DRAINAGE STUDY
for
SUNBOW II, PHASE 3(TM)

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CHAPTER 1 - EXECUTIVE SUMMARY

1.1 - Introduction

The Sunbow Planning Area is located in the City of Chula Vista, California, in south of the Olympic Pkwy, north of the Otay Landfill (see the Vicinity Map below).

Sunbow II, Phase 3 Sectional Planning Area (SPA) Plan Amendment encompasses approximately 135.7[1] acres (Project Area) that includes a 67.5 development area comprised of 44.2 acres of residential, a 0.9-acre Community Purpose Facility (CPF) site, 5.9 acres of public streets and 16.5 manufactured slopes/basins. Approximately 4.3 acres of conserved Poggi Creek Easement areas, a 0.3 acre of conserved wetland resource area and 63.6[2] acres of adjacent MSCP Preserve area are also within the Project Area.

The total drainage area of the project is approximately 117.3 acres. In between with the north side of the site and the south curb of the Olympic Pkwy, the Poggi Canyon creek is running parallel to the road from northwest to southwest. The south boundary of the site is delineated by the natural ridges along landfill boarder.

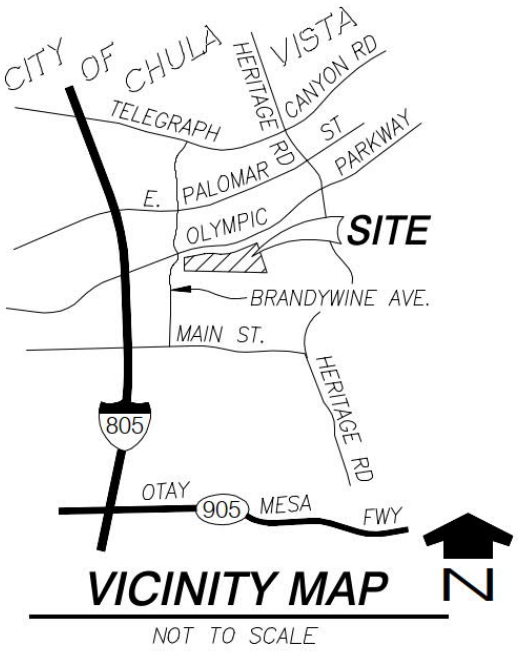
The project will consist of 718 units of multi-story townhomes as well as associated public and private roads, and parking spaces. The storm drain and storm water quality control facilities are proposed to meet the city requirements. This study will be focusing on quantifying the runoff for the 100-year storm event and analyzing the capacity of the storm drain and detention basin to minimize the impact of the proposed development.

Treatment of storm water runoff from the site has been addressed in a separate report – 'The Priority Development Project Storm Water Quality Management Plan (SWQMP) for Sunbow Planning Area' dated June 23, 2020 prepared by Hunsaker & Associates San Diego Inc.

Per City's drainage criteria, the onsite hydrology calculation will be based on 100-year storm event.

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[1] Acreages are rounded to the nearest 1/10th acre and may vary slightly from calculated total.
[2] The Proposed MSCP area includes approximately 1.31 acres of "Mapping Correction Area" and approximately 1.12 acres of MSCP Allowable Use (Basin – Future Facility).



VICINITY MAP

NOT TO SCALE

Per County of San Diego drainage criteria, the Modified Rational Method should be used to determine peak design flowrates when the contributing drainage area is less than 1.0 square mile. Since the total watershed area discharging from the site is less than 1.0 square mile, the AES-2015 computer software was used to model the runoff response per the Modified Rational Method. Methodology used for the computation of design rainfall events, runoff coefficients, and rainfall intensity values are consistent with criteria set forth in the "County of San Diego 2003 Hydrology Manual." A more detailed explanation of methodology used for this analysis is listed in Chapter 2 of this report.

Detailed calculations such as storm drain hydraulics, inlet calculations, and street capacity calculations will be addressed during final engineering.

The 50-yr and 100-yr depth provided in Chapter 2 are for P6.

1.2 – Summary of Existing Conditions

The 117.3-acre hydrologic catchment primarily consist of natural grades and hills all covered by native vegetations and shrubs. The site is accessible from Olympic Pkwy through two separate bridges crossing Poggi Canyon creek in north side. The Poggi Canyon creek flows from northeast to southwest and accepts large amount of storm runoff from surrounding area. It is also the downstream of the onsite runoff from both our existing and proposed condition. The local high points are in southern boundary of the site adjacent to the Otay landfill and make the overall on site flow pattern simply south to north.

A small portion of the site in southwest corner was occupied by a water tank which is serving the nearby residential areas.

Based on the site topo, the existing condition catchment was divided into 7 sub-catchments. All onsite runoff from sub-catchment under design event will flow from south to north into Poggi Canyon creek and eventually confluence at the northwest corner of our catchment (hydrologic node 126).

1.3 – Summary of Developed Condition

The Proposed Project's residential land use includes four unique multi-family attached residential product types with 15 unique floor plans, ranging in square footage from approximately 1,100 to 2,050 square feet in two- and three-story units. Each home includes a two-car garage and two to four bedrooms.

The Proposed Project includes a Chula Vista General Plan Amendment, Sunbow General Development Plan Amendment, Sunbow II SPA Plan Amendment, a rezone, and a Tentative Map. The Proposed Project also includes a Chula Vista MSCP Boundary Adjustment to implement minor adjustments to the development limits and the adjacent MSCP Preserve areas that would result in a 0.09-acre increase to MSCP Preserve Area and an MSCP Minor Amendment to address off-site grading adjacent to the southwestern boundary of the development area.

The development of the site will include adding the storm drains, curb inlets, cleanouts along the proposed onsite private roads and parking spaces to collect and convey the storm runoff to the two proposed detention and water quality control basins located at northeast and northwest part of the development area.

The project also proposed bypassing storm drains running from south into Poggi Canyon creek in north to collect and bypass the offsite flow primarily from south and east side of the catchment.

After the majority of the onsite runoff is treated and detained by the biofiltration basin, the outflow will confluence with the bypass storm drain and discharge into the Poggi Canyon creek. For small amount of runoff generated from the north portion of proposed public roads which will be connecting with Olympic Pkwy, only the water quality control measurements are proposed, i.e., multiple Modular Wetland structures will be installed to control the water quality. The outflow from Modular Wetlands then discharges into Poggi Canyon creek without detention.

A calculation node 126 (similar as the one in existing condition hydrology) has been assigned at the ultimate downstream point of our development area. The hydrology results from existing and proposed conditions at this point will be compared to ensure no impact exists after implementing attenuation measurements.

Pollution Control and Hydromodification Flow Control of the overall site will be addressed in the separate report 'The Priority Development Project Storm Water Quality Management Plan (SWQMP) for Sunbow Planning Area' dated June 15, 2020 prepared by Hunsaker & Associates San Diego Inc.

1.4 – Results and Recommendations

Table 1 below summarizes the existing and proposed peak flows from the site. The developed peak flows consider the flow attenuation from the proposed detention basin. Per the San Diego County rainfall isolpluvial maps, the design rainfall depth for the 50-year flow event at the project site area is 2.10-inches, 100-year flow event at the project site area is 2.40-inches.

Table 1 - Summary of 100 Year Peak Flows

	Existing Condition			Developed Condition				Flow Reduction between EX and PR(ATT)
POC	EX NODE	AREA (acres)	Q100 (cfs)	PR NODE	AREA (acres)	Q100 (cfs) Unattenuated	Q100 (cfs) Attenuated**	
1	126	117.3		126	117.5*	165.62	60.81	
Total	-	117.3	90.81	-	117.5*	165.62	60.81	90.81-60.81=30

* The 0.2 acres of increase is due to the rounding error. Offsite letter of permission to grade to be provided during final engineering.
** Design flows used for storm drain design.

Since the proposed development will increase runoff generated by the project site, the project will utilize onsite detention facilities to mitigate for the increase in peak flow. As a result, the mitigated Q100 of proposed condition demonstrates 30 cfs flow rate reduction compare to that of the existing condition. Runoff generated by the project will not exceed pre-project peak flow rates, and runoff velocities will be dissipated by rock riprap at storm drain outfalls. Riprap design (per SDRSD D-40) will be provided with hydraulics during final engineering stage.

The project has been designed to honor pre-project watershed basins and outfall locations. Considering the limitations which result from Subdivision layout and design, minor exchanges in watershed areas occur but are minimized to the maximum extent practicable.

Since the project site is located outside any FEMA floodplain zones (#06073C2157G), there is no requirement for a Letter of Map Revision.

For the HEC-HMS detention calculation for flows through the basin, refer to the calculations in Chapter 5.

The above results show there is no adverse impact from the proposed development after the attenuation because there is reduction in flows.

Peak flow rates listed above were generated based on the criteria set forth in the "*2003 San Diego County Hydrology Manual*" (methodology presented in Chapter 2 of this report). The Modified Rational Method output is located in Chapter 3.

1.5 - References

"San Diego County Hydrology Manual"; Department of Public Works – Flood Control Division; County of San Diego, California; Revised June 2003.

"*The Priority Development Project Storm Water Quality Management Plan (SWQMP) for Sunbow II, Phase 3*" dated Jan 26, 2021 prepared by Hunsaker & Associates San Diego Inc.

CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.1 – County of San Diego Drainage Design Criteria

2.3 SELECTION OF HYDROLOGIC METHOD AND DESIGN CRITERIA

Design Frequency – The flood frequency for determining the design storm discharge is 50 years for drainage that is upstream of any major roadway and 100 years frequency for all design storms at a major roadway, crossing the major roadway and thereafter. The 50-year storm flows shall be contained within the pipe and not encroach into the travel lane. For the 100-year storm this includes allowing one lane of a four-lane road (four or more lanes) to be used for conveyance without encroaching onto private property outside the dedicated street right-of-way. Natural channels that remain natural within private property are excluded from the right-of-way guideline.

Design Method – The choice of method to determine flows (discharge) shall be based on the size of the watershed area. For an area 0 to approximately l square mile the Rational Method or the Modified Rational Method shall be used. For watershed areas larger than l square mile the NRCS hydrologic method shall be used. Please check with the governing agency for any variations to these guidelines.

