.376

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 174.32 Tc(MIN.) = 23.75
TOTAL AREA(ACRES) = 143.7

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<

FLOW PROCESS FROM NODE 214.00 TO NODE 1132.00 IS CODE = 51

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

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

ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 636.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 769.00 CHANNEL SLOPE = 0.1092
CHANNEL BASE(FEET) = 12.00 "Z" FACTOR = 6.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 4.00
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.228
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) = 71
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 179.70
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.53
AVERAGE FLOW DEPTH(FEET) = 1.23 TRAVEL TIME(MIN.) = 1.70
Tc(MIN.) = 25.45
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 10.75
AREA-AVERAGE RUNOFF COEFFICIENT = 0.353
TOTAL AREA(ACRES) = 154.8 PEAK FLOW RATE(CFS) = 176.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.22 FLOW VELOCITY(FEET/SEC.) = 7.50

```

LONGEST FLOWPATH FROM NODE    223.00 TO NODE    1132.00 =    5256.00 FEET.
*****
FLOW PROCESS FROM NODE    1132.00 TO NODE    1132.00 IS CODE =  10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<
=====
*****
FLOW PROCESS FROM NODE    1133.00 TO NODE    1134.00 IS CODE =  21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====
LAWNS, GOLF COURSES, ETC. GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  74
INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
UPSTREAM ELEVATION(FEET) =    920.00
DOWNSTREAM ELEVATION(FEET) =    916.00
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    1134.00 TO NODE    1132.00 IS CODE =  51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) =    916.00  DOWNSTREAM(FEET) =    636.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  2324.00  CHANNEL SLOPE =  0.1205
CHANNEL BASE(FEET) =   16.00  "Z" FACTOR =   2.000
MANNING'S FACTOR = 0.060  MAXIMUM DEPTH(FEET) =   5.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.523
CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
SOIL CLASSIFICATION IS "C"
S.C.S. CURVE NUMBER (AMC II) =  71
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    19.96
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.87
AVERAGE FLOW DEPTH(FEET) =   0.31  TRAVEL TIME(MIN.) =  10.00
Tc(MIN.) =   15.09
SUBAREA AREA(ACRES) =    26.50  SUBAREA RUNOFF(CFS) =    35.96
AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
TOTAL AREA(ACRES) =    26.6  PEAK FLOW RATE(CFS) =    36.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.45  FLOW VELOCITY(FEET/SEC.) =   4.80
LONGEST FLOWPATH FROM NODE    1133.00 TO NODE    1132.00 =    2374.00 FEET.
*****
FLOW PROCESS FROM NODE    1132.00 TO NODE    1132.00 IS CODE =  11
-----
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
=====

```

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	36.09	15.09	4.523	26.60

LONGEST FLOWPATH FROM NODE 1133.00 TO NODE 1132.00 = 2374.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	316.83	19.55	3.827	209.60

LONGEST FLOWPATH FROM NODE 1106.00 TO NODE 1132.00 = 6240.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	280.60	15.09	4.523
2	347.37	19.55	3.827

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 347.37 Tc(MIN.) = 19.55
 TOTAL AREA(ACRES) = 236.2

 FLOW PROCESS FROM NODE 1132.00 TO NODE 1132.00 IS CODE = 11

 >>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
 =====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	347.37	19.55	3.827	236.20

LONGEST FLOWPATH FROM NODE 1106.00 TO NODE 1132.00 = 6240.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	176.45	25.45	3.228	154.80

LONGEST FLOWPATH FROM NODE 223.00 TO NODE 1132.00 = 5256.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	482.92	19.55	3.827
2	469.49	25.45	3.228

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 482.92 Tc(MIN.) = 19.55
 TOTAL AREA(ACRES) = 391.0

 FLOW PROCESS FROM NODE 1132.00 TO NODE 1132.00 IS CODE = 12

 >>>>CLEAR MEMORY BANK # 1 <<<<<
 =====

FLOW PROCESS FROM NODE 1132.00 TO NODE 1132.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<<

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 391.0 TC(MIN.) = 19.55

PEAK FLOW RATE(CFS) = **482.92***

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=====

END OF RATIONAL METHOD ANALYSIS

- PEAK DISCAHRGE REAT IS UNMITIGATED. The proposed detention basin and its outlet structure will regulate the out flow to no more than 78 cfs such that the overall discharge from the site at the final discharge point is not greater than that under the pre-development conditions.

100-YEAR HYDROGRAPH CALCULATIONS

PRE-DEVELOPMENT CONDITIONS

F L O O D R O U T I N G A N A L Y S I S

ACCORDING TO COUNTY OF SAN DIEGO
DEPARTMENT OF PUBLIC WORKS FLOOD CONTROL DIVISION HYDROLOGY MANUAL(2003)
(c) Copyright 1989-2004 Advanced Engineering Software (aes)
Ver. 10.0 Release Date: 01/01/2004 License ID 1503

Analysis prepared by:

LANDMARK CONSULTING
9555 GENESEE AVE. SUITE 200
SAN DIEGO, CA 92121
TEL: 858-587-8070, FAX: 858-587-8750

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

* LILAC HILLS RANCH *
* IMPLEMENTATION TM *
* PRE-DEVELOPMENT CONDITIONS *

FILE NAME: 1037I1X.DAT
TIME/DATE OF STUDY: 15:46 04/04/2012

FLOW PROCESS FROM NODE 101.00 TO NODE 118.00 IS CODE = 1

>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<
=====

(UNIT-HYDROGRAPH ADDED TO STREAM #1)

WATERCOURSE LENGTH = 6176.000 FEET
LENGTH FROM CONCENTRATION POINT TO CENTROID = 2613.000 FEET
ELEVATION VARIATION ALONG WATERCOURSE = 406.000 FEET
BASIN FACTOR = 0.030
WATERSHED AREA = 396.270 ACRES
BASEFLOW = 0.000 CFS/SQUARE-MILE
WATERCOURSE "LAG" TIME = 0.192 HOURS
* Instantaneous Unit-Hydrograph Option Selected.
CAUTION: LAG TIME IS LESS THAN 0.75 HOURS.
THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
S.C.S. S-GRAPH SELECTED
WATERSHED RUNOFF CURVE NUMBER = 85.00

SPECIFIED PEAK 5-MINUTES RAINFALL(INCH)= 0.77
SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)= 1.45
SPECIFIED PEAK 1-HOUR RAINFALL(INCH) = 1.86
SPECIFIED PEAK 3-HOUR RAINFALL(INCH) = 2.74
SPECIFIED PEAK 6-HOUR RAINFALL(INCH) = 3.50
SPECIFIED PEAK 24-HOUR RAINFALL(INCH) = 6.00
24-HOUR NESTED DESIGN STORM DISTRIBUTION SELECTED
(Ref: San Diego County Hydrology Manual)

PRECIPITATION DEPTH-AREA REDUCTION FACTORS:

5-MINUTE FACTOR = 0.993
 30-MINUTE FACTOR = 0.993
 1-HOUR FACTOR = 0.996
 3-HOUR FACTOR = 0.998
 6-HOUR FACTOR = 0.998
 24-HOUR FACTOR = 0.999

UNIT HYDROGRAPH TIME UNIT = 5.000 MINUTES
 UNIT INTERVAL PERCENTAGE OF LAG-TIME = 43.290

UNIT HYDROGRAPH DETERMINATION

INTERVAL NUMBER	"q/qp" GRAPH VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	0.474	856.205
2	1.000	1805.093
3	0.672	1213.893
4	0.277	499.926
5	0.125	225.429
6	0.054	97.560
7	0.024	44.050
8	0.011	19.489
9	0.005	8.677
10	0.000	0.000

UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL - LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0081	0.0081	0.0000
2	0.0081	0.0081	0.0000
3	0.0082	0.0082	0.0000
4	0.0082	0.0082	0.0000
5	0.0082	0.0082	0.0000
6	0.0082	0.0082	0.0000
7	0.0083	0.0083	0.0000
8	0.0083	0.0083	0.0000
9	0.0083	0.0083	0.0000
10	0.0083	0.0083	0.0000
11	0.0084	0.0084	0.0000
12	0.0084	0.0084	0.0000
13	0.0084	0.0084	0.0000
14	0.0085	0.0085	0.0000
15	0.0085	0.0085	0.0000
16	0.0085	0.0085	0.0000
17	0.0086	0.0086	0.0000
18	0.0086	0.0086	0.0000
19	0.0086	0.0086	0.0000
20	0.0086	0.0086	0.0000
21	0.0087	0.0087	0.0000
22	0.0087	0.0087	0.0000
23	0.0087	0.0087	0.0000
24	0.0088	0.0088	0.0000
25	0.0088	0.0088	0.0000
26	0.0088	0.0088	0.0000
27	0.0089	0.0089	0.0000
28	0.0089	0.0089	0.0000
29	0.0089	0.0089	0.0000
30	0.0090	0.0090	0.0000
31	0.0090	0.0090	0.0000
32	0.0090	0.0090	0.0000
33	0.0091	0.0091	0.0000
34	0.0091	0.0091	0.0000
35	0.0091	0.0091	0.0000
36	0.0092	0.0092	0.0000
37	0.0092	0.0092	0.0000
38	0.0092	0.0092	0.0000
39	0.0093	0.0093	0.0000
40	0.0093	0.0093	0.0000
41	0.0094	0.0094	0.0000
42	0.0094	0.0093	0.0001
43	0.0094	0.0092	0.0002
44	0.0095	0.0092	0.0003
45	0.0095	0.0091	0.0004
46	0.0095	0.0091	0.0005
47	0.0096	0.0090	0.0006
48	0.0096	0.0089	0.0007
49	0.0097	0.0089	0.0008
50	0.0097	0.0088	0.0009
51	0.0098	0.0088	0.0010
52	0.0098	0.0087	0.0011
53	0.0098	0.0087	0.0012
54	0.0099	0.0086	0.0013
55	0.0099	0.0086	0.0013

56	0.0100	0.0085	0.0014
57	0.0100	0.0085	0.0015
58	0.0100	0.0084	0.0016
59	0.0101	0.0084	0.0017
60	0.0101	0.0083	0.0018
61	0.0102	0.0083	0.0019
62	0.0102	0.0082	0.0020
63	0.0103	0.0082	0.0021
64	0.0103	0.0081	0.0022
65	0.0104	0.0081	0.0023
66	0.0104	0.0080	0.0024
67	0.0105	0.0080	0.0025
68	0.0105	0.0079	0.0026
69	0.0106	0.0079	0.0027
70	0.0106	0.0079	0.0028
71	0.0107	0.0078	0.0029
72	0.0107	0.0078	0.0030
73	0.0108	0.0077	0.0031
74	0.0108	0.0077	0.0032
75	0.0109	0.0077	0.0033
76	0.0110	0.0076	0.0033
77	0.0110	0.0076	0.0034
78	0.0111	0.0075	0.0035
79	0.0112	0.0075	0.0036
80	0.0112	0.0075	0.0037
81	0.0113	0.0074	0.0038
82	0.0113	0.0074	0.0039
83	0.0114	0.0074	0.0040
84	0.0114	0.0073	0.0041
85	0.0115	0.0073	0.0042
86	0.0116	0.0072	0.0043
87	0.0117	0.0072	0.0044
88	0.0117	0.0072	0.0045
89	0.0118	0.0072	0.0046
90	0.0118	0.0071	0.0047
91	0.0119	0.0071	0.0048
92	0.0120	0.0071	0.0049
93	0.0121	0.0070	0.0050
94	0.0121	0.0070	0.0051
95	0.0122	0.0070	0.0053
96	0.0123	0.0069	0.0054
97	0.0124	0.0069	0.0055
98	0.0124	0.0069	0.0056
99	0.0126	0.0069	0.0057
100	0.0126	0.0068	0.0058
101	0.0127	0.0068	0.0059
102	0.0128	0.0068	0.0060
103	0.0129	0.0068	0.0061
104	0.0129	0.0067	0.0062
105	0.0131	0.0067	0.0064
106	0.0131	0.0067	0.0065
107	0.0133	0.0067	0.0066
108	0.0133	0.0066	0.0067
109	0.0134	0.0066	0.0068
110	0.0135	0.0066	0.0069
111	0.0136	0.0066	0.0071
112	0.0137	0.0065	0.0072
113	0.0139	0.0065	0.0073
114	0.0139	0.0065	0.0074
115	0.0141	0.0065	0.0076