SECTION 3
RATIONAL METHOD AND MODIFIED RATIONAL METHOD

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 l 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 l 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 l square mile in size (see Section 3.4), or the NRCS Hydrologic Method should be used for watersheds greater than approximately l square mile in size (see Section 4).

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

3.1.1 Rational Method Formula

The RM formula estimates the peak rate of runoff at any location in a watershed as a function of the drainage area (A), runoff coefficient (C), and rainfall intensity (I) for a duration equal to the time of concentration (TC), 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 (Σ[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.

3.1.3 Rainfall Intensity

The rainfall intensity (I) is the rainfall in inches per hour (in/hr) for a duration equal to the T_c for a selected storm frequency. Once a particular storm frequency has been selected for design and a T_c calculated for the drainage area, the rainfall intensity can be determined from the Intensity-Duration Design Chart (Figure 3-1). The 6-hour storm rainfall amount (P_6) and the 24-hour storm rainfall amount (P_{24}) for the selected storm frequency are also needed for calculation of I. P_6 and P_{24} can be read from the isopluvial maps provided in Appendix B. An Intensity-Duration Design Chart applicable to all areas within San Diego County is provided as Figure 3-1. Figure 3-2 provides an example of use of the Intensity-Duration Design Chart. Intensity can also be calculated using the following equation:

$$I = 7.44\ P_6\ D^{-0.645}$$

Where: P_6 = adjusted 6-hour storm rainfall amount (see discussion below)
D = duration in minutes (use T_c)

Note: This equation applies only to the 6-hour storm rainfall amount (i.e., P_6 cannot be changed to P_{24} to calculate a 24-hour intensity using this equation).

The Intensity-Duration Design Chart and the equation are for the 6-hour storm rainfall amount. In general, P_6 for the selected frequency should be between 45% and 65% of P_{24} for the selected frequency. If P_6 is not within 45% to 65% of P_{24}, P_6 should be increased or decreased as necessary to meet this criteria. The isopluvial lines are based on precipitation gauge data. At the time that the isopluvial lines were created, the majority of precipitation gauges in San Diego County were read daily, and these readings yielded 24-hour precipitation data. Some 6-hour data were available from the few recording gauges distributed throughout the County at that time; however, some 6-hour data were extrapolated. Therefore, the 24-hour precipitation data for San Diego County are considered to be more reliable.

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 runaways (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 ¼ 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).

The sheet flow that is predicted by the FAA equation is limited to conditions that are similar to runway topography. Some considerations that limit the extent to which the FAA equation applies are identified below:

- Urban Areas – This "runway type" runoff includes:
  1) Flat roofs, sloping at 1% ±
  2) Parking lots at the extreme upstream drainage basin boundary (at the "ridge" of a catchment area).
     Even a parking lot is limited in the amounts of sheet flow. Parked or moving vehicles would "break-up" the sheet flow, concentrating runoff into streams that are not characteristic of sheet flow.
  3) Driveways are constructed at the upstream end of catchment areas in some developments. However, if flow from a roof is directed to a driveway through a downspout or other conveyance mechanism, flow would be concentrated.
  4) Flat slopes are prone to meandering flow that tends to be disrupted by minor irregularities and obstructions. Maximum Overland Flow lengths are shorter for the flatter slopes (see Table 3-2).

- Rural or Natural Areas - The FAA equation is applicable to these conditions since (.5% to 10%) slopes that are uniform in width of flow have slow velocities consistent with the equation. Irregularities in terrain limit the length of application.
  1) Most hills and ridge lines have a relatively flat area near the drainage divide. However, with flat slopes of .5% ±, minor irregularities would cause flow to concentrate into streams.
  2) Parks, lawns and other vegetated areas would have slow velocities that are consistent with the FAA Equation.

The concepts related to the initial time of concentration were evaluated in a report entitled *Initial Time of Concentration, Analysis of Parameters* (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.

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

Table 3-2 provides limits of the length (Maximum Length (L_M)) of sheet flow to be used in hydrology studies. Initial T_i values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the "Regulating Agency" when submitted with a detailed study.

Table 3-2

MAXIMUM OVERLAND FLOW LENGTH (L_M) & INITIAL TIME OF CONCENTRATION (T_i)

Element*	DU/ Acre	.5%		1%		2%		3%		5%		10%	
		L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

*See Table 3-1 for more detailed description

3.1.4.1A Planning Considerations

The purpose of most hydrology studies is to develop flood flow values for areas that are not at the upstream end of the basin. Another example is the Master Plan, which is usually completed before the actual detailed design of lots, streets, etc. are accomplished. In these situations it is necessary that the initial time of concentration be determined without detailed information about flow patterns.

To provide guidance for the initial time of concentration design parameters, Table 3-2 includes the Land Use Elements and other variables related to the Time of Concentration. The table development included a review of the typical "layout" of the different Land Use Elements and related flow patterns and consideration of the extent of the sheet flow regimen, the effect of ponding, the significance to the drainage basin, downstream effects, etc.

3.1.4.1B Computation Criteria

(a) Developed Drainage Areas With Overland Flow - T_i may be obtained directly from the chart, "Rational Formula – Overland Time of Flow Nomograph," shown in Figure 3-3 or from Table 3-2. This chart is based on the Federal Aviation Agency (FAA) equation (FAA, 1970). For the short rain durations (<15 minutes) involved, intensities are high but the depth of flooding is limited and much of the runoff is stored temporarily in the overland flow and in shallow ponded areas. In developed areas, overland flow is limited to lengths given in Table 3-2. Beyond these distances, flow tends to become concentrated into streets, gutters, swales, ditches, etc.

(b) Natural Or Rural Watersheds – These areas usually have an initial subarea at the upstream end with sheet flow. The sheet flow length is limited to 50 to 100 feet as specified in Table 3-2. The Overland Time of Flow Nomograph, Figure 3-3, can be used to obtain T_i. The initial time of concentration can excessively affect the magnitude of flow further downstream in the drainage basin. For instance, variations in the initial time of concentration for an initial subarea of one acre can change the flow further downstream where the area is 400 acres by 100%. Therefore, the initial time of concentration is limited (see Table 3-2).

The Rational Method procedure included in the original Hydrology Manual (1971) and Design and Procedure Manual (1968) included a 10 minute value to be added to the initial time of concentration developed through the Kirpich Formula (see Figure 3-4) for a natural watershed. That procedure is superceded by the procedure above to use Table 3-2 or Figure 3-3 to determine T_i for the appropriate sheet flow length of the initial subarea. The values for natural watersheds given in Table 3-2 vary from 13 to 7 minutes, depending on slope. If the total length of the initial subarea is greater than the maximum length allowable based on Table 3-2, add the travel time based on the Kirpich formula for the remaining length of the initial subarea.

3.1.4.2 Travel Time

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. The T_t is computed by dividing the length of the flow path by the computed flow velocity. Since the velocity normally changes as a result of each change in flow rate or slope, such as at an inlet or grade break, the total T_t must be computed as the sum of the T_t's for each section of the flow path. Use Figure 3-6 to estimate time of travel for street gutter flow. Velocity in a channel can be estimated by using the nomograph shown in Figure 3-7 (Manning's Equation Nomograph).

(a) Natural Watersheds – This includes rural, ranch, and agricultural areas with natural channels. Obtain T_t directly from the Kirpich nomograph in Figure 3-4 or from the equation. This nomograph requires values for length and change in elevation along the effective slope line for the subarea. See Figure 3-5 for a representation of the effective slope line.

This nomograph is based on the Kirpich formula, which was developed with data from agricultural watersheds ranging from 1.25 to 112 acres in area, 350 to 4,000 feet in length, and 2.7 to 8.8% slope (Kirpich, 1940). A maximum length of 4,000 feet should be used for the subarea length. Typically, as the flow length increases, the depth of flow will increase, and therefore it is considered a concentration of flow at points beyond lengths listed in Figure 3-2. However, because the Kirpich formula has been shown to be applicable for watersheds up to 4,000 feet in length (Kirpich, 1940), a subarea may be designated with a length up to 4,000 feet provided the topography and slope of the natural channel are generally uniform.

Justification needs to be included with this calculation showing that the watershed will remain natural forever. Examples include areas located in the Multiple Species Conservation Plan (MSCP), areas designated as open space or rural in a community's General Plan, and Cleveland National Forest.

(b) Urban Watersheds - Flow through a closed conduit where no additional flow can enter the system during the travel, length, velocity and T_t are determined using the peak flow in the conduit. In cases where the conduit is not closed and additional flow from a contributing subarea is added to the total flow during travel (e.g., street flow in a gutter), calculation of velocity and T_t is performed using an assumed average flow based on the total area (including upstream subareas) contributing to the point of interest. The Manning equation is usually used to determine velocity. Discharges for small watersheds typically range from 2 to 3 cfs per acre, depending on land use, drainage area, and slope and rainfall intensity.

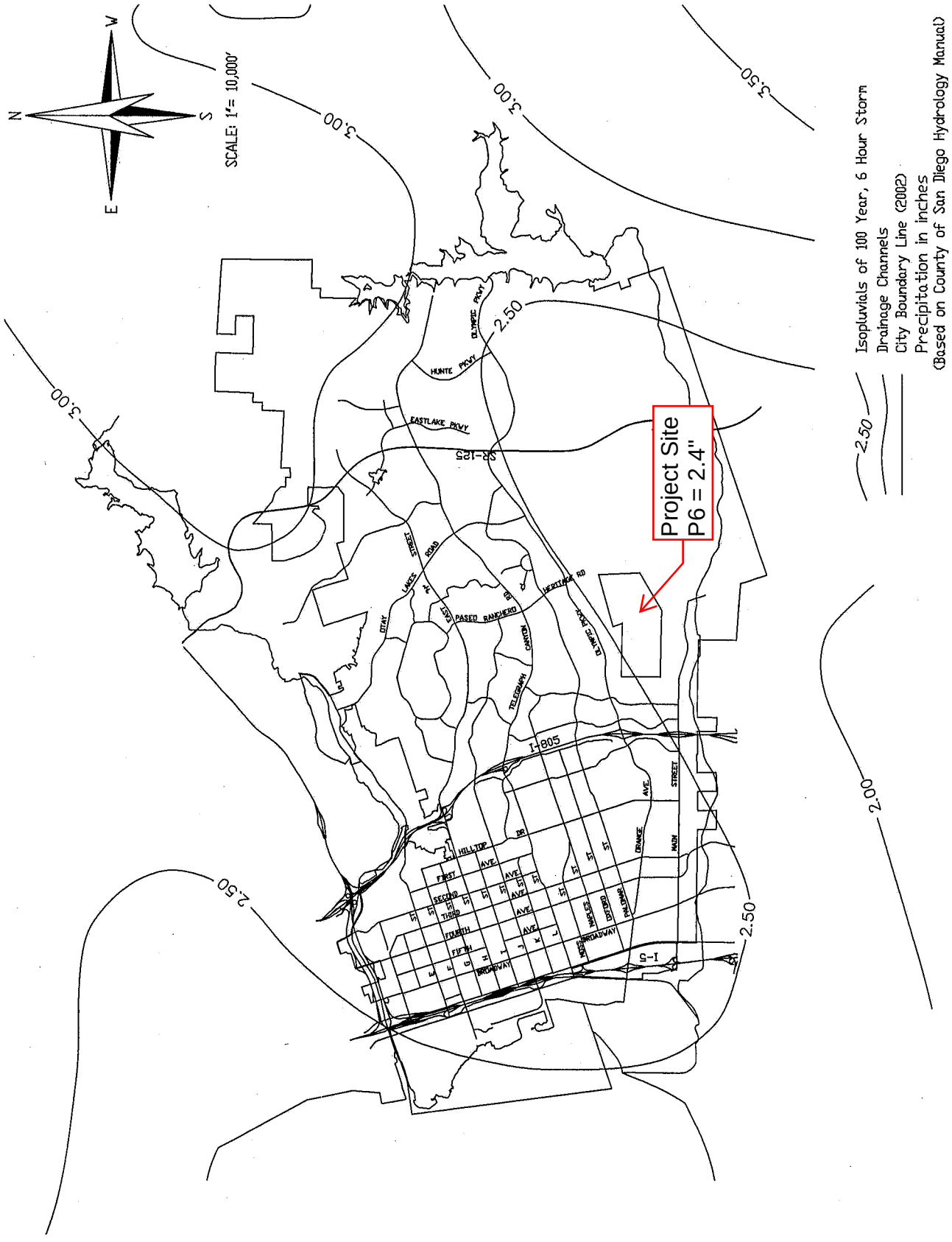
Note: The MRM should be used to calculate the peak discharge when there is a junction from independent subareas into the drainage system.

CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.2 – Design Rainfall Determination

100-Year, 6-Hour Rainfall Isopluvial Map



REVISION	BY	APPROVED	DATE
ORIGINAL			01/02
REVISION	CVM	C. SWANSON	11/02
REVISION	DPH	W. VALLE	11/17

CITY OF CHULA VISTA
ENGINEERING & CAPITAL PROJECTS
STANDARD DRAWING

100-YEAR, 6-HOUR PRECIPITATION

William S. Valle

WILLIAM S. VALLE 11/21/2017
CITY ENGINEER

DRN-04

CHAPTER 2

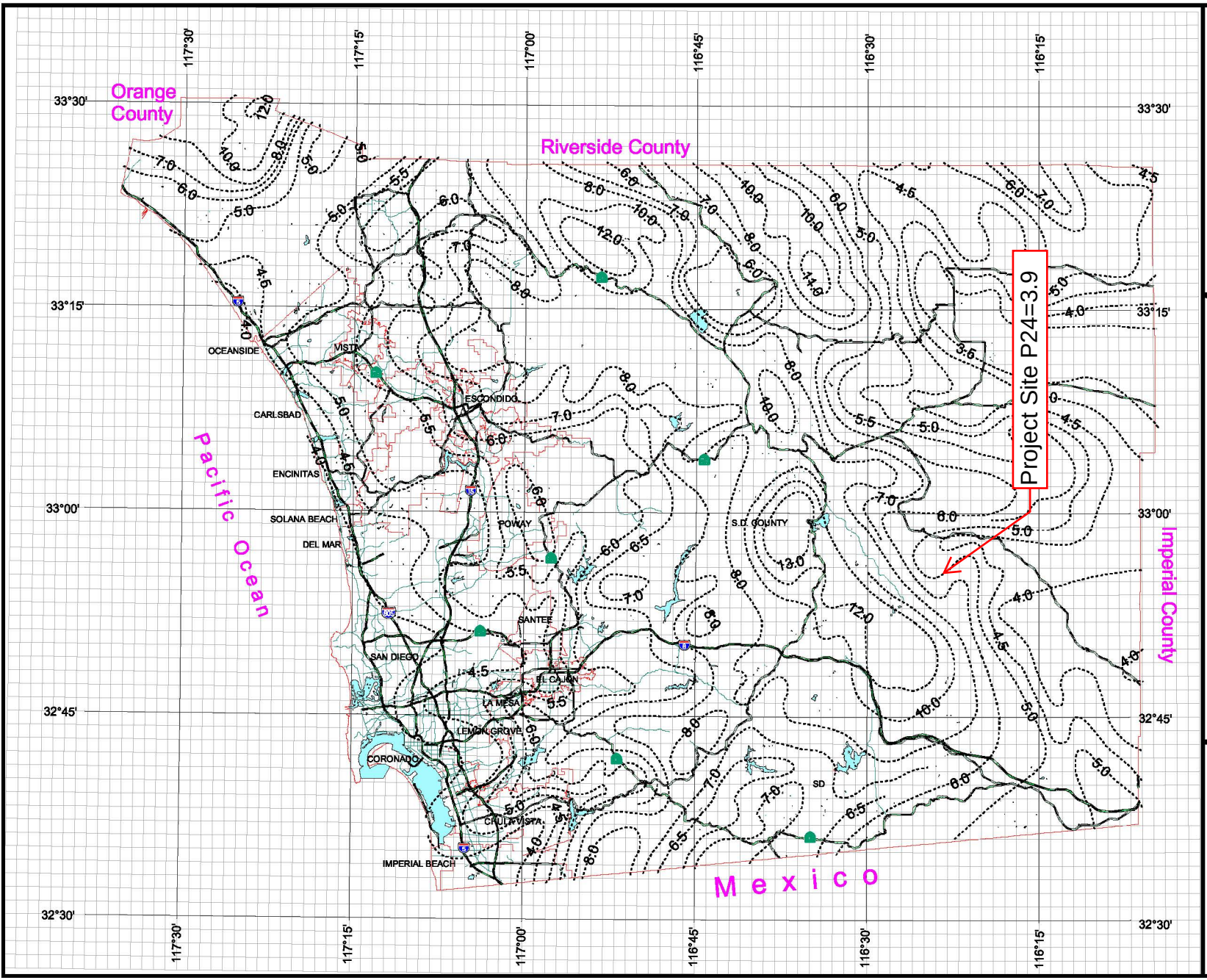
METHODOLOGY & MODEL DEVELOPMENT

2.2 – Design Rainfall Determination

100-Year, 24-Hour Rainfall Isopluvial Map

County of San Diego Hydrology Manual

Rainfall Isopluvials



100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

DPW GIS
Department of Public Works
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CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.2 – Design Rainfall Determination

50-Year, 6-Hour Rainfall Isopluvial Map

REVISION	BY	APPROVED	DATE
ORIGINAL			01/02
REVISION	CVM	C. SWANSON	11/02
REVISION	DPH	W. VALLE	11/17

CITY OF CHULA VISTA
ENGINEERING & CAPITAL PROJECTS
STANDARD DRAWING

50-YEAR, 6-HOUR PRECIPITATION

WILLIAM S. VALLE
CITY ENGINEER
11/21/2017

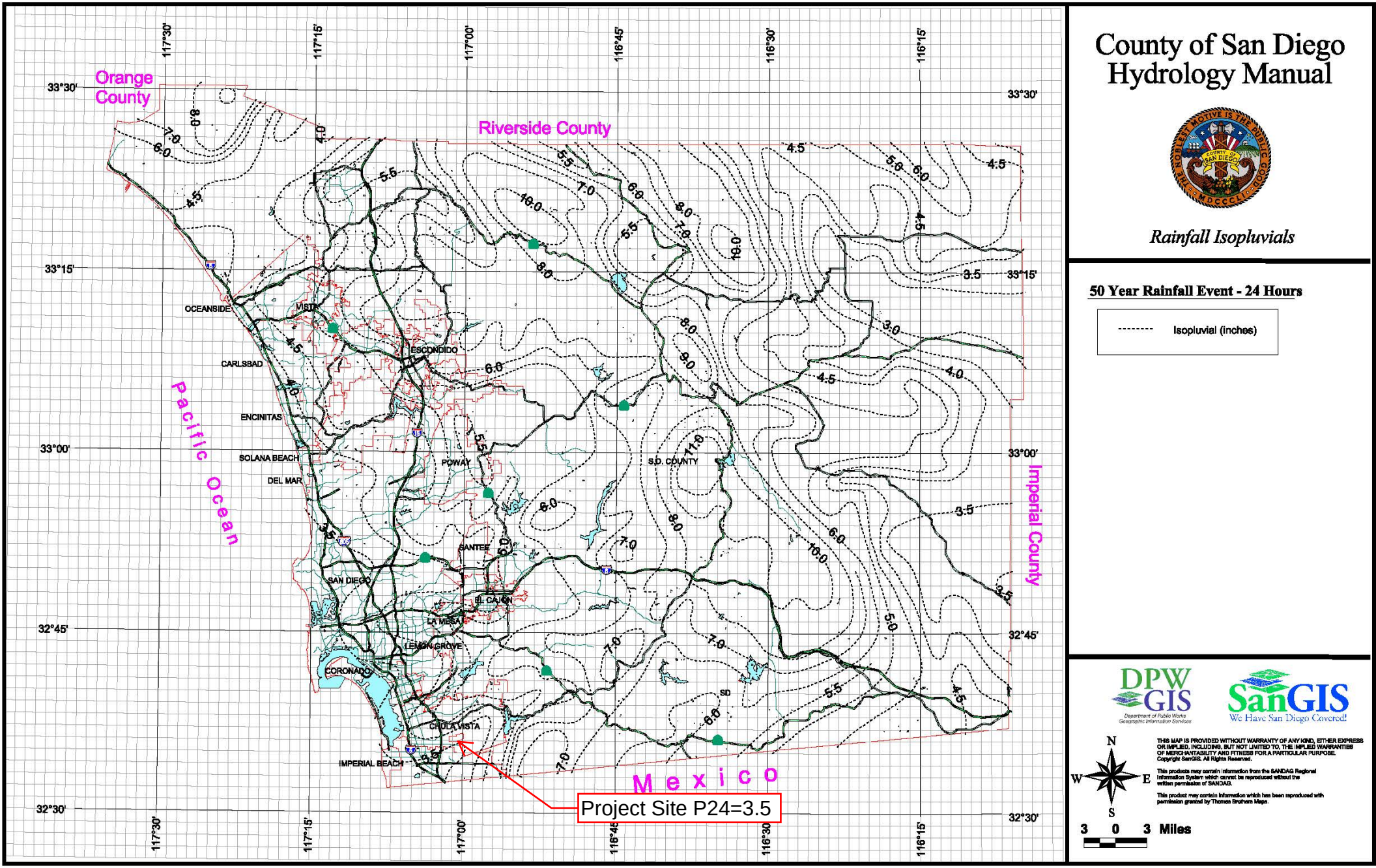
DRN-03

CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.2 – Design Rainfall Determination