116	0.0141	0.0065	0.0077
117	0.0143	0.0065	0.0078
118	0.0144	0.0064	0.0080
119	0.0145	0.0064	0.0081
120	0.0146	0.0064	0.0082
121	0.0148	0.0064	0.0084
122	0.0149	0.0064	0.0085
123	0.0150	0.0064	0.0087
124	0.0151	0.0063	0.0088
125	0.0153	0.0063	0.0090
126	0.0154	0.0063	0.0091
127	0.0156	0.0063	0.0093
128	0.0157	0.0063	0.0094
129	0.0159	0.0063	0.0096
130	0.0160	0.0062	0.0097
131	0.0162	0.0063	0.0099
132	0.0163	0.0062	0.0101
133	0.0165	0.0062	0.0103
134	0.0166	0.0062	0.0104
135	0.0169	0.0062	0.0106
136	0.0170	0.0062	0.0108
137	0.0172	0.0062	0.0110
138	0.0174	0.0062	0.0112
139	0.0176	0.0062	0.0114
140	0.0178	0.0062	0.0116
141	0.0180	0.0062	0.0118
142	0.0182	0.0062	0.0120
143	0.0185	0.0062	0.0123
144	0.0186	0.0062	0.0125
145	0.0101	0.0033	0.0068
146	0.0176	0.0057	0.0118
147	0.0179	0.0058	0.0121
148	0.0181	0.0057	0.0123
149	0.0184	0.0058	0.0126
150	0.0186	0.0058	0.0128
151	0.0190	0.0058	0.0131
152	0.0192	0.0058	0.0133
153	0.0196	0.0059	0.0137
154	0.0198	0.0059	0.0139
155	0.0202	0.0059	0.0143
156	0.0205	0.0059	0.0146
157	0.0210	0.0060	0.0150
158	0.0212	0.0060	0.0152
159	0.0217	0.0060	0.0157
160	0.0220	0.0060	0.0160
161	0.0226	0.0061	0.0165
162	0.0229	0.0061	0.0168
163	0.0236	0.0062	0.0174
164	0.0239	0.0062	0.0177
165	0.0247	0.0063	0.0183
166	0.0251	0.0063	0.0187
167	0.0259	0.0065	0.0194
168	0.0263	0.0065	0.0199
169	0.0274	0.0066	0.0207
170	0.0279	0.0066	0.0212
171	0.0289	0.0068	0.0222
172	0.0295	0.0068	0.0227
173	0.0308	0.0070	0.0238
174	0.0315	0.0070	0.0245
175	0.0330	0.0072	0.0257

176	0.0338	0.0073	0.0265
177	0.0356	0.0075	0.0281
178	0.0366	0.0076	0.0290
179	0.0389	0.0079	0.0310
180	0.0401	0.0080	0.0321
181	0.0430	0.0084	0.0346
182	0.0447	0.0086	0.0361
183	0.0486	0.0091	0.0395
184	0.0508	0.0093	0.0416
185	0.0573	0.0102	0.0471
186	0.0606	0.0105	0.0501
187	0.0692	0.0116	0.0576
188	0.0749	0.0122	0.0627
189	0.0903	0.0141	0.0762
190	0.1029	0.0154	0.0875
191	0.1511	0.0214	0.1296
192	0.2129	0.0280	0.1849
193	0.7629	0.0833	0.6797
194	0.1212	0.0112	0.1099
195	0.0820	0.0073	0.0746
196	0.0645	0.0056	0.0589
197	0.0534	0.0046	0.0488
198	0.0465	0.0039	0.0426
199	0.0415	0.0034	0.0381
200	0.0377	0.0031	0.0346
201	0.0347	0.0028	0.0319
202	0.0322	0.0026	0.0296
203	0.0301	0.0024	0.0278
204	0.0284	0.0022	0.0262
205	0.0268	0.0021	0.0247
206	0.0255	0.0020	0.0235
207	0.0243	0.0019	0.0224
208	0.0232	0.0018	0.0215
209	0.0223	0.0017	0.0206
210	0.0215	0.0016	0.0199
211	0.0207	0.0015	0.0192
212	0.0200	0.0015	0.0185
213	0.0194	0.0014	0.0179
214	0.0188	0.0014	0.0174
215	0.0182	0.0013	0.0169
216	0.0177	0.0013	0.0164
217	0.0188	0.0014	0.0174
218	0.0183	0.0013	0.0170
219	0.0179	0.0013	0.0166
220	0.0175	0.0012	0.0163
221	0.0171	0.0012	0.0159
222	0.0168	0.0012	0.0156
223	0.0164	0.0011	0.0153
224	0.0161	0.0011	0.0150
225	0.0158	0.0011	0.0147
226	0.0155	0.0011	0.0144
227	0.0152	0.0010	0.0142
228	0.0149	0.0010	0.0139
229	0.0147	0.0010	0.0137
230	0.0145	0.0010	0.0135
231	0.0142	0.0010	0.0133
232	0.0140	0.0009	0.0131
233	0.0138	0.0009	0.0129
234	0.0136	0.0009	0.0127
235	0.0134	0.0009	0.0125

236	0.0132	0.0009	0.0123
237	0.0130	0.0009	0.0122
238	0.0128	0.0008	0.0120
239	0.0127	0.0008	0.0118
240	0.0125	0.0008	0.0117
241	0.0123	0.0008	0.0115
242	0.0122	0.0008	0.0114
243	0.0120	0.0008	0.0113
244	0.0119	0.0008	0.0111
245	0.0118	0.0008	0.0110
246	0.0116	0.0007	0.0109
247	0.0115	0.0007	0.0108
248	0.0114	0.0007	0.0106
249	0.0112	0.0007	0.0105
250	0.0111	0.0007	0.0104
251	0.0110	0.0007	0.0103
252	0.0109	0.0007	0.0102
253	0.0108	0.0007	0.0101
254	0.0107	0.0007	0.0100
255	0.0106	0.0007	0.0099
256	0.0105	0.0006	0.0098
257	0.0104	0.0006	0.0097
258	0.0103	0.0006	0.0096
259	0.0102	0.0006	0.0095
260	0.0101	0.0006	0.0095
261	0.0100	0.0006	0.0094
262	0.0099	0.0006	0.0093
263	0.0098	0.0006	0.0092
264	0.0097	0.0006	0.0091
265	0.0096	0.0006	0.0091
266	0.0096	0.0006	0.0090
267	0.0095	0.0006	0.0089
268	0.0094	0.0006	0.0088
269	0.0093	0.0006	0.0088
270	0.0093	0.0005	0.0087
271	0.0092	0.0005	0.0086
272	0.0091	0.0005	0.0086
273	0.0090	0.0005	0.0085
274	0.0090	0.0005	0.0085
275	0.0089	0.0005	0.0084
276	0.0088	0.0005	0.0083
277	0.0088	0.0005	0.0083
278	0.0087	0.0005	0.0082
279	0.0087	0.0005	0.0082
280	0.0086	0.0005	0.0081
281	0.0085	0.0005	0.0080
282	0.0085	0.0005	0.0080
283	0.0084	0.0005	0.0079
284	0.0084	0.0005	0.0079
285	0.0083	0.0005	0.0078
286	0.0083	0.0005	0.0078
287	0.0082	0.0005	0.0077
288	0.0082	0.0005	0.0077

TOTAL STORM RAINFALL(INCHES) = 5.99
 TOTAL SOIL-LOSS(INCHES) = 1.70
 TOTAL EFFECTIVE RAINFALL(INCHES) = 4.30

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 56.0411

TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 141.1224

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2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	425.0	850.0	1275.0	1700.0
0.083	0.0000	0.00	Q	.	.	.	.
0.167	0.0000	0.00	Q	.	.	.	.
0.250	0.0000	0.00	Q	.	.	.	.
0.333	0.0000	0.00	Q	.	.	.	.
0.417	0.0000	0.00	Q	.	.	.	.
0.500	0.0000	0.00	Q	.	.	.	.
0.583	0.0000	0.00	Q	.	.	.	.
0.667	0.0000	0.00	Q	.	.	.	.
0.750	0.0000	0.00	Q	.	.	.	.
0.833	0.0000	0.00	Q	.	.	.	.
0.917	0.0000	0.00	Q	.	.	.	.
1.000	0.0000	0.00	Q	.	.	.	.
1.083	0.0000	0.00	Q	.	.	.	.
1.167	0.0000	0.00	Q	.	.	.	.
1.250	0.0000	0.00	Q	.	.	.	.
1.333	0.0000	0.00	Q	.	.	.	.
1.417	0.0000	0.00	Q	.	.	.	.
1.500	0.0000	0.00	Q	.	.	.	.
1.583	0.0000	0.00	Q	.	.	.	.
1.667	0.0000	0.00	Q	.	.	.	.
1.750	0.0000	0.00	Q	.	.	.	.
1.833	0.0000	0.00	Q	.	.	.	.
1.917	0.0000	0.00	Q	.	.	.	.
2.000	0.0000	0.00	Q	.	.	.	.
2.083	0.0000	0.00	Q	.	.	.	.
2.167	0.0000	0.00	Q	.	.	.	.
2.250	0.0000	0.00	Q	.	.	.	.
2.333	0.0000	0.00	Q	.	.	.	.
2.417	0.0000	0.00	Q	.	.	.	.
2.500	0.0000	0.00	Q	.	.	.	.
2.583	0.0000	0.00	Q	.	.	.	.
2.667	0.0000	0.00	Q	.	.	.	.
2.750	0.0000	0.00	Q	.	.	.	.
2.833	0.0000	0.00	Q	.	.	.	.
2.917	0.0000	0.00	Q	.	.	.	.
3.000	0.0000	0.00	Q	.	.	.	.
3.083	0.0000	0.00	Q	.	.	.	.
3.167	0.0000	0.00	Q	.	.	.	.
3.250	0.0000	0.00	Q	.	.	.	.
3.333	0.0000	0.00	Q	.	.	.	.
3.417	0.0000	0.01	Q	.	.	.	.
3.500	0.0006	0.09	Q	.	.	.	.
3.583	0.0029	0.32	Q	.	.	.	.
3.667	0.0076	0.69	Q	.	.	.	.
3.750	0.0152	1.11	Q	.	.	.	.
3.833	0.0260	1.56	Q	.	.	.	.
3.917	0.0398	2.02	Q	.	.	.	.
4.000	0.0569	2.48	Q	.	.	.	.
4.083	0.0771	2.94	Q	.	.	.	.