50-Year, 24-Hour Rainfall Isopluvial Map



County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 24 Hours

Isopluvial (inches)

DPW GIS
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CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.3 – Rainfall Coefficient Determination

Development Density Map

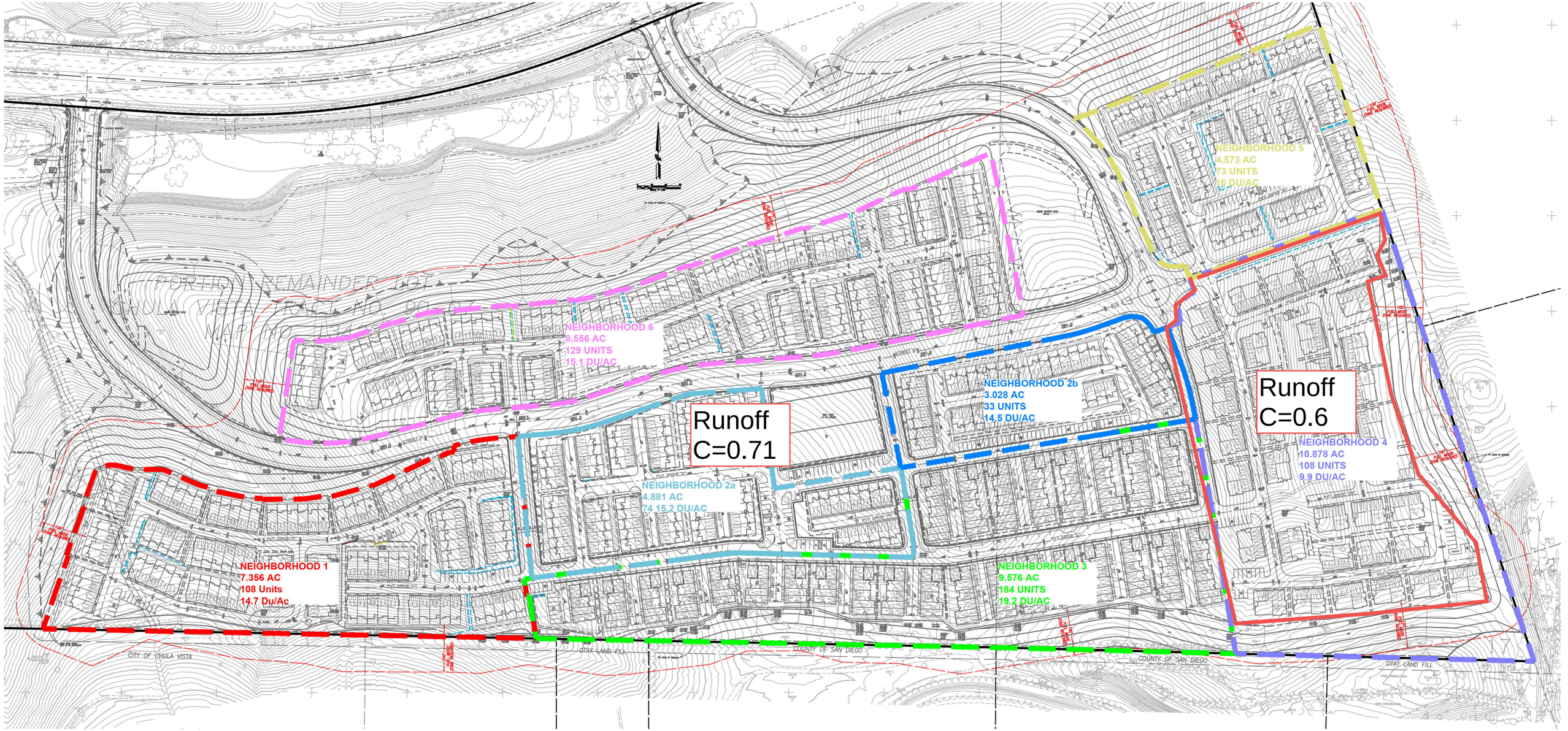


Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.4 – Rainfall Intensity Determination

Maximum Overland Flow Length & Initial Time of Concentration Table

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

Table 3-2 provides limits of the length (Maximum Length (L_M)) of sheet flow to be used in hydrology studies. Initial T_i values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the "Regulating Agency" when submitted with a detailed study.

Table 3-2

MAXIMUM OVERLAND FLOW LENGTH (L_M) & INITIAL TIME OF CONCENTRATION (T_i)

Element*	DU/ Acre	.5%		1%		2%		3%		5%		10%	
		L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

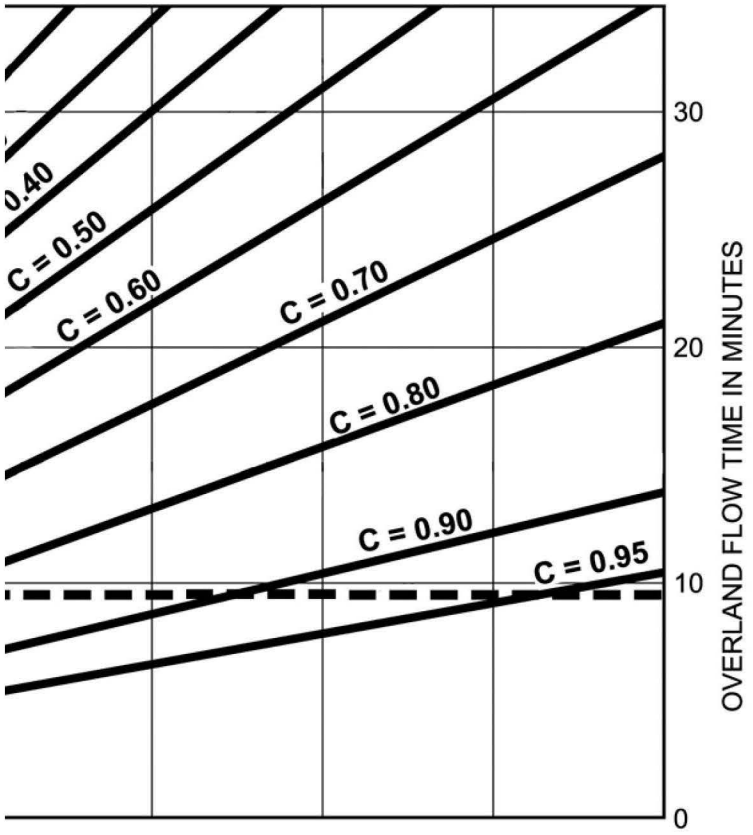
*See Table 3-1 for more detailed description

CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.4 – Rainfall Intensity Determination

Urban Watershed Overland Time of Flow Nomograph

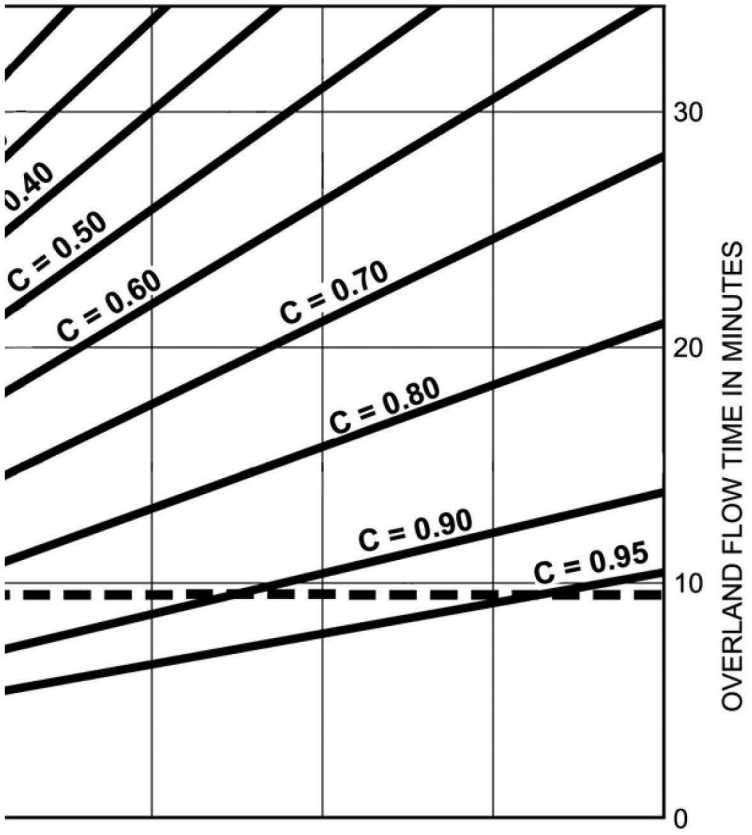


$$T = \frac{1.8\,(1.1-C)\sqrt{D}}{\sqrt[3]{s}}$$

FIGURE

Time of Flow Nomograph

3-5



$$T = \frac{1.8\,(1.1-C)\sqrt{D}}{\sqrt[3]{s}}$$

FIGURE

Time of Flow Nomograph

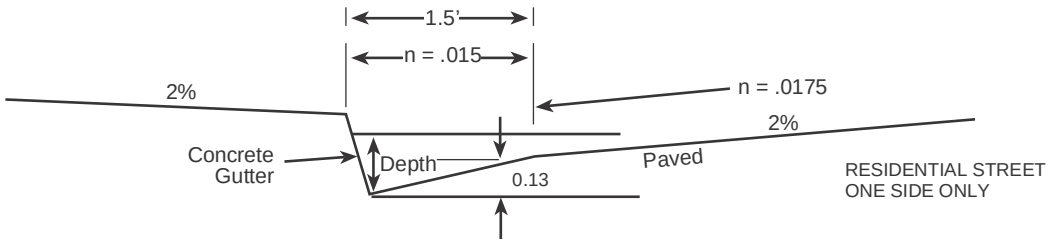
3-3

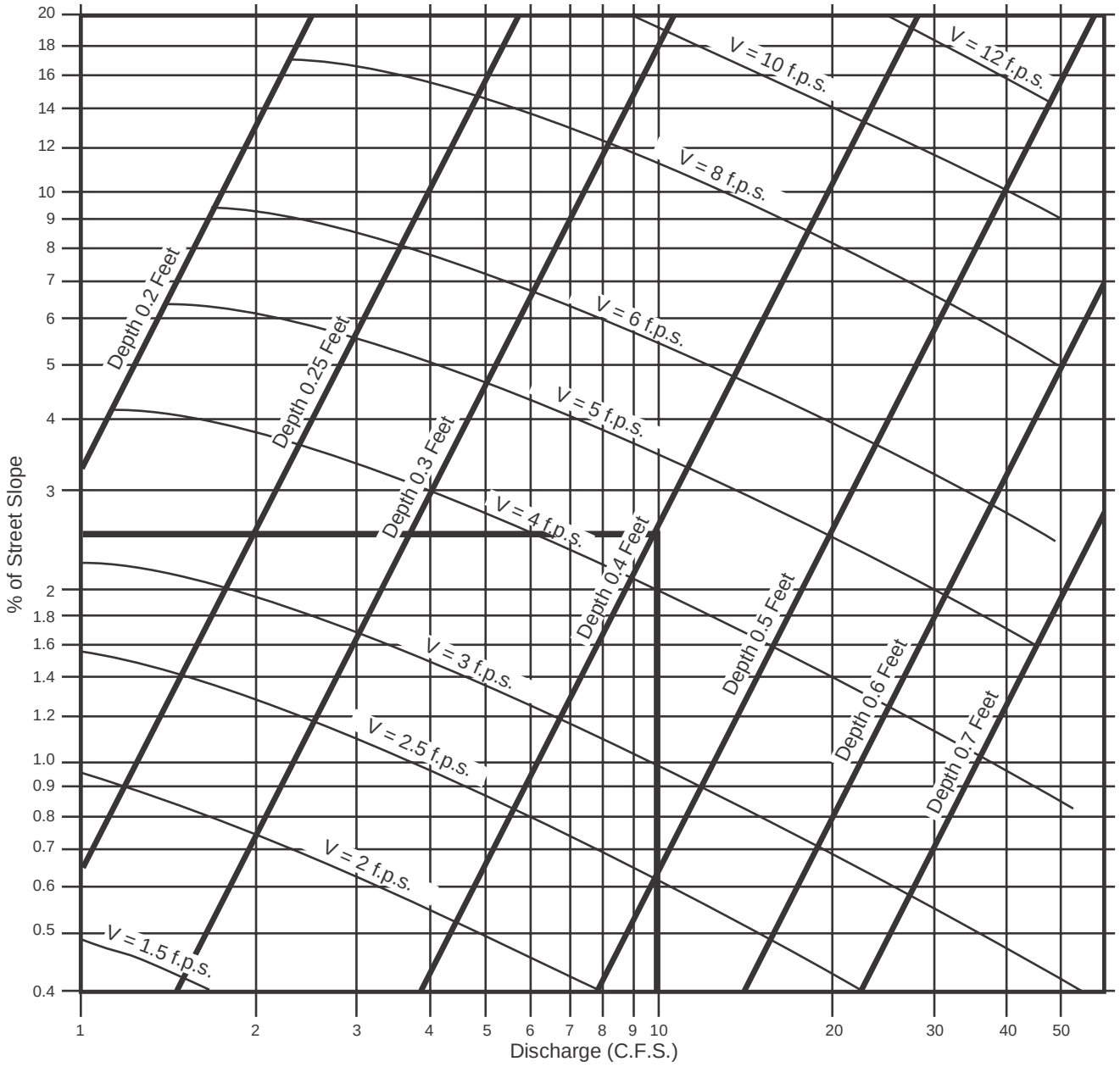
CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.4 – Rainfall Intensity Determination

Gutter & Roadway Discharge-Velocity Chart





EXAMPLE:
Given: Q = 10 S = 2.5%
Chart gives: Depth = 0.4, Velocity = 4.4 f.p.s.

SOURCE: San Diego County Department of Special District Services Design Manual

F I G U R E

Gutter and Roadway Discharge - Velocity Chart

3-6

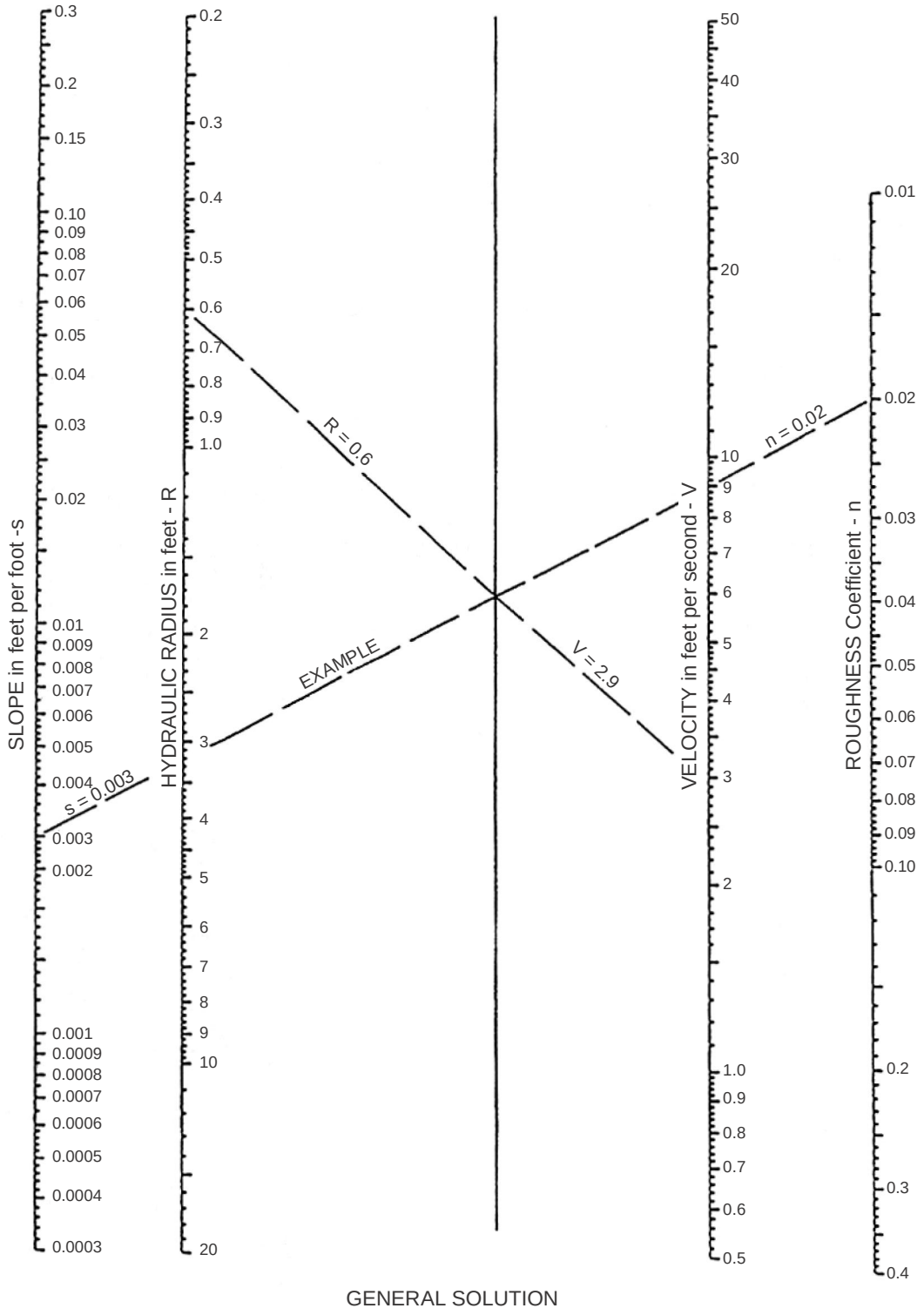
CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.4 – Rainfall Intensity Determination

Manning's Equation Nomograph

EQUATION: $V = \frac{1.49}{n} R^{2/3} s^{1/2}$



GENERAL SOLUTION

SOURCE: USDOT, FHWA, HDS-3 (1961)