4.167	0.1006	3.40	Q	.	.	.	.
4.250	0.1272	3.86	Q	.	.	.	.
4.333	0.1570	4.33	Q	.	.	.	.
4.417	0.1899	4.78	Q	.	.	.	.
4.500	0.2260	5.24	Q	.	.	.	.
4.583	0.2653	5.70	Q	.	.	.	.
4.667	0.3077	6.16	Q	.	.	.	.
4.750	0.3532	6.61	Q	.	.	.	.
4.833	0.4019	7.07	Q	.	.	.	.
4.917	0.4537	7.52	Q	.	.	.	.
5.000	0.5087	7.98	Q	.	.	.	.
5.083	0.5667	8.43	Q	.	.	.	.
5.167	0.6279	8.88	Q	.	.	.	.
5.250	0.6922	9.34	Q	.	.	.	.
5.333	0.7596	9.79	Q	.	.	.	.
5.417	0.8302	10.24	Q	.	.	.	.
5.500	0.9038	10.70	Q	.	.	.	.
5.583	0.9806	11.15	Q	.	.	.	.
5.667	1.0605	11.60	Q	.	.	.	.
5.750	1.1435	12.06	Q	.	.	.	.
5.833	1.2297	12.51	Q	.	.	.	.
5.917	1.3190	12.96	Q	.	.	.	.
6.000	1.4114	13.42	Q	.	.	.	.
6.083	1.5069	13.87	Q	.	.	.	.
6.167	1.6056	14.33	Q	.	.	.	.
6.250	1.7075	14.79	Q	.	.	.	.
6.333	1.8125	15.24	Q	.	.	.	.
6.417	1.9206	15.70	Q	.	.	.	.
6.500	2.0319	16.16	Q	.	.	.	.
6.583	2.1464	16.63	Q	.	.	.	.
6.667	2.2641	17.09	Q	.	.	.	.
6.750	2.3850	17.55	Q	.	.	.	.
6.833	2.5091	18.02	Q	.	.	.	.
6.917	2.6364	18.48	Q	.	.	.	.
7.000	2.7669	18.95	Q	.	.	.	.
7.083	2.9007	19.42	Q	.	.	.	.
7.167	3.0378	19.90	Q	.	.	.	.
7.250	3.1781	20.37	Q	.	.	.	.
7.333	3.3217	20.85	Q	.	.	.	.
7.417	3.4686	21.33	Q	.	.	.	.
7.500	3.6188	21.81	QV	.	.	.	.
7.583	3.7724	22.30	QV	.	.	.	.
7.667	3.9293	22.79	QV	.	.	.	.
7.750	4.0896	23.28	QV	.	.	.	.
7.833	4.2533	23.77	QV	.	.	.	.
7.917	4.4204	24.27	QV	.	.	.	.
8.000	4.5910	24.77	QV	.	.	.	.
8.083	4.7651	25.27	QV	.	.	.	.
8.167	4.9426	25.78	QV	.	.	.	.
8.250	5.1237	26.29	QV	.	.	.	.
8.333	5.3083	26.81	QV	.	.	.	.
8.417	5.4964	27.32	QV	.	.	.	.
8.500	5.6883	27.85	QV	.	.	.	.
8.583	5.8837	28.38	QV	.	.	.	.
8.667	6.0828	28.91	QV	.	.	.	.
8.750	6.2856	29.45	QV	.	.	.	.
8.833	6.4922	29.99	QV	.	.	.	.
8.917	6.7025	30.54	QV	.	.	.	.
9.000	6.9167	31.10	QV	.	.	.	.
9.083	7.1347	31.66	Q V	.	.	.	.

9.167	7.3567	32.22	Q V	.	.	.	.
9.250	7.5825	32.80	Q V	.	.	.	.
9.333	7.8124	33.38	Q V	.	.	.	.
9.417	8.0463	33.96	Q V	.	.	.	.
9.500	8.2843	34.56	Q V	.	.	.	.
9.583	8.5264	35.16	Q V	.	.	.	.
9.667	8.7727	35.77	Q V	.	.	.	.
9.750	9.0233	36.38	Q V	.	.	.	.
9.833	9.2782	37.01	Q V	.	.	.	.
9.917	9.5374	37.64	Q V	.	.	.	.
10.000	9.8011	38.29	Q V	.	.	.	.
10.083	10.0693	38.94	Q V	.	.	.	.
10.167	10.3420	39.60	Q V	.	.	.	.
10.250	10.6194	40.27	Q V	.	.	.	.
10.333	10.9015	40.96	Q V	.	.	.	.
10.417	11.1884	41.65	Q V	.	.	.	.
10.500	11.4801	42.36	Q V	.	.	.	.
10.583	11.7769	43.08	.Q V	.	.	.	.
10.667	12.0786	43.82	.Q V	.	.	.	.
10.750	12.3855	44.56	.Q V	.	.	.	.
10.833	12.6976	45.32	.Q V	.	.	.	.
10.917	13.0151	46.09	.Q V	.	.	.	.
11.000	13.3380	46.89	.Q V	.	.	.	.
11.083	13.6664	47.69	.Q V	.	.	.	.
11.167	14.0006	48.52	.Q V	.	.	.	.
11.250	14.3405	49.35	.Q V	.	.	.	.
11.333	14.6863	50.21	.Q V	.	.	.	.
11.417	15.0382	51.09	.Q V	.	.	.	.
11.500	15.3962	51.99	.Q V	.	.	.	.
11.583	15.7606	52.91	.Q V	.	.	.	.
11.667	16.1315	53.85	.Q V	.	.	.	.
11.750	16.5090	54.81	.Q V	.	.	.	.
11.833	16.8933	55.81	.Q V	.	.	.	.
11.917	17.2847	56.82	.Q V	.	.	.	.
12.000	17.6832	57.87	.Q V	.	.	.	.
12.083	18.0538	53.82	.Q V	.	.	.	.
12.167	18.3866	48.31	.Q V	.	.	.	.
12.250	18.7378	50.99	.Q V	.	.	.	.
12.333	19.1169	55.06	.Q V	.	.	.	.
12.417	19.5115	57.28	.Q V	.	.	.	.
12.500	19.9176	58.97	.Q V	.	.	.	.
12.583	20.3334	60.38	.Q V	.	.	.	.
12.667	20.7585	61.72	.Q V	.	.	.	.
12.750	21.1927	63.05	.Q V	.	.	.	.
12.833	21.6364	64.43	.Q V	.	.	.	.
12.917	22.0897	65.81	.Q V	.	.	.	.
13.000	22.5529	67.26	.Q V	.	.	.	.
13.083	23.0264	68.75	.Q V	.	.	.	.
13.167	23.5107	70.32	.Q V	.	.	.	.
13.250	24.0062	71.95	.Q V	.	.	.	.
13.333	24.5135	73.66	.Q V	.	.	.	.
13.417	25.0331	75.44	.Q V	.	.	.	.
13.500	25.5656	77.32	.Q V	.	.	.	.
13.583	26.1116	79.28	.Q V	.	.	.	.
13.667	26.6719	81.35	.Q V	.	.	.	.
13.750	27.2471	83.53	.Q V	.	.	.	.
13.833	27.8383	85.83	. Q V	.	.	.	.
13.917	28.4461	88.26	. Q V	.	.	.	.
14.000	29.0718	90.85	. Q V	.	.	.	.
14.083	29.7167	93.64	. Q V	.	.	.	.

14.167	30.3827	96.70	. Q	V .	.	.	.
14.250	31.0707	99.90	. Q	V .	.	.	.
14.333	31.7820	103.28	. Q	V.	.	.	.
14.417	32.5181	106.88	. Q	V.	.	.	.
14.500	33.2809	110.77	. Q	V.	.	.	.
14.583	34.0726	114.96	. Q	V.	.	.	.
14.667	34.8959	119.54	. Q	V.	.	.	.
14.750	35.7534	124.51	. Q	V	.	.	.
14.833	36.6488	130.02	. Q	V	.	.	.
14.917	37.5860	136.07	. Q	V	.	.	.
15.000	38.5698	142.85	. Q	V	.	.	.
15.083	39.6058	150.42	. Q	.V	.	.	.
15.167	40.7010	159.04	. Q	.V	.	.	.
15.250	41.8641	168.87	. Q	.V	.	.	.
15.333	43.1058	180.30	. Q	. V	.	.	.
15.417	44.4448	194.42	. Q	. V	.	.	.
15.500	45.9044	211.93	. Q	. V	.	.	.
15.583	47.5065	232.63	. Q	. V	.	.	.
15.667	49.2822	257.84	. Q	. V	.	.	.
15.750	51.2853	290.84	. Q	. V	.	.	.
15.833	53.6005	336.17	. Q	. V	.	.	.
15.917	56.4506	413.83	. Q.	. V	.	.	.
16.000	60.3060	559.80	.	. Q	. V	.	.
16.083	68.1844	1143.96	.	.	. V.	. Q	.
16.167	79.4910	1641.71	.	.	. V	.	. Q
16.250	87.9115	1222.66	.	.	. V	. Q	.
16.333	92.8605	718.59	.	. Q	.	. V	.
16.417	96.1183	473.03	.	.Q	.	. V	.
16.500	98.4322	335.98	.	. Q	.	. V	.
16.583	100.2259	260.45	.	. Q	.	. V	.
16.667	101.7049	214.75	.	. Q	.	. V	.
16.750	102.9816	185.38	.	. Q	.	. V.	.
16.833	104.1065	163.33	. Q	.	.	. V.	.
16.917	105.1390	149.93	. Q	.	.	. V.	.
17.000	106.0981	139.26	. Q	.	.	. V	.
17.083	106.9960	130.37	. Q	.	.	. V	.
17.167	107.8414	122.75	. Q	.	.	. V	.
17.250	108.6418	116.22	. Q	.	.	. V	.
17.333	109.4033	110.57	. Q	.	.	. V	.
17.417	110.1306	105.60	. Q	.	.	. V	.
17.500	110.8275	101.18	. Q	.	.	. V	.
17.583	111.4970	97.22	. Q	.	.	. V	.
17.667	112.1420	93.64	. Q	.	.	. V	.
17.750	112.7645	90.39	. Q	.	.	. V	.
17.833	113.3666	87.42	. Q	.	.	. V	.
17.917	113.9499	84.69	.Q	.	.	. V	.
18.000	114.5158	82.17	.Q	.	.	. V	.
18.083	115.0742	81.07	.Q	.	.	. V	.
18.167	115.6354	81.49	.Q	.	.	. V	.
18.250	116.1945	81.18	.Q	.	.	. V	.
18.333	116.7452	79.96	.Q	.	.	. V	.
18.417	117.2855	78.45	.Q	.	.	. V	.
18.500	117.8148	76.86	.Q	.	.	. V	.
18.583	118.3334	75.29	.Q	.	.	. V	.
18.667	118.8415	73.78	.Q	.	.	. V	.
18.750	119.3397	72.33	.Q	.	.	. V	.
18.833	119.8283	70.95	.Q	.	.	. V	.
18.917	120.3078	69.63	.Q	.	.	. V	.
19.000	120.7787	68.38	.Q	.	.	. V	.
19.083	121.2414	67.18	.Q	.	.	. V	.

19.167	121.6963	66.04	.Q	.	.	.	V	.
19.250	122.1436	64.95	.Q	.	.	.	V	.
19.333	122.5838	63.91	.Q	.	.	.	V	.
19.417	123.0171	62.91	.Q	.	.	.	V	.
19.500	123.4438	61.95	.Q	.	.	.	V	.
19.583	123.8641	61.03	.Q	.	.	.	V	.
19.667	124.2784	60.15	.Q	.	.	.	V	.
19.750	124.6868	59.30	.Q	.	.	.	V	.
19.833	125.0895	58.48	.Q	.	.	.	V	.
19.917	125.4868	57.69	.Q	.	.	.	V	.
20.000	125.8789	56.93	.Q	.	.	.	V	.
20.083	126.2659	56.19	.Q	.	.	.	V	.
20.167	126.6480	55.48	.Q	.	.	.	V	.
20.250	127.0254	54.80	.Q	.	.	.	V	.
20.333	127.3982	54.13	.Q	.	.	.	V	.
20.417	127.7666	53.49	.Q	.	.	.	V	.
20.500	128.1307	52.87	.Q	.	.	.	V	.
20.583	128.4906	52.26	.Q	.	.	.	V	.
20.667	128.8466	51.68	.Q	.	.	.	V	.
20.750	129.1985	51.11	.Q	.	.	.	V	.
20.833	129.5467	50.56	.Q	.	.	.	V	.
20.917	129.8912	50.02	.Q	.	.	.	V	.
21.000	130.2321	49.50	.Q	.	.	.	V	.
21.083	130.5696	48.99	.Q	.	.	.	V	.
21.167	130.9036	48.50	.Q	.	.	.	V	.
21.250	131.2343	48.02	.Q	.	.	.	V	.
21.333	131.5618	47.55	.Q	.	.	.	V	.
21.417	131.8861	47.09	.Q	.	.	.	V	.
21.500	132.2074	46.65	.Q	.	.	.	V	.
21.583	132.5257	46.22	.Q	.	.	.	V	.
21.667	132.8411	45.80	.Q	.	.	.	V	.
21.750	133.1537	45.38	.Q	.	.	.	V	.
21.833	133.4635	44.98	.Q	.	.	.	V	.
21.917	133.7706	44.59	.Q	.	.	.	V	.
22.000	134.0750	44.21	.Q	.	.	.	V	.
22.083	134.3769	43.83	.Q	.	.	.	V	.
22.167	134.6762	43.46	.Q	.	.	.	V	.
22.250	134.9731	43.11	.Q	.	.	.	V	.
22.333	135.2676	42.75	.Q	.	.	.	V	.
22.417	135.5596	42.41	Q	.	.	.	V	.
22.500	135.8494	42.08	Q	.	.	.	V	.
22.583	136.1369	41.75	Q	.	.	.	V	.
22.667	136.4222	41.42	Q	.	.	.	V	.
22.750	136.7053	41.11	Q	.	.	.	V	.
22.833	136.9863	40.80	Q	.	.	.	V	.
22.917	137.2652	40.50	Q	.	.	.	V	.
23.000	137.5421	40.20	Q	.	.	.	V	.
23.083	137.8170	39.91	Q	.	.	.	V.	.
23.167	138.0898	39.62	Q	.	.	.	V.	.
23.250	138.3608	39.34	Q	.	.	.	V.	.
23.333	138.6299	39.07	Q	.	.	.	V.	.
23.417	138.8971	38.80	Q	.	.	.	V.	.
23.500	139.1625	38.53	Q	.	.	.	V.	.
23.583	139.4261	38.27	Q	.	.	.	V.	.
23.667	139.6879	38.02	Q	.	.	.	V.	.
23.750	139.9480	37.77	Q	.	.	.	V.	.
23.833	140.2065	37.52	Q	.	.	.	V.	.
23.917	140.4632	37.28	Q	.	.	.	V.	.
24.000	140.7183	37.04	Q	.	.	.	V.	.
24.083	140.9268	30.27	Q	.	.	.	V.	.

24.167	141.0390	16.29	Q	.	.	.	V.
24.250	141.0866	6.91	Q	.	.	.	V.
24.333	141.1076	3.05	Q	.	.	.	V.
24.417	141.1166	1.31	Q	.	.	.	V.
24.500	141.1205	0.56	Q	.	.	.	V.
24.583	141.1219	0.22	Q	.	.	.	V.
24.667	141.1224	0.07	Q	.	.	.	V
24.750	141.1224	0.00	Q	.	.	.	V

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| END OF ANALYSIS |
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END OF FLOODSCx ROUTING ANALYSIS

100-YEAR HYDROGRAPH CALCULATIONS

POST-DEVELOPMENT CONDITIONS

F L O O D R O U T I N G A N A L Y S I S

ACCORDING TO COUNTY OF SAN DIEGO
DEPARTMENT OF PUBLIC WORKS FLOOD CONTROL DIVISION HYDROLOGY MANUAL(2003)
(c) Copyright 1989-2004 Advanced Engineering Software (aes)
Ver. 10.0 Release Date: 01/01/2004 License ID 1503

Analysis prepared by:

LANDMARK CONSULTING
9555 GENESEE AVE. SUITE 200
SAN DIEGO, CA 92121
TEL: 858-587-8070, FAX: 858-587-8750

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

* LILAC HILLS RANCH *
* IMPLEMENTATION TM *
* POST-DEVELOPMENT CONDITIONS *

FILE NAME: 1037I1P.DAT
TIME/DATE OF STUDY: 15:56 04/04/2012

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 1

>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<
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(UNIT-HYDROGRAPH ADDED TO STREAM #1)

WATERCOURSE LENGTH = 6606.000 FEET
LENGTH FROM CONCENTRATION POINT TO CENTROID = 3090.000 FEET
ELEVATION VARIATION ALONG WATERCOURSE = 406.000 FEET
BASIN FACTOR = 0.015
WATERSHED AREA = 396.300 ACRES
BASEFLOW = 0.000 CFS/SQUARE-MILE
WATERCOURSE "LAG" TIME = 0.107 HOURS
* Instantaneous Unit-Hydrograph Option Selected.
CAUTION: LAG TIME IS LESS THAN 0.75 HOURS.
THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
S.C.S. S-GRAPH SELECTED
WATERSHED RUNOFF CURVE NUMBER = 87.00

SPECIFIED PEAK 5-MINUTES RAINFALL(INCH)= 0.77
SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)= 1.45
SPECIFIED PEAK 1-HOUR RAINFALL(INCH) = 1.86
SPECIFIED PEAK 3-HOUR RAINFALL(INCH) = 2.74
SPECIFIED PEAK 6-HOUR RAINFALL(INCH) = 3.50
SPECIFIED PEAK 24-HOUR RAINFALL(INCH) = 6.00

24-HOUR NESTED DESIGN STORM DISTRIBUTION SELECTED
(Ref: San Diego County Hydrology Manual)

PRECIPITATION DEPTH-AREA REDUCTION FACTORS:

5-MINUTE FACTOR = 0.993
 30-MINUTE FACTOR = 0.993
 1-HOUR FACTOR = 0.996
 3-HOUR FACTOR = 0.998
 6-HOUR FACTOR = 0.998
 24-HOUR FACTOR = 0.999

UNIT HYDROGRAPH TIME UNIT = 5.000 MINUTES
 UNIT INTERVAL PERCENTAGE OF LAG-TIME = 78.179

UNIT HYDROGRAPH DETERMINATION

INTERVAL NUMBER	"q/qp" GRAPH VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	0.991	3231.131
2	0.382	1245.081
3	0.089	289.969
4	0.020	65.801
5	0.005	15.186
6	0.000	0.000

UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL - LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0081	0.0081	0.0000
2	0.0081	0.0081	0.0000
3	0.0082	0.0082	0.0000
4	0.0082	0.0082	0.0000
5	0.0082	0.0082	0.0000
6	0.0082	0.0082	0.0000
7	0.0083	0.0083	0.0000
8	0.0083	0.0083	0.0000
9	0.0083	0.0083	0.0000
10	0.0083	0.0083	0.0000
11	0.0084	0.0084	0.0000
12	0.0084	0.0084	0.0000
13	0.0084	0.0084	0.0000
14	0.0085	0.0085	0.0000
15	0.0085	0.0085	0.0000
16	0.0085	0.0085	0.0000
17	0.0086	0.0086	0.0000
18	0.0086	0.0086	0.0000
19	0.0086	0.0086	0.0000
20	0.0086	0.0086	0.0000
21	0.0087	0.0087	0.0000
22	0.0087	0.0087	0.0000
23	0.0087	0.0087	0.0000
24	0.0088	0.0088	0.0000
25	0.0088	0.0088	0.0000
26	0.0088	0.0088	0.0000
27	0.0089	0.0089	0.0000
28	0.0089	0.0089	0.0000
29	0.0089	0.0089	0.0000
30	0.0090	0.0090	0.0000
31	0.0090	0.0090	0.0000
32	0.0090	0.0090	0.0000
33	0.0091	0.0091	0.0000
34	0.0091	0.0091	0.0000
35	0.0091	0.0091	0.0000
36	0.0092	0.0091	0.0001
37	0.0092	0.0090	0.0002
38	0.0092	0.0089	0.0003
39	0.0093	0.0089	0.0004
40	0.0093	0.0088	0.0005
41	0.0094	0.0087	0.0006
42	0.0094	0.0086	0.0007
43	0.0094	0.0086	0.0008
44	0.0095	0.0085	0.0009
45	0.0095	0.0085	0.0011
46	0.0095	0.0084	0.0012
47	0.0096	0.0083	0.0013
48	0.0096	0.0082	0.0014
49	0.0097	0.0082	0.0015
50	0.0097	0.0081	0.0016
51	0.0098	0.0081	0.0017
52	0.0098	0.0080	0.0018
53	0.0098	0.0080	0.0019
54	0.0099	0.0079	0.0020
55	0.0099	0.0078	0.0021

56	0.0100	0.0078	0.0022
57	0.0100	0.0077	0.0023
58	0.0100	0.0077	0.0024
59	0.0101	0.0076	0.0025
60	0.0101	0.0075	0.0026
61	0.0102	0.0075	0.0027
62	0.0102	0.0074	0.0028
63	0.0103	0.0074	0.0029
64	0.0103	0.0073	0.0030
65	0.0104	0.0073	0.0031
66	0.0104	0.0072	0.0032
67	0.0105	0.0072	0.0033
68	0.0105	0.0071	0.0034
69	0.0106	0.0071	0.0035
70	0.0106	0.0070	0.0036
71	0.0107	0.0070	0.0037
72	0.0107	0.0070	0.0038
73	0.0108	0.0069	0.0039
74	0.0108	0.0069	0.0040
75	0.0109	0.0068	0.0041
76	0.0110	0.0068	0.0042
77	0.0110	0.0067	0.0043
78	0.0111	0.0067	0.0044
79	0.0112	0.0067	0.0045
80	0.0112	0.0066	0.0046
81	0.0113	0.0066	0.0047
82	0.0113	0.0065	0.0048
83	0.0114	0.0065	0.0049
84	0.0114	0.0064	0.0050
85	0.0115	0.0064	0.0051
86	0.0116	0.0064	0.0052
87	0.0117	0.0063	0.0053
88	0.0117	0.0063	0.0054
89	0.0118	0.0063	0.0055
90	0.0118	0.0062	0.0056
91	0.0119	0.0062	0.0057
92	0.0120	0.0062	0.0058
93	0.0121	0.0061	0.0059
94	0.0121	0.0061	0.0060
95	0.0122	0.0061	0.0062
96	0.0123	0.0060	0.0063
97	0.0124	0.0060	0.0064
98	0.0124	0.0060	0.0065
99	0.0126	0.0060	0.0066
100	0.0126	0.0059	0.0067
101	0.0127	0.0059	0.0068
102	0.0128	0.0059	0.0069
103	0.0129	0.0058	0.0071
104	0.0129	0.0058	0.0072
105	0.0131	0.0058	0.0073
106	0.0131	0.0057	0.0074
107	0.0133	0.0057	0.0075
108	0.0133	0.0057	0.0076
109	0.0134	0.0057	0.0078
110	0.0135	0.0056	0.0079
111	0.0136	0.0056	0.0080
112	0.0137	0.0056	0.0081
113	0.0139	0.0056	0.0083
114	0.0139	0.0055	0.0084
115	0.0141	0.0055	0.0085