FIGURE

Manning's Equation Nomograph

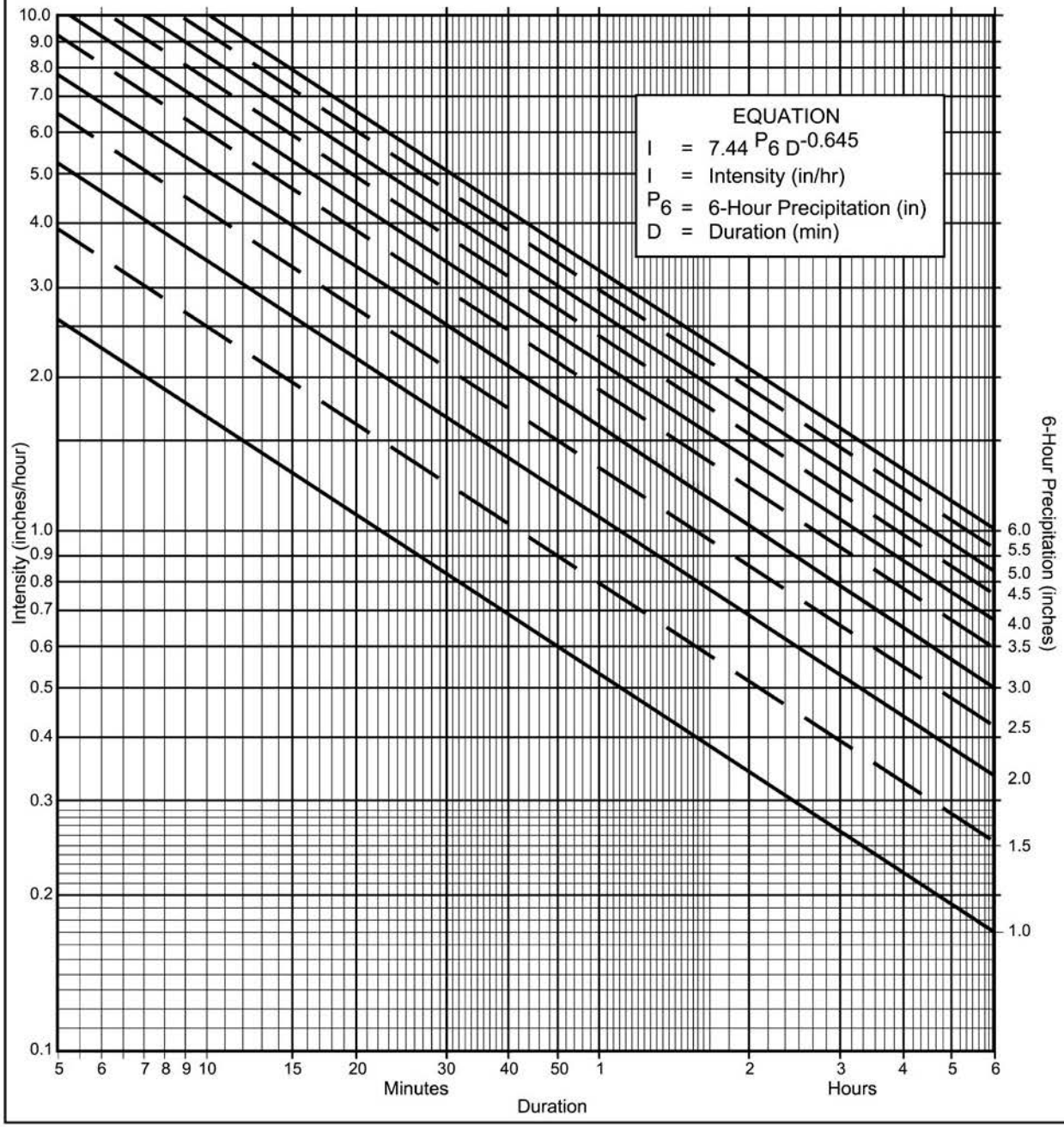
3-7

CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.4 – Rainfall Intensity Determination

Intensity-Duration Design Chart



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 2.4 in., P_{24} = 3.9, $\frac{P_6}{P_{24}}$ = 61 %(2)

(c) Adjusted P_6(2) = 2.4 in.

(d) t_x = _____ min.

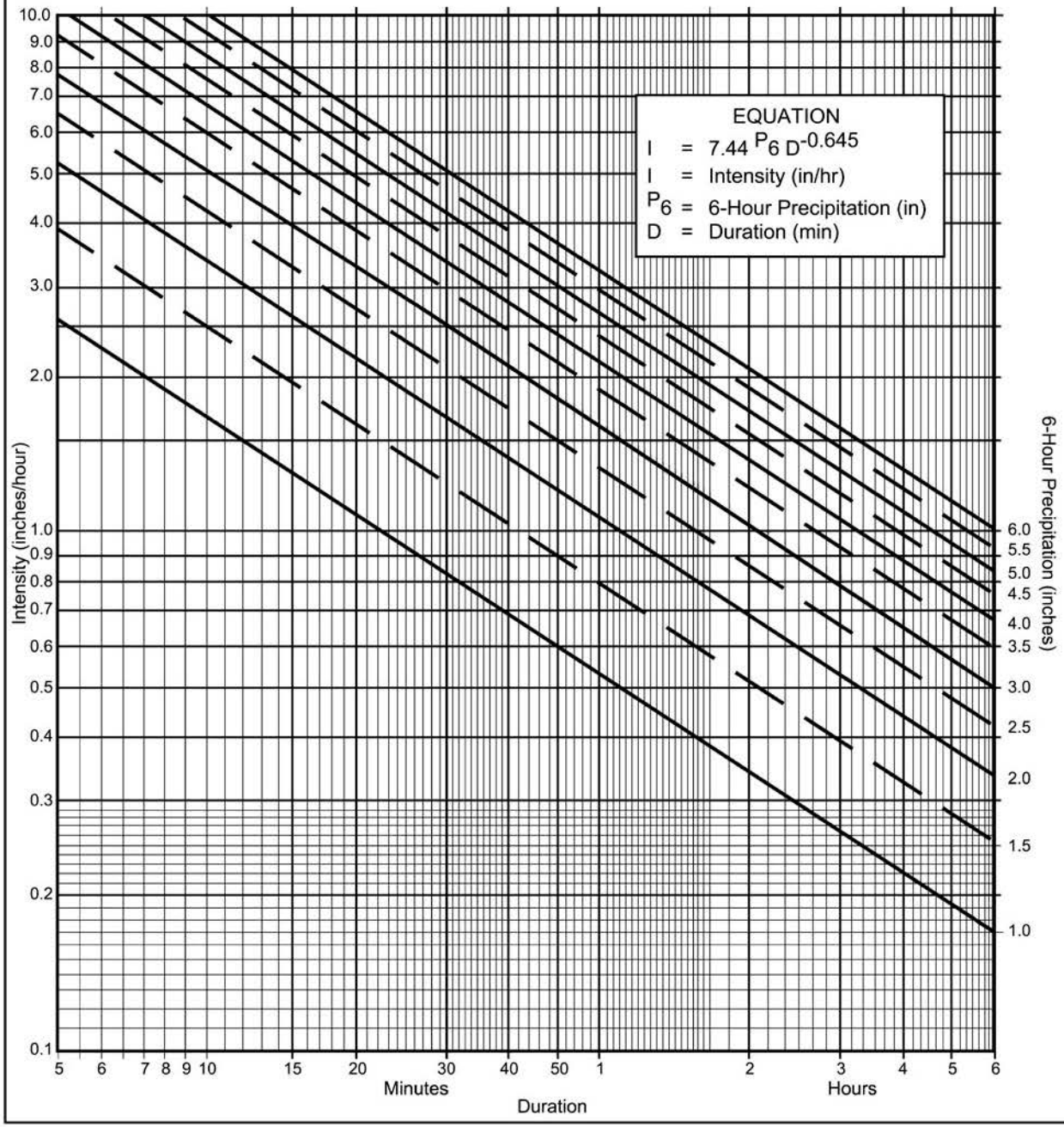
(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 50 year

(b) P_6 = 2.1 in., P_{24} = 3.5, $\frac{P_6}{P_{24}}$ = 60 %(2)

(c) Adjusted P_6(2) = 2.1 in.

(d) t_x = _____ min.

(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1

CHAPTER 2

METHODOLOGY & MODEL DEVELOPMENT

2.5 - Rational Method Model Development Summary

Rational Method Hydrologic Analysis

Computer Software Package – AES-2015

Design Storm - 50-Year Return Interval for Storm Drain Hydraulics
100 - Year Return Interval for Inlet Sizing (Sump) and Detention

Land Use – High Density Residential (HDR) in Developed Areas

Soil Type – From the soil map, both group C and D are discovered from the site, however, to be conservative, Hydrologic soil group D was assumed for all areas. Group D soils have very slow infiltration rates when thoroughly wetted. Consisting chiefly of clay soils with a high swelling potential, soils with a high permanent water table, soils with clay pan or clay layer at or near the surface, and shallow soils over nearly impervious materials, Group D soils have a very slow rate of water transmission.

Runoff Coefficient – According to Development Density Map, the overall development density rated from 10DU/AC to 19.2 DU/AC, as a result, a set of runoff Cs then are determined based on County Hydrology Manual Table 3-1:
Onsite graded pervious slopes: 0.35
14.7 DU/A – 19.2DU/A: 0.71
9.9 DU/A: 0.6
Roads: 0.87

Method of Analysis – The Rational Method is the most widely used hydrologic model for estimating peak runoff rates. Applied to small urban and semi-urban areas with drainage areas less than 1.0 square mile, the Rational Method relates storm rainfall intensity, a runoff coefficient, and drainage area to peak runoff rate. This relationship is expressed by the equation:

Q = CIA, where:

Q = The peak runoff rate in cubic feet per second at the point of analysis.

C = A runoff coefficient representing the area - averaged ratio of runoff to rainfall intensity.

I = The time-averaged rainfall intensity in inches per hour corresponding to the time of concentration.

A = The drainage basin area in acres.

To perform a node-link study, the total watershed area is divided into subareas which discharge at designated nodes.

The procedure for the subarea summation model is as follows:

(1) Subdivide the watershed into an initial subarea (generally 1 lot) and subsequent subareas, which are generally less than 10 acres in size. Assign upstream and downstream node numbers to each subarea.

(2) Estimate an initial T_c by using the appropriate nomograph or overland flow velocity estimation.

(3) Using the initial T_c, determine the corresponding values of I. Then Q = C I A.

(4) Using Q, estimate the travel time between this node and the next by Manning's equation as applied to the particular channel or conduit linking the two nodes. Then, repeat the calculation for Q based on the revised intensity (which is a function of the revised time of concentration)

The nodes are joined together by links, which may be street gutter flows, drainage swales, drainage ditches, pipe flow, or various channel flows. The AES-2010 computer subarea menu is as follows:

SUBAREA HYDROLOGIC PROCESS

1. Confluence analysis at node.
2. Initial subarea analysis (including time of concentration calculation).
3. Pipeflow travel time (computer estimated).
4. Pipeflow travel time (user specified).
5. Trapezoidal channel travel time.
6. Street flow analysis through subarea.
7. User - specified information at node.
8. Addition of subarea runoff to main line.
9. V-gutter flow through area.
10. Copy main stream data to memory bank
11. Confluence main stream data with a memory bank
12. Clear a memory bank

At the confluence point of two or more basins, the following procedure is used to combine peak flow rates to account for differences in the basin's times of concentration. This adjustment is based on the assumption that each basin's hydrographs are triangular in shape.