116	0.0141	0.0055	0.0086
117	0.0143	0.0055	0.0088
118	0.0144	0.0055	0.0089
119	0.0145	0.0055	0.0091
120	0.0146	0.0054	0.0092
121	0.0148	0.0054	0.0094
122	0.0149	0.0054	0.0095
123	0.0150	0.0054	0.0097
124	0.0151	0.0053	0.0098
125	0.0153	0.0053	0.0100
126	0.0154	0.0053	0.0101
127	0.0156	0.0053	0.0103
128	0.0157	0.0053	0.0104
129	0.0159	0.0053	0.0106
130	0.0160	0.0053	0.0107
131	0.0162	0.0053	0.0109
132	0.0163	0.0052	0.0111
133	0.0165	0.0052	0.0113
134	0.0166	0.0052	0.0114
135	0.0169	0.0052	0.0117
136	0.0170	0.0052	0.0118
137	0.0172	0.0052	0.0121
138	0.0174	0.0052	0.0122
139	0.0176	0.0052	0.0125
140	0.0178	0.0051	0.0126
141	0.0180	0.0052	0.0129
142	0.0182	0.0051	0.0131
143	0.0185	0.0052	0.0133
144	0.0186	0.0051	0.0135
145	0.0101	0.0027	0.0073
146	0.0176	0.0047	0.0128
147	0.0179	0.0048	0.0131
148	0.0181	0.0048	0.0133
149	0.0184	0.0048	0.0136
150	0.0186	0.0048	0.0138
151	0.0190	0.0048	0.0142
152	0.0192	0.0048	0.0144
153	0.0196	0.0048	0.0147
154	0.0198	0.0048	0.0150
155	0.0202	0.0049	0.0154
156	0.0205	0.0049	0.0156
157	0.0210	0.0049	0.0160
158	0.0212	0.0049	0.0163
159	0.0217	0.0050	0.0168
160	0.0220	0.0050	0.0171
161	0.0226	0.0050	0.0176
162	0.0229	0.0050	0.0179
163	0.0236	0.0051	0.0185
164	0.0239	0.0051	0.0189
165	0.0247	0.0052	0.0195
166	0.0251	0.0052	0.0199
167	0.0259	0.0052	0.0206
168	0.0263	0.0053	0.0211
169	0.0274	0.0054	0.0220
170	0.0279	0.0054	0.0225
171	0.0289	0.0055	0.0234
172	0.0295	0.0055	0.0240
173	0.0308	0.0057	0.0251
174	0.0315	0.0057	0.0258
175	0.0330	0.0058	0.0271

176	0.0338	0.0059	0.0279
177	0.0356	0.0061	0.0295
178	0.0366	0.0061	0.0305
179	0.0389	0.0064	0.0325
180	0.0401	0.0064	0.0337
181	0.0430	0.0067	0.0363
182	0.0447	0.0068	0.0378
183	0.0486	0.0073	0.0413
184	0.0508	0.0074	0.0434
185	0.0573	0.0081	0.0492
186	0.0606	0.0084	0.0523
187	0.0692	0.0092	0.0600
188	0.0749	0.0096	0.0652
189	0.0903	0.0112	0.0791
190	0.1029	0.0122	0.0907
191	0.1511	0.0169	0.1342
192	0.2129	0.0220	0.1909
193	0.7629	0.0649	0.6981
194	0.1212	0.0087	0.1125
195	0.0820	0.0057	0.0763
196	0.0645	0.0043	0.0602
197	0.0534	0.0035	0.0499
198	0.0465	0.0030	0.0435
199	0.0415	0.0027	0.0389
200	0.0377	0.0024	0.0353
201	0.0347	0.0022	0.0325
202	0.0322	0.0020	0.0302
203	0.0301	0.0018	0.0283
204	0.0284	0.0017	0.0267
205	0.0268	0.0016	0.0252
206	0.0255	0.0015	0.0239
207	0.0243	0.0014	0.0229
208	0.0232	0.0014	0.0219
209	0.0223	0.0013	0.0210
210	0.0215	0.0012	0.0202
211	0.0207	0.0012	0.0195
212	0.0200	0.0011	0.0189
213	0.0194	0.0011	0.0183
214	0.0188	0.0011	0.0177
215	0.0182	0.0010	0.0172
216	0.0177	0.0010	0.0167
217	0.0188	0.0010	0.0178
218	0.0183	0.0010	0.0173
219	0.0179	0.0010	0.0169
220	0.0175	0.0009	0.0166
221	0.0171	0.0009	0.0162
222	0.0168	0.0009	0.0159
223	0.0164	0.0009	0.0155
224	0.0161	0.0009	0.0152
225	0.0158	0.0008	0.0150
226	0.0155	0.0008	0.0147
227	0.0152	0.0008	0.0144
228	0.0149	0.0008	0.0142
229	0.0147	0.0008	0.0139
230	0.0145	0.0007	0.0137
231	0.0142	0.0007	0.0135
232	0.0140	0.0007	0.0133
233	0.0138	0.0007	0.0131
234	0.0136	0.0007	0.0129
235	0.0134	0.0007	0.0127

236	0.0132	0.0007	0.0125
237	0.0130	0.0007	0.0124
238	0.0128	0.0006	0.0122
239	0.0127	0.0006	0.0120
240	0.0125	0.0006	0.0119
241	0.0123	0.0006	0.0117
242	0.0122	0.0006	0.0116
243	0.0120	0.0006	0.0114
244	0.0119	0.0006	0.0113
245	0.0118	0.0006	0.0112
246	0.0116	0.0006	0.0111
247	0.0115	0.0006	0.0109
248	0.0114	0.0005	0.0108
249	0.0112	0.0005	0.0107
250	0.0111	0.0005	0.0106
251	0.0110	0.0005	0.0105
252	0.0109	0.0005	0.0104
253	0.0108	0.0005	0.0103
254	0.0107	0.0005	0.0102
255	0.0106	0.0005	0.0101
256	0.0105	0.0005	0.0100
257	0.0104	0.0005	0.0099
258	0.0103	0.0005	0.0098
259	0.0102	0.0005	0.0097
260	0.0101	0.0005	0.0096
261	0.0100	0.0005	0.0095
262	0.0099	0.0005	0.0094
263	0.0098	0.0005	0.0094
264	0.0097	0.0004	0.0093
265	0.0096	0.0004	0.0092
266	0.0096	0.0004	0.0091
267	0.0095	0.0004	0.0091
268	0.0094	0.0004	0.0090
269	0.0093	0.0004	0.0089
270	0.0093	0.0004	0.0088
271	0.0092	0.0004	0.0088
272	0.0091	0.0004	0.0087
273	0.0090	0.0004	0.0086
274	0.0090	0.0004	0.0086
275	0.0089	0.0004	0.0085
276	0.0088	0.0004	0.0085
277	0.0088	0.0004	0.0084
278	0.0087	0.0004	0.0083
279	0.0087	0.0004	0.0083
280	0.0086	0.0004	0.0082
281	0.0085	0.0004	0.0082
282	0.0085	0.0004	0.0081
283	0.0084	0.0004	0.0081
284	0.0084	0.0004	0.0080
285	0.0083	0.0004	0.0079
286	0.0083	0.0004	0.0079
287	0.0082	0.0004	0.0078
288	0.0082	0.0004	0.0078

TOTAL STORM RAINFALL(INCHES) = 5.99

TOTAL SOIL-LOSS(INCHES) = 1.48

TOTAL EFFECTIVE RAINFALL(INCHES) = 4.51

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 48.9587

TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 150.5591

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2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	650.0	1300.0	1950.0	2600.0
0.083	0.0000	0.00	Q	.	.	.	.
0.167	0.0000	0.00	Q	.	.	.	.
0.250	0.0000	0.00	Q	.	.	.	.
0.333	0.0000	0.00	Q	.	.	.	.
0.417	0.0000	0.00	Q	.	.	.	.
0.500	0.0000	0.00	Q	.	.	.	.
0.583	0.0000	0.00	Q	.	.	.	.
0.667	0.0000	0.00	Q	.	.	.	.
0.750	0.0000	0.00	Q	.	.	.	.
0.833	0.0000	0.00	Q	.	.	.	.
0.917	0.0000	0.00	Q	.	.	.	.
1.000	0.0000	0.00	Q	.	.	.	.
1.083	0.0000	0.00	Q	.	.	.	.
1.167	0.0000	0.00	Q	.	.	.	.
1.250	0.0000	0.00	Q	.	.	.	.
1.333	0.0000	0.00	Q	.	.	.	.
1.417	0.0000	0.00	Q	.	.	.	.
1.500	0.0000	0.00	Q	.	.	.	.
1.583	0.0000	0.00	Q	.	.	.	.
1.667	0.0000	0.00	Q	.	.	.	.
1.750	0.0000	0.00	Q	.	.	.	.
1.833	0.0000	0.00	Q	.	.	.	.
1.917	0.0000	0.00	Q	.	.	.	.
2.000	0.0000	0.00	Q	.	.	.	.
2.083	0.0000	0.00	Q	.	.	.	.
2.167	0.0000	0.00	Q	.	.	.	.
2.250	0.0000	0.00	Q	.	.	.	.
2.333	0.0000	0.00	Q	.	.	.	.
2.417	0.0000	0.00	Q	.	.	.	.
2.500	0.0000	0.00	Q	.	.	.	.
2.583	0.0000	0.00	Q	.	.	.	.
2.667	0.0000	0.00	Q	.	.	.	.
2.750	0.0000	0.00	Q	.	.	.	.
2.833	0.0000	0.00	Q	.	.	.	.
2.917	0.0001	0.01	Q	.	.	.	.
3.000	0.0019	0.26	Q	.	.	.	.
3.083	0.0068	0.72	Q	.	.	.	.
3.167	0.0154	1.24	Q	.	.	.	.
3.250	0.0275	1.77	Q	.	.	.	.
3.333	0.0433	2.29	Q	.	.	.	.
3.417	0.0628	2.82	Q	.	.	.	.
3.500	0.0858	3.34	Q	.	.	.	.
3.583	0.1124	3.87	Q	.	.	.	.
3.667	0.1426	4.38	Q	.	.	.	.
3.750	0.1764	4.90	Q	.	.	.	.
3.833	0.2136	5.41	Q	.	.	.	.
3.917	0.2544	5.92	Q	.	.	.	.
4.000	0.2986	6.42	Q	.	.	.	.
4.083	0.3464	6.93	Q	.	.	.	.

4.167	0.3976	7.43	Q	.	.	.	.
4.250	0.4522	7.94	Q	.	.	.	.
4.333	0.5103	8.43	Q	.	.	.	.
4.417	0.5718	8.93	Q	.	.	.	.
4.500	0.6368	9.42	Q	.	.	.	.
4.583	0.7051	9.92	Q	.	.	.	.
4.667	0.7768	10.41	Q	.	.	.	.
4.750	0.8519	10.91	Q	.	.	.	.
4.833	0.9304	11.39	Q	.	.	.	.
4.917	1.0122	11.89	Q	.	.	.	.
5.000	1.0974	12.37	Q	.	.	.	.
5.083	1.1860	12.86	Q	.	.	.	.
5.167	1.2778	13.34	Q	.	.	.	.
5.250	1.3731	13.83	Q	.	.	.	.
5.333	1.4716	14.30	Q	.	.	.	.
5.417	1.5735	14.80	Q	.	.	.	.
5.500	1.6787	15.27	Q	.	.	.	.
5.583	1.7873	15.77	Q	.	.	.	.
5.667	1.8991	16.24	Q	.	.	.	.
5.750	2.0143	16.73	Q	.	.	.	.
5.833	2.1328	17.20	Q	.	.	.	.
5.917	2.2547	17.70	Q	.	.	.	.
6.000	2.3798	18.16	Q	.	.	.	.
6.083	2.5083	18.66	Q	.	.	.	.
6.167	2.6400	19.13	Q	.	.	.	.
6.250	2.7752	19.63	Q	.	.	.	.
6.333	2.9137	20.10	Q	.	.	.	.
6.417	3.0555	20.60	Q	.	.	.	.
6.500	3.2006	21.07	Q	.	.	.	.
6.583	3.3492	21.57	Q	.	.	.	.
6.667	3.5010	22.04	Q	.	.	.	.
6.750	3.6564	22.55	Q	.	.	.	.
6.833	3.8149	23.02	QV	.	.	.	.
6.917	3.9770	23.54	QV	.	.	.	.
7.000	4.1424	24.01	QV	.	.	.	.
7.083	4.3113	24.53	QV	.	.	.	.
7.167	4.4836	25.00	QV	.	.	.	.
7.250	4.6594	25.53	QV	.	.	.	.
7.333	4.8385	26.01	QV	.	.	.	.
7.417	5.0212	26.53	QV	.	.	.	.
7.500	5.2073	27.02	QV	.	.	.	.
7.583	5.3970	27.55	QV	.	.	.	.
7.667	5.5902	28.04	QV	.	.	.	.
7.750	5.7870	28.58	QV	.	.	.	.
7.833	5.9872	29.07	QV	.	.	.	.
7.917	6.1912	29.62	QV	.	.	.	.
8.000	6.3987	30.12	QV	.	.	.	.
8.083	6.6099	30.68	QV	.	.	.	.
8.167	6.8247	31.18	QV	.	.	.	.
8.250	7.0433	31.75	QV	.	.	.	.
8.333	7.2655	32.26	QV	.	.	.	.
8.417	7.4916	32.84	QV	.	.	.	.
8.500	7.7213	33.35	Q V	.	.	.	.
8.583	7.9551	33.94	Q V	.	.	.	.
8.667	8.1924	34.47	Q V	.	.	.	.
8.750	8.4340	35.07	Q V	.	.	.	.
8.833	8.6791	35.60	Q V	.	.	.	.
8.917	8.9286	36.22	Q V	.	.	.	.
9.000	9.1817	36.76	Q V	.	.	.	.
9.083	9.4392	37.39	Q V	.	.	.	.

9.167	9.7005	37.94	Q V	.	.	.	.
9.250	9.9663	38.59	Q V	.	.	.	.
9.333	10.2359	39.15	Q V	.	.	.	.
9.417	10.5101	39.81	Q V	.	.	.	.
9.500	10.7883	40.39	Q V	.	.	.	.
9.583	11.0711	41.07	Q V	.	.	.	.
9.667	11.3580	41.66	Q V	.	.	.	.
9.750	11.6498	42.36	Q V	.	.	.	.
9.833	11.9457	42.97	Q V	.	.	.	.
9.917	12.2467	43.69	Q V	.	.	.	.
10.000	12.5518	44.31	Q V	.	.	.	.
10.083	12.8622	45.06	Q V	.	.	.	.
10.167	13.1769	45.70	Q V	.	.	.	.
10.250	13.4969	46.47	Q V	.	.	.	.
10.333	13.8215	47.13	Q V	.	.	.	.
10.417	14.1516	47.93	Q V	.	.	.	.
10.500	14.4864	48.61	Q V	.	.	.	.
10.583	14.8269	49.44	Q V	.	.	.	.
10.667	15.1723	50.14	Q V	.	.	.	.
10.750	15.5235	51.01	Q V	.	.	.	.
10.833	15.8799	51.74	Q V	.	.	.	.
10.917	16.2424	52.64	Q V	.	.	.	.
11.000	16.6101	53.39	Q V	.	.	.	.
11.083	16.9843	54.33	Q V	.	.	.	.
11.167	17.3639	55.12	Q V	.	.	.	.
11.250	17.7502	56.10	Q V	.	.	.	.
11.333	18.1423	56.92	Q V	.	.	.	.
11.417	18.5414	57.95	Q V	.	.	.	.
11.500	18.9464	58.81	Q V	.	.	.	.
11.583	19.3589	59.89	Q V	.	.	.	.
11.667	19.7776	60.79	Q V	.	.	.	.
11.750	20.2041	61.93	Q V	.	.	.	.
11.833	20.6371	62.88	Q V	.	.	.	.
11.917	21.0785	64.08	Q V	.	.	.	.
12.000	21.5267	65.08	.Q V	.	.	.	.
12.083	21.8396	45.43	Q V	.	.	.	.
12.167	22.2221	55.54	Q V	.	.	.	.
12.250	22.6461	61.56	Q V	.	.	.	.
12.333	23.0849	63.71	Q V	.	.	.	.
12.417	23.5348	65.32	.Q V	.	.	.	.
12.500	23.9928	66.51	.Q V	.	.	.	.
12.583	24.4609	67.97	.Q V	.	.	.	.
12.667	24.9371	69.15	.Q V	.	.	.	.
12.750	25.4242	70.73	.Q V	.	.	.	.
12.833	25.9201	72.00	.Q V	.	.	.	.
12.917	26.4277	73.70	.Q V	.	.	.	.
13.000	26.9448	75.08	.Q V	.	.	.	.
13.083	27.4746	76.93	.Q V	.	.	.	.
13.167	28.0148	78.43	.Q V	.	.	.	.
13.250	28.5689	80.46	.Q V	.	.	.	.
13.333	29.1342	82.09	.Q V	.	.	.	.
13.417	29.7149	84.32	.Q V	.	.	.	.
13.500	30.3080	86.11	.Q V	.	.	.	.
13.583	30.9180	88.58	.Q V	.	.	.	.
13.667	31.5417	90.56	.Q V	.	.	.	.
13.750	32.1844	93.31	.Q V	.	.	.	.
13.833	32.8422	95.52	.Q V	.	.	.	.
13.917	33.5214	98.62	.Q V	.	.	.	.
14.000	34.2177	101.10	.Q V.	.	.	.	.
14.083	34.9399	104.86	.Q V.	.	.	.	.

14.167	35.6821	107.77	.Q	V.	.	.	.
14.250	36.4522	111.81	.Q	V.	.	.	.
14.333	37.2446	115.06	.Q	V.	.	.	.
14.417	38.0692	119.73	.Q	V	.	.	.
14.500	38.9198	123.51	.Q	V	.	.	.
14.583	39.8085	129.04	.Q	V	.	.	.
14.667	40.7281	133.52	. Q	V	.	.	.
14.750	41.6935	140.18	. Q	.V	.	.	.
14.833	42.6963	145.61	. Q	.V	.	.	.
14.917	43.7557	153.83	. Q	.V	.	.	.
15.000	44.8617	160.60	. Q	.V	.	.	.
15.083	46.0400	171.08	. Q	. V	.	.	.
15.167	47.2783	179.81	. Q	. V	.	.	.
15.250	48.6127	193.76	. Q	. V	.	.	.
15.333	50.0286	205.59	. Q	. V	.	.	.
15.417	51.5986	227.97	. Q	. V	.	.	.
15.500	53.2932	246.05	. Q	. V	.	.	.
15.583	55.1984	276.63	. Q	. V	.	.	.
15.667	57.2954	304.48	. Q	. V	.	.	.
15.750	59.7644	358.50	. Q	. V	.	.	.
15.833	62.6242	415.26	. Q	. V	.	.	.
15.917	66.5817	574.62	. Q	. V	.	.	.
16.000	72.2036	816.29	.	. Q	. V.	.	.
16.083	89.6922	2539.35	.	.	. V	.	.Q.
16.167	98.6328	1298.17	.	.	.Q.	. V	.
16.250	102.7895	603.56	.	.Q.	.	. V	.
16.333	105.3442	370.94	. Q	.	.	. V	.
16.417	107.2469	276.27	. Q	.	.	. V	.
16.500	108.8092	226.84	. Q	.	.	. V	.
16.583	110.1819	199.33	. Q	.	.	. V.	.
16.667	111.4171	179.35	. Q	.	.	. V.	.
16.750	112.5463	163.95	. Q	.	.	. V.	.
16.833	113.5904	151.61	. Q	.	.	. V	.
16.917	114.5645	141.44	. Q	.	.	. V	.
17.000	115.4796	132.88	. Q	.	.	. V	.
17.083	116.3423	125.27	.Q	.	.	. V	.
17.167	117.1604	118.79	.Q	.	.	.V	.
17.250	117.9398	113.16	.Q	.	.	.V	.
17.333	118.6850	108.20	.Q	.	.	.V	.
17.417	119.3996	103.76	.Q	.	.	.V	.
17.500	120.0867	99.77	.Q	.	.	.V	.
17.583	120.7489	96.15	.Q	.	.	. V	.
17.667	121.3884	92.86	.Q	.	.	. V	.
17.750	122.0071	89.84	.Q	.	.	. V	.
17.833	122.6067	87.06	.Q	.	.	. V	.
17.917	123.1887	84.50	.Q	.	.	. V	.
18.000	123.7543	82.13	.Q	.	.	. V	.
18.083	124.3373	84.65	.Q	.	.	. V	.
18.167	124.9183	84.36	.Q	.	.	. V	.
18.250	125.4884	82.79	.Q	.	.	. V	.
18.333	126.0463	81.00	.Q	.	.	. V	.
18.417	126.5921	79.25	.Q	.	.	. V	.
18.500	127.1264	77.58	.Q	.	.	. V	.
18.583	127.6498	76.00	.Q	.	.	. V	.
18.667	128.1628	74.50	.Q	.	.	. V	.
18.750	128.6661	73.07	.Q	.	.	. V	.
18.833	129.1600	71.72	.Q	.	.	. V	.
18.917	129.6452	70.44	.Q	.	.	. V	.
19.000	130.1218	69.21	.Q	.	.	. V	.
19.083	130.5904	68.04	.Q	.	.	. V	.