(1). If the collection streams have the same times of concentration, then the Q values are directly summed,

$Q_p = Q_a + Q_b$; $T_p = T_a = T_b$

(2). If the collection streams have different times of concentration, the smaller of the tributary Q values may be adjusted as follows:

(i). The most frequent case is where the collection stream with the longer time of concentration has the larger Q. The smaller Q value is adjusted by the ratio of rainfall intensities.

$Q_p = Q_a + Q_b \ (I_a/I_b)$; $T_p = T_a$

(ii). In some cases, the collection stream with the shorter time of concentration has the larger Q. Then the smaller Q is adjusted by a ratio of the T values.

$Q_p = Q_b + Q_a \ (T_b/T_a)$; $T_p = T_b$

CHAPTER 3

EXISTING AND PROPOSED CONDITION RATIONAL METHOD HYDROLOGIC ANALYSIS

EXISTING CONDITION

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           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2015 Advanced Engineering Software (aes)
             Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                           Analysis prepared by:




----------------------------------------------------------------------------
  FILE NAME: R:\1561\HYD\DR\CALCS\TM\AES\EX.DAT
  TIME/DATE OF STUDY: 10:00 01/20/2020
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  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-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   12.0      6.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.33    1.50 0.0313 0.125 0.0130

  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.*

+--------------------------------------------------------------------------+
| BEGIN EXISTING CONDITION HYD                                             |
| SUNBOW PA-23                                                             |
```



```
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   116.00
  UPSTREAM ELEVATION(FEET) =    474.00
  DOWNSTREAM ELEVATION(FEET) =    460.00
  ELEVATION DIFFERENCE(FEET) =     14.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
  SUBAREA RUNOFF(CFS) =      0.38
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    104.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    274.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2118.00   CHANNEL SLOPE =  0.0878
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.38
  FLOW VELOCITY(FEET/SEC) =   4.45 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   7.94   Tc(MIN.) =   14.21
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =    2234.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.224
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
```

```
 SUBAREA AREA(ACRES) =   27.29   SUBAREA RUNOFF(CFS) =   30.79
 TOTAL AREA(ACRES) =       27.5   TOTAL RUNOFF(CFS) =      31.02
 TC(MIN.) =   14.21

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    114.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    274.00  DOWNSTREAM(FEET) =    272.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   707.00   CHANNEL SLOPE =  0.0028
 CHANNEL FLOW THRU SUBAREA(CFS) =      31.02
 FLOW VELOCITY(FEET/SEC) =   1.80 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   6.55   Tc(MIN.) =   20.76
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    114.00 =    2941.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.524
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    5.75   SUBAREA RUNOFF(CFS) =    5.08
 TOTAL AREA(ACRES) =       33.2   TOTAL RUNOFF(CFS) =      31.02
 TC(MIN.) =   20.76
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 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.) =   20.76
 RAINFALL INTENSITY(INCH/HR) =   2.52
 TOTAL STREAM AREA(ACRES) =    33.24
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.02