19.167	131.0513	66.92	.Q	.	.	.	V	.
19.250	131.5047	65.84	.Q	.	.	.	V	.
19.333	131.9511	64.82	Q	.	.	.	V	.
19.417	132.3908	63.83	Q	.	.	.	V	.
19.500	132.8239	62.88	Q	.	.	.	V	.
19.583	133.2507	61.97	Q	.	.	.	V	.
19.667	133.6715	61.10	Q	.	.	.	V	.
19.750	134.0864	60.26	Q	.	.	.	V	.
19.833	134.4958	59.44	Q	.	.	.	V	.
19.917	134.8998	58.66	Q	.	.	.	V	.
20.000	135.2986	57.90	Q	.	.	.	V	.
20.083	135.6923	57.17	Q	.	.	.	V	.
20.167	136.0811	56.46	Q	.	.	.	V	.
20.250	136.4653	55.78	Q	.	.	.	V	.
20.333	136.8448	55.11	Q	.	.	.	V	.
20.417	137.2200	54.47	Q	.	.	.	V	.
20.500	137.5908	53.85	Q	.	.	.	V	.
20.583	137.9575	53.25	Q	.	.	.	V	.
20.667	138.3202	52.66	Q	.	.	.	V	.
20.750	138.6789	52.09	Q	.	.	.	V	.
20.833	139.0339	51.54	Q	.	.	.	V	.
20.917	139.3851	51.00	Q	.	.	.	V	.
21.000	139.7327	50.48	Q	.	.	.	V	.
21.083	140.0769	49.97	Q	.	.	.	V	.
21.167	140.4176	49.47	Q	.	.	.	V	.
21.250	140.7550	48.99	Q	.	.	.	V	.
21.333	141.0891	48.52	Q	.	.	.	V	.
21.417	141.4201	48.06	Q	.	.	.	V	.
21.500	141.7480	47.61	Q	.	.	.	V	.
21.583	142.0730	47.18	Q	.	.	.	V	.
21.667	142.3949	46.75	Q	.	.	.	V	.
21.750	142.7141	46.34	Q	.	.	.	V	.
21.833	143.0304	45.93	Q	.	.	.	V	.
21.917	143.3440	45.54	Q	.	.	.	V	.
22.000	143.6550	45.15	Q	.	.	.	V	.
22.083	143.9633	44.77	Q	.	.	.	V	.
22.167	144.2691	44.40	Q	.	.	.	V	.
22.250	144.5724	44.04	Q	.	.	.	V	.
22.333	144.8733	43.68	Q	.	.	.	V	.
22.417	145.1718	43.34	Q	.	.	.	V	.
22.500	145.4679	43.00	Q	.	.	.	V	.
22.583	145.7617	42.67	Q	.	.	.	V	.
22.667	146.0533	42.34	Q	.	.	.	V	.
22.750	146.3427	42.02	Q	.	.	.	V	.
22.833	146.6300	41.71	Q	.	.	.	V	.
22.917	146.9151	41.40	Q	.	.	.	V	.
23.000	147.1982	41.10	Q	.	.	.	V	.
23.083	147.4793	40.81	Q	.	.	.	V	.
23.167	147.7583	40.52	Q	.	.	.	V	.
23.250	148.0354	40.23	Q	.	.	.	V	.
23.333	148.3106	39.96	Q	.	.	.	V	.
23.417	148.5839	39.68	Q	.	.	.	V	.
23.500	148.8553	39.41	Q	.	.	.	V	.
23.583	149.1250	39.15	Q	.	.	.	V	.
23.667	149.3928	38.89	Q	.	.	.	V	.
23.750	149.6589	38.64	Q	.	.	.	V	.
23.833	149.9233	38.39	Q	.	.	.	V	.
23.917	150.1860	38.14	Q	.	.	.	V	.
24.000	150.4470	37.90	Q	.	.	.	V	.
24.083	150.5340	12.62	Q	.	.	.	V	.

24.167	150.5539	2.90	Q	.	.	.	V.
24.250	150.5583	0.63	Q	.	.	.	V.
24.333	150.5591	0.12	Q	.	.	.	V.
24.417	150.5591	0.00	Q	.	.	.	V.

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END OF FLOODSCx ROUTING ANALYSIS

APPENDIX

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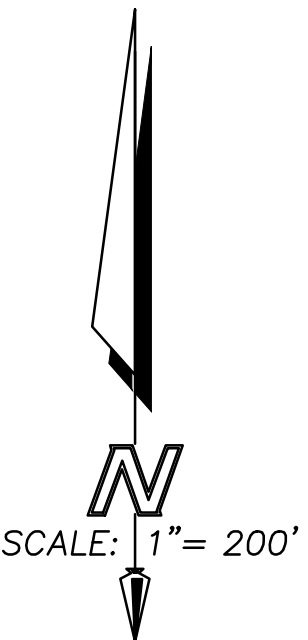
PRE-DEVELOPMENT HYDROLOGY MAP
LILAC HILLS RANCH, IMPLEMENTING TM
TM 5572

LEGEND

- PROJECT BOUNDARY
- MAJOR BASIN BOUNDARY
- TRIBUTARY AREA BOUNDARY
- FLOW PATH
- 101
- 101

U/S NODE	D/S NODE	U/S ELEV	D/S ELEV	FLOW LENGTH	AREA	C	I
101	102	1042	1038	60	0.1	0.36	8.7
102	103	1038	826	2700	57.8	0.30	4.5
104	105	928	927	60	0.1	0.36	6.4
105	103	927	826	1200	20.7	0.30	4.5
103	106	826	794	780	12.7	0.30	4.0
107	108	958	956	60	0.1	0.30	7.1
108	106	956	794	1030	9.7	0.30	5.4
106	109	794	786	144	0.7	0.30	4.0
110	111	989	988	50	0.1	0.30	6.8
111	112	988	842	1340	18.2	0.36	5.2
113	114	978	977	50	0.1	0.36	7.5
114	112	977	842	1870	19.9	0.36	4.4
112	109	842	786	875	10.1	0.36	4.2
109	115	786	772	826	6.7	0.30	3.8
116	117	895.5	894	50	0.1	0.30	7.4
117	115	894	772	1120	9.1	0.30	5.1
115	118	772	636	1966	40.1	0.30	3.3
119	120	935.5	934	50	0.1	0.30	7.4
120	118	934	636	2105	26.9	0.30	4.4
121	122	937	936	50	0.1	0.30	6.8
122	123	936	800	1182	11.6	0.36	5.0
124	125	1015	1014	50	0.1	0.30	6.8
125	123	1014	800	2690	49.8	0.36	3.8
123	126	800	787	542	4.1	0.30	3.5
127	128	898	896	50	0.1	0.30	7.8
128	126	896	787	1470	15.9	0.36	4.2
126	129	787	720	1205	13.8	0.30	3.2
130	131	963	962	50	0.1	0.36	7.1
131	129	962	720	3400	55.6	0.30	3.4
129	118	720	636	770	11	0.30	3.0

A=395.5 Ac
V100=7.3 FPS
Q100=384.7 CFS



POST-DEVELOPMENT HYDROLOGY MAP
LILAC HILLS RANCH
TM 5572

US NODE	DS NODE	US ELEV.	DS ELEV.	FLOW LENGTH	AREA	C	I
101	102	978	977	50	0.1	0.54	8.5
102	103	977	894	1432	13.1	0.36	5.2
105	106	925.9	925	50	0.1	0.54	8.3
106	107	922	912	825	2.3	0.54	5.5
109	110	904.3	904	50	0.1	0.54	8.4
110	111	896	892	390	1.5	0.54	5.4
113	114	903.8	903	50	0.1	0.54	8.1
114	115	896	882	380	1.5	0.54	7.0
116	117	912	911	50	0.1	0.54	8.5
117	118	911	883	444	1.4	0.54	7.3
120	121	990	989	50	0.1	0.54	8.5
121	123	988	910	648	11.1	0.36	8.4
125	126	919.2	919	50	0.1	0.54	7.3
126	124	916	894	422	1.7	0.54	6.5
128	129	919.7	919	50	0.1	0.54	7.9
129	127	916	894	422	1.1	0.54	6.8
131	132	890	889	50	0.1	0.54	7.3
132	133	888	886	327	1.4	0.54	6.0
135	136	889	888	50	0.1	0.54	7.3
136	134	888	886	351	1.0	0.54	5.6
138	139	919.4	919	50	0.1	0.54	7.3
139	140	919	871	633	0.8	0.54	6.1
141	142	877	876	50	0.1	0.54	7.3
142	143	876	871	115	0.7	0.54	7.0
145	146	914	913	50	0.1	0.54	7.3
146	147	913	872	564	1.8	0.54	6.3
149	150	919.4	919	50	0.1	0.54	7.3
150	151	916	896	370	2.1	0.54	6.6
152	153	890	850	736	1.3	0.54	6.0
155	156	884	880	50	0.1	0.87	9.2
156	157	880	828	1237	4.5	0.54	9.1
160	161	874	864	50	0.1	0.87	9.2
161	162	864	830	1028	1.3	0.87	8.8
163	164	978	976	50	0.1	0.30	7.8
164	165	976	910	433	1.6	0.30	5.8
166	167	898	876	360	1.3	0.87	5.4
169	170	934	930	50	0.1	0.30	9.1
170	171	930	902	274	0.7	0.30	6.3
173	174	940	938	50	0.1	0.30	7.8
174	172	938	908	863	2.6	0.30	6.4
176	177	930.7	930	50	0.1	0.54	7.9
177	175	928	888	1200	4.5	0.54	5.4
175	178	888	870	395	2.6	0.54	5.1
180	181	931	930	50	0.1	0.54	7.3
181	179	930	870	1399	4.2	0.54	5.8
183	184	897.3	897	50	0.1	0.54	7.3
184	185	897	858	687	6.9	0.54	6.3
186	187	870	869	50	0.1	0.54	7.3
187	188	869	585	750	2.1	0.54	5.4
190	191	897.3	897	50	0.1	0.54	6.6

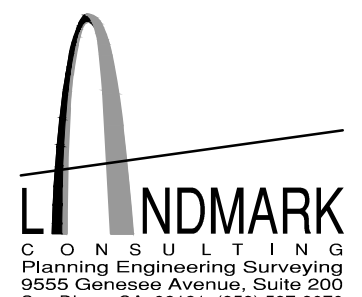
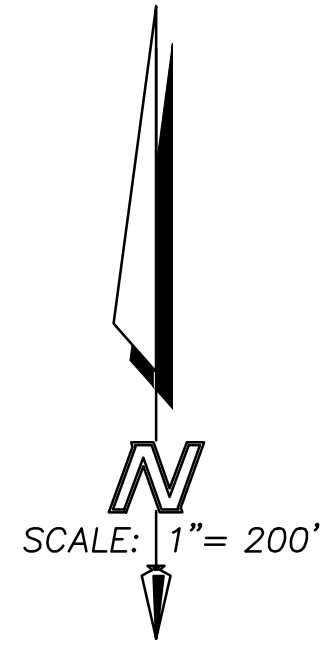
191	192	897	854	656	1.1	0.54	5.6
194	195	872	866	50	0.1	0.87	9.2
195	196	866	813	805	0.6	0.87	9.2
197	198	854	830	50	0.1	0.87	9.2
198	199	838	813	553	0.6	0.87	9.2
1101	1102	784	782.2	350	2.8	0.30	4.3
1103	1104	762	730	156	0	0.30	9.1
1106	1107	1042	1038	60	0.1	0.30	8.3
1107	1108	1038	840	2420	46.4	0.30	4.4
1109	1110	836	820	599	5.3	0.30	3.9
1111	1112	810	787	381	2.9	0.30	3.7
1113	1114	940	939	50	0.1	0.30	6.8
1114	1115	939	804	1333	11.4	0.30	4.1
1112	1116	787	766	748	4.2	0.30	3.4
1117	1118	938	934	50	0.1	0.30	9.1
1118	1119	934	804	900	8.2	0.30	5.6
1120	1116	790	766	385	1.7	0.30	4.9
1121	1122	916	914	50	1	0.36	8.2
1122	1123	924	825	1736	9.6	0.54	5.8
1125	1126	930.3	929.2	50	0.1	0.54	8.7
1126	1124	929.2	825	1940	10.6	0.54	5.8
1127	1116	790	766	354	1.7	0.30	5.4
1116	1104	766	730	684	7.9	0.30	3.2
1128	1129	892	886	50	0.1	0.30	9.2
1129	1130	886	800	578	3.8	0.30	5.7
1131	1104	780	730	580	3.8	0.30	4.5
1104	1132	730	636	1083	7.8	0.30	4
201	202	901.3	900	50	0.1	0.54	7.3
202	203	900	896	315	1	0.54	6.1
205	206	925	924.5	50	0.1	0.54	7.3
206	204	924.5	896	785	3.9	0.54	5.9
208	209	901	900	50	0.1	0.54	8.5
209	207	900	892	273	0.6	0.54	7.3
211	212	917.2	916.5	50	0.1	0.54	7.9
212	210	916.5	892	695	1.7	0.54	6.2
213	214	864	720	2276	35.3	0.30	3.5
215	216	926.1	925	50	0.1	0.54	8.7
216	217	925	890	1353	8.3	0.54	5.8
219	220	912	910	50	0.1	0.87	9.2
220	218	910	890	873	1.8	0.54	8.3
221	222	872	802	651	7.4	0.30	4.9
223	224	1016	1014	50	0.1	0.30	7.8
224	222	1014	802	2690	48.8	0.54	4
222	225	802	788	542	4.2	0.30	3.8
226	227	954	950	50	0.1	0.30	9.1
227	225	950	788	1895	16	0.36	4.7
225	214	788	720	1205	13.9	0.30	3.4
214	1132	730	636	769	11.1	0.30	3.2
1133	1134	920	916	50	0.1	0.30	9.1
1134	1132	916	636	2324	26.5	0.30	4.5
TOTAL							391.0

LEGEND

PROJECT BOUNDARY	-----
MAJOR BASIN BOUNDARY	-----
TRIBUTARY AREA BOUNDARY	-----
FLOW PATH	----->
NODE NUMBER	101

A=391.0 Ac
V100=7.5 FPS*
Q100=482.9 CFS*
* UNMITIGATED

PEAK DISCHARGE RATE NOTE:
THE PROPOSED DETENTION BASIN AND ITS OUTLET
STRUCTURE WILL MITIGATE THE PEAK DISCHARGE
FROM THE DETENTION BASIN TO BE NO MORE THAN
78 CFS SUCH THAT THE COMBINED OVERALL PEAK
DISCHARGE AT NODE 1132 WILL BE LESS THAN THAT
OF THE PRE-DEVELOPMENT CONDITIONS.



ADDENDUM

ALTERNATIVE TO DETENTION BASINS

The developer has proposed a few alternative measures to augment or enhance the storm water runoff volume attenuation methods. In recent years, new technologies have become available to better retain and store excess runoff volume such as rain barrels, bio-retention (see page 166 – Typical Residential Lot Rain Water Capturing Schematic) and permeable pavers (see page 165 – Typical Permeable Paver Section). These rain capturing measures will not only reduce the project's hydrologic and subsequent development footprint but also reduce the water demand of the project since the captured runoff will be used for irrigation.

ASSUMPTIONS:

Bio-retention:

- Average lot size = 4500 sf
- Average impervious coverage per lot = 1500 sf roof + 300 sf walkways and driveway = 1800 sf
- Typical pervious coverage (bio-retention) per lot = 1000 sf with the top 12" layer providing a minimum of 5"/hour infiltration rate.
- Typical void ratio of engineered infiltration material = 0.55

Rain barrels:

- Typical home rain gutter down spout location = 4
- Typical rain barrel capacity = 50 gal.

Permeable pavers:

- Average permeable paver section: 2" bedding + 4" no. 57 stone base + 24" no. 2 stone subbase
- Average permeable paver base void ratio = 0.4
- Typical storage volume under each square foot of pavers = 1.0 cf

Project design:

- Proposed residential units = 352 (Phase 1 only)

ANALYSIS:

Typical Lot rainwater capturing/retention calculations:

Bio-retention volume per typical home: $1000 \text{ sf} \times 12" / 12 \times 0.55 \text{ void ratio} = 550 \text{ cf}$.

Total bio-retention vol. = $550 \text{ cf} \times 352 \text{ SFR homes} = 193600 \text{ cf} = \mathbf{4.4 \text{ Ac-Ft.}}$

Rain barrel capacity = $4 \times 50\text{gal} = 200 \text{ gal} = 27 \text{ cf}$

Total rain barrel capturing capacity = $27 \text{ cf} \times 352 \text{ SFR homes} = 9500 \text{ cf} = \mathbf{0.2 \text{ Ac-Ft.}}$

Total lot rain capturing capacity for the development = $4.4 + 0.2 = \mathbf{4.6 \text{ Ac-Ft.}}$

Permeable Pavers:

The developer proposes to install a total of 23 acres of permeable pavers throughout the entire project, only a portion of the 23 acres of pavers will be deployed for this Implementing tentative map, the rest will be installed in later phases throughout the project.

The project will need to install a minimum of **4.8** acres of permeable pavers, in additions to the rain barrels on each lot, to achieve the 9.4 Ac-Ft of total storage space. The combined capacity will eliminate the required detention basin for 100-year runoff attenuation purposes.

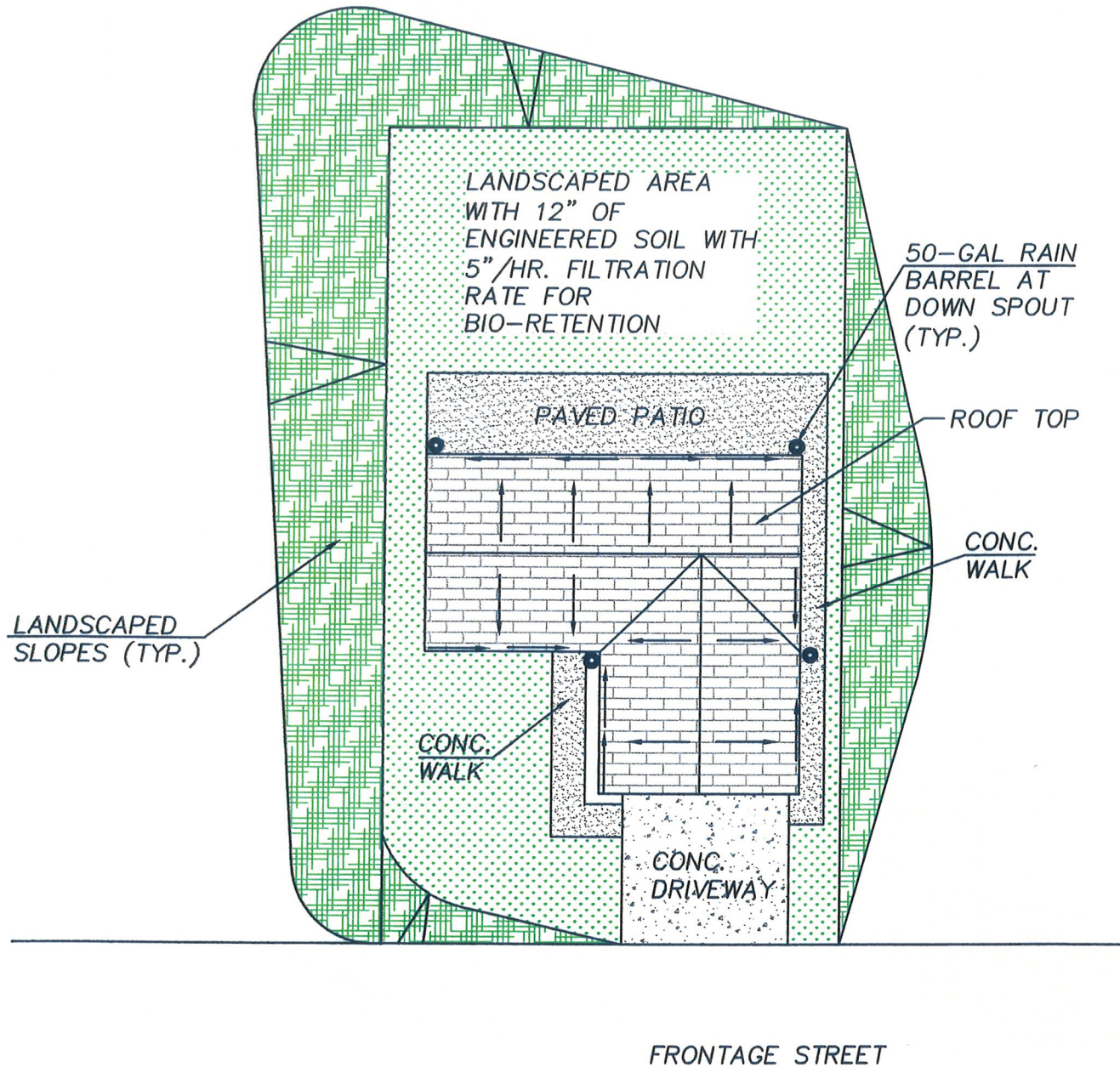
Total alternative storage capacity = rain barrels + bio-retention + permeable pavers = $4.6 + 4.8 = \mathbf{9.4 \text{ Ac-Ft.}}$

CONCLUSION:

These permeable pavers, bio-retention and rain barrels offer a great alternative to the proposed detention basins for 100-year runoff volume attenuation.

The project developers projected a total of 23 acres of pavers throughout the project. Per the calculations presented in this report, the proposed rain barrels, bio-retention areas and permeable pavers will provide adequate storage capacity to eliminate the required detention basin for 100-year storm water runoff volume attenuation purposes. It is possible to eliminate the proposed large detention basins and reduce the project foot print with the deployment of these alternative methods. Additionally, the captured rainwater in the bio-retention areas and rain barrels will offset the irrigation water demand of the project to make it a more sustainable development.

LILAC HILLS RANCH TYPICAL RESIDENTIAL LOT RAIN WATER CAPTURING SCHEMATIC



PERMEABLE PAVERS ANALYSIS

LILAC HILLS RANCH

Streets "O" & "ZZ"
0.6 acres (26,136sf)

Streets "C" & "Z"
2.1 acres (91,476sf)

TOWN CENTER AREA 1
1.5 acres (65,340sf)

Street "F"
2.2 acres (95,832sf)

TOWN CENTER AREA 2
0.6 acres (26,136sf)

MAIN STREET
4.9 acres (213,444sf)

INTERNAL TOWN CENTER
ROADS & PARKING
5.1 acres (222,156sf)

Private Recreation Couplet
2.2 acres (95,832sf)