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```



```
============================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   149.00
 UPSTREAM ELEVATION(FEET) =    452.00
 DOWNSTREAM ELEVATION(FEET) =    445.00
 ELEVATION DIFFERENCE(FEET) =      7.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.061
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.647
 SUBAREA RUNOFF(CFS) =      0.36
 TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      0.36

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    114.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    272.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1550.00   CHANNEL SLOPE =  0.1116
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.36
 FLOW VELOCITY(FEET/SEC) =   4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   5.45   Tc(MIN.) =   13.51
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    114.00 =    1699.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.331
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =   18.92   SUBAREA RUNOFF(CFS) =   22.06
 TOTAL AREA(ACRES) =       19.1   TOTAL RUNOFF(CFS) =      22.31
 TC(MIN.) =   13.51

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =   1
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.51
  RAINFALL INTENSITY(INCH/HR) =   3.33
  TOTAL STREAM AREA(ACRES) =    19.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.31

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       31.02    20.76        2.524         33.24
      2       22.31    13.51        3.331         19.14

  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       42.49    13.51       3.331
      2       47.93    20.76       2.524

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.93   Tc(MIN.) =   20.76
  TOTAL AREA(ACRES) =       52.4
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    114.00 =    2941.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    126.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    272.00  DOWNSTREAM(FEET) =    232.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1830.00   CHANNEL SLOPE =  0.0219
  CHANNEL FLOW THRU SUBAREA(CFS) =      47.93
  FLOW VELOCITY(FEET/SEC) =   5.65 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.40   Tc(MIN.) =   26.16
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    126.00 =    4771.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    126.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.175
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =   21.40   SUBAREA RUNOFF(CFS) =   16.29
  TOTAL AREA(ACRES) =       73.8   TOTAL RUNOFF(CFS) =      56.16
  TC(MIN.) =   26.16

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
================================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    122.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   136.00
  UPSTREAM ELEVATION(FEET) =    444.00
  DOWNSTREAM ELEVATION(FEET) =    435.00
  ELEVATION DIFFERENCE(FEET) =      9.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.191
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.002
  SUBAREA RUNOFF(CFS) =      0.46
  TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    124.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    434.00  DOWNSTREAM(FEET) =    264.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1683.00   CHANNEL SLOPE =  0.1010
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.46
```

```
 FLOW VELOCITY(FEET/SEC) =   4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   5.91   Tc(MIN.) =   13.10
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =    1819.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.397
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =   27.07   SUBAREA RUNOFF(CFS) =   32.18
 TOTAL AREA(ACRES) =       27.3   TOTAL RUNOFF(CFS) =      32.49
 TC(MIN.) =   13.10

****************************************************************************
 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.) =   13.10
 RAINFALL INTENSITY(INCH/HR) =   3.40
 TOTAL STREAM AREA(ACRES) =    27.33
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     32.49

****************************************************************************
 FLOW PROCESS FROM NODE    130.00 TO NODE    132.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   123.00
 UPSTREAM ELEVATION(FEET) =    452.00
 DOWNSTREAM ELEVATION(FEET) =    420.00
 ELEVATION DIFFERENCE(FEET) =     32.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
```



```
 SUBAREA RUNOFF(CFS) =      0.63
 TOTAL AREA(ACRES) =      0.33   TOTAL RUNOFF(CFS) =      0.63

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    134.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    420.00  DOWNSTREAM(FEET) =    418.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   391.00   CHANNEL SLOPE =  0.0051
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.63
 FLOW VELOCITY(FEET/SEC) =   1.07 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   6.07   Tc(MIN.) =   12.34
 LONGEST FLOWPATH FROM NODE    130.00 TO NODE    134.00 =     514.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    134.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.531
 RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6300
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  89
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5973
 SUBAREA AREA(ACRES) =    2.50   SUBAREA RUNOFF(CFS) =    5.56
 TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =       5.97
 TC(MIN.) =   12.34

****************************************************************************
 FLOW PROCESS FROM NODE    134.00 TO NODE    124.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    418.00  DOWNSTREAM(FEET) =    264.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1048.00   CHANNEL SLOPE =  0.1469
 NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       5.97
 FLOW VELOCITY(FEET/SEC) =   6.96 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   2.51   Tc(MIN.) =   14.85
 LONGEST FLOWPATH FROM NODE    130.00 TO NODE    124.00 =    1562.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    134.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.133
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3999
 SUBAREA AREA(ACRES) =   11.19   SUBAREA RUNOFF(CFS) =   12.27
 TOTAL AREA(ACRES) =       14.0   TOTAL RUNOFF(CFS) =      17.57
 TC(MIN.) =   14.85

****************************************************************************
 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.) =   14.85
 RAINFALL INTENSITY(INCH/HR) =   3.13
 TOTAL STREAM AREA(ACRES) =    14.02
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.57

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       32.49    13.10        3.397         27.33
     2       17.57    14.85        3.133         14.02

 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       47.99    13.10       3.397
     2       47.54    14.85       3.133

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      47.99   Tc(MIN.) =   13.10
 TOTAL AREA(ACRES) =       41.3
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =    1819.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    124.00 TO NODE    126.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
```



```
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    264.00  DOWNSTREAM(FEET) =    232.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   389.00   CHANNEL SLOPE =  0.0823
 CHANNEL FLOW THRU SUBAREA(CFS) =      47.99
 FLOW VELOCITY(FEET/SEC) =  10.97 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   0.59   Tc(MIN.) =   13.70
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    126.00 =    2208.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    124.00 TO NODE    126.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.301
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3661
 SUBAREA AREA(ACRES) =    2.17   SUBAREA RUNOFF(CFS) =    2.51
 TOTAL AREA(ACRES) =       43.5   TOTAL RUNOFF(CFS) =      52.60
 TC(MIN.) =   13.70

****************************************************************************
 FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 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       52.60    13.70       3.301       43.52
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    126.00 =    2208.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       56.16    26.16       2.175       73.78
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    126.00 =    4771.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      82.00      13.70        3.301
     2      90.81      26.16        2.175

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      90.81   Tc(MIN.) =   26.16
  TOTAL AREA(ACRES) =      117.3

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| END EXISTING CONDITION HYD                                               |
| SUNBOW PA-23                                                             |
|                                                                          |
+--------------------------------------------------------------------------+
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      117.3  TC(MIN.) =     26.16
  PEAK FLOW RATE(CFS)   =      90.81
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

PROPOSED CONDITION (UNATTENUATED)

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2015 Advanced Engineering Software (aes)
              Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                           Analysis prepared by:




------------------------------------------------------------------------
  FILE NAME: R:\1561\HYD\DR\CALCS\TM\AES\PR.DAT
  TIME/DATE OF STUDY: 17:02 06/12/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  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-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   12.0      6.0    0.020/0.020/0.020   0.50    1.50 0.0312 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.33    1.50 0.0312 0.125 0.0130

  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.*

+----------------------------------------------------------------------+
| BEGIN PROPOSED CONDITION HYD                                         |
| SUNBOW PA-23                                                         |
|                                                                      |
+----------------------------------------------------------------------+

************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    102.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    88.00
  UPSTREAM ELEVATION(FEET) =    474.00
  DOWNSTREAM ELEVATION(FEET) =    460.00
  ELEVATION DIFFERENCE(FEET) =     14.00
```



```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.879
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.696
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.40

************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    104.00 IS CODE =  52
------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    438.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   317.00   CHANNEL SLOPE =  0.0694
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.40
  FLOW VELOCITY(FEET/SEC) =   3.95 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.34   Tc(MIN.) =    7.22
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     405.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    104.00 IS CODE =  81
------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.991
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    1.73   SUBAREA RUNOFF(CFS) =    3.02
  TOTAL AREA(ACRES) =        1.9   TOTAL RUNOFF(CFS) =       3.37
  TC(MIN.) =    7.22

************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    128.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.00  DOWNSTREAM(FEET) =   403.20
  FLOW LENGTH(FEET) =   594.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.37
  PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =    8.17
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    128.00 =     999.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  10
------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
========================================================================

************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    112.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   342.00
  UPSTREAM ELEVATION(FEET) =    464.00
  DOWNSTREAM ELEVATION(FEET) =    434.00
  ELEVATION DIFFERENCE(FEET) =     30.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.546
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.315
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    114.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.00  DOWNSTREAM(FEET) =   408.60
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   0.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.54
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.35
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    6.64
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    114.00 =     402.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 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.) =    6.64
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    114.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  UPSTREAM ELEVATION(FEET) =    440.00
  DOWNSTREAM ELEVATION(FEET) =    412.00
  ELEVATION DIFFERENCE(FEET) =     28.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
  SUBAREA RUNOFF(CFS) =      0.42
  TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      0.42
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 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.) =    6.27
  RAINFALL INTENSITY(INCH/HR) =   5.47
  TOTAL STREAM AREA(ACRES) =     0.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.42

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.35     6.64        5.265          0.19
      2        0.42     6.27        5.466          0.22

  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        0.75     6.27       5.466
      2        0.76     6.64       5.265

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       0.76   Tc(MIN.) =    6.64
  TOTAL AREA(ACRES) =        0.4
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    114.00 =     402.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 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) =   408.00  DOWNSTREAM(FEET) =   402.70
  FLOW LENGTH(FEET) =   650.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.76
  PIPE TRAVEL TIME(MIN.) =   3.25    Tc(MIN.) =    9.89
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    124.00 =    1052.00 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.) =    9.89
  RAINFALL INTENSITY(INCH/HR) =   4.07
  TOTAL STREAM AREA(ACRES) =     0.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.76

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    122.00 IS CODE =  21
```

```
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    460.00
  DOWNSTREAM ELEVATION(FEET) =    420.00
  ELEVATION DIFFERENCE(FEET) =     40.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.27

************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    124.00 IS CODE =  62
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  408.60  DOWNSTREAM ELEVATION(FEET) =  402.70
  STREET LENGTH(FEET) =   788.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.15
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.37   FLOOD WIDTH(FEET) =   12.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.01
    SPLIT DEPTH(FEET) =    0.27   SPLIT FLOOD WIDTH(FEET) =    7.27
    SPLIT FLOW(CFS) =    1.01   SPLIT VELOCITY(FEET/SEC.) =    1.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.01
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.74
  STREET FLOW TRAVEL TIME(MIN.) =   6.52   Tc(MIN.) =   12.79
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.451
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.695
  SUBAREA AREA(ACRES) =    3.17      SUBAREA RUNOFF(CFS) =    7.77
  TOTAL AREA(ACRES) =        3.3        PEAK FLOW RATE(CFS) =       7.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  2.20   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =     888.00 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.) =   12.79
  RAINFALL INTENSITY(INCH/HR) =   3.45
  TOTAL STREAM AREA(ACRES) =     3.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.94

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.76     9.89        4.072          0.41
      2        7.94    12.79        3.451          3.31

  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        6.90     9.89       4.072
      2        8.58    12.79       3.451

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.58   Tc(MIN.) =   12.79
  TOTAL AREA(ACRES) =        3.7
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    124.00 =    1052.00 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) =   402.70  DOWNSTREAM(FEET) =   402.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.58
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   12.92
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    127.00 =    1112.00 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.) =   12.92
  RAINFALL INTENSITY(INCH/HR) =   3.43
  TOTAL STREAM AREA(ACRES) =     3.72
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.58

************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    123.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
```

```
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   143.00
 UPSTREAM ELEVATION(FEET) =    474.00
 DOWNSTREAM ELEVATION(FEET) =    460.00
 ELEVATION DIFFERENCE(FEET) =     14.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.311
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.441
 SUBAREA RUNOFF(CFS) =      0.34
 TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
 FLOW PROCESS FROM NODE    123.00 TO NODE    125.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    440.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   229.00   CHANNEL SLOPE =  0.0873
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.34
 FLOW VELOCITY(FEET/SEC) =   4.43 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   0.86   Tc(MIN.) =    7.17
 LONGEST FLOWPATH FROM NODE    121.00 TO NODE    125.00 =     372.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    123.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.011
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    1.39   SUBAREA RUNOFF(CFS) =    2.44
 TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       2.75
 TC(MIN.) =    7.17

****************************************************************************
 FLOW PROCESS FROM NODE    125.00 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) =   408.00  DOWNSTREAM(FEET) =   402.00
 FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.76
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.75
 PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =    7.89
 LONGEST FLOWPATH FROM NODE    121.00 TO NODE    127.00 =     662.00 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.) =    7.89
 RAINFALL INTENSITY(INCH/HR) =   4.71
 TOTAL STREAM AREA(ACRES) =     1.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.75

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        8.58    12.92        3.428          3.72
     2        2.75     7.89        4.713          1.57

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        8.99     7.89       4.713
     2       10.58    12.92       3.428

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      10.58   Tc(MIN.) =   12.92
 TOTAL AREA(ACRES) =        5.3
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    127.00 =    1112.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   404.00  DOWNSTREAM(FEET) =   403.20
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.14
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.58
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   13.11
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    128.00 =    1192.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 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       10.58    13.11       3.396        5.29
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    128.00 =    1192.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
     1        3.37     8.17        4.607        1.93
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    128.00 =     999.00 FEET.

 ** PEAK FLOW RATE TABLE **
```

```
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       9.97       8.17        4.607
      2      13.07      13.11        3.396

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.07   Tc(MIN.) =   13.11
  TOTAL AREA(ACRES) =        7.2

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 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) =   403.20  DOWNSTREAM(FEET) =   402.45
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.87
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.07
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   13.15
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    134.00 =    1222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    134.00 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.) =   13.15
  RAINFALL INTENSITY(INCH/HR) =   3.39
  TOTAL STREAM AREA(ACRES) =     7.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.07

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    132.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   101.00
  UPSTREAM ELEVATION(FEET) =    450.00
  DOWNSTREAM ELEVATION(FEET) =    417.00
  ELEVATION DIFFERENCE(FEET) =     33.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
  SUBAREA RUNOFF(CFS) =      0.23
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.23
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    134.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  417.00  DOWNSTREAM ELEVATION(FEET) =  402.45
  STREET LENGTH(FEET) =   673.30   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  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) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.08
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.01
  STREET FLOW TRAVEL TIME(MIN.) =   3.65   Tc(MIN.) =    9.91
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.067
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.589
  SUBAREA AREA(ACRES) =    2.70      SUBAREA RUNOFF(CFS) =    6.59
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       6.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  3.42   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    134.00 =     774.30 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.) =    9.91
  RAINFALL INTENSITY(INCH/HR) =   4.07
  TOTAL STREAM AREA(ACRES) =     2.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.76

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       13.07    13.15        3.388          7.22
      2        6.76     9.91        4.067          2.82

  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       16.61     9.91       4.067
      2       18.70    13.15       3.388

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.70   Tc(MIN.) =   13.15
  TOTAL AREA(ACRES) =       10.0
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    134.00 =    1222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    146.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   402.45  DOWNSTREAM(FEET) =   392.90
  FLOW LENGTH(FEET) =   352.60   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.30
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.70
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   13.63
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    146.00 =    1574.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    146.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================


****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    142.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   106.00
  UPSTREAM ELEVATION(FEET) =    435.00
  DOWNSTREAM ELEVATION(FEET) =    415.00
  ELEVATION DIFFERENCE(FEET) =     20.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.178
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.46
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    144.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  415.60  DOWNSTREAM ELEVATION(FEET) =  398.00
  STREET LENGTH(FEET) =   643.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
```



```
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =    7.24
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.978
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    2.40      SUBAREA RUNOFF(CFS) =    7.17
  TOTAL AREA(ACRES) =        2.5        PEAK FLOW RATE(CFS) =       7.53

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE    140.00 TO NODE    144.00 =     749.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    145.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   398.00  DOWNSTREAM(FEET) =   393.00
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.82
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.53
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    7.56
  LONGEST FLOWPATH FROM NODE    140.00 TO NODE    145.00 =     934.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    145.00 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.) =    7.56
  RAINFALL INTENSITY(INCH/HR) =   4.84
  TOTAL STREAM AREA(ACRES) =     2.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.53

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    143.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   150.00
  UPSTREAM ELEVATION(FEET) =    407.00
  DOWNSTREAM ELEVATION(FEET) =    406.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.640
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    55.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.810
  SUBAREA RUNOFF(CFS) =      0.52
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    145.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  406.00  DOWNSTREAM ELEVATION(FEET) =  393.00
  STREET LENGTH(FEET) =   478.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.92
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
  STREET FLOW TRAVEL TIME(MIN.) =   2.57   Tc(MIN.) =   10.21
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.990
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    1.49      SUBAREA RUNOFF(CFS) =    3.57
  TOTAL AREA(ACRES) =        1.7        PEAK FLOW RATE(CFS) =       4.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.17
  FLOW VELOCITY(FEET/SEC.) =  3.47   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    145.00 =     628.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    145.00 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.) =   10.21
  RAINFALL INTENSITY(INCH/HR) =   3.99
```



```
  TOTAL STREAM AREA(ACRES) =     1.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.00

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.53     7.56        4.844          2.52
      2        4.00    10.21        3.990          1.67

  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       10.49     7.56       4.844
      2       10.20    10.21       3.990

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.49   Tc(MIN.) =    7.56
  TOTAL AREA(ACRES) =        4.2
  LONGEST FLOWPATH FROM NODE    140.00 TO NODE    145.00 =     934.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    146.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   393.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.90
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.49
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.63
  LONGEST FLOWPATH FROM NODE    140.00 TO NODE    146.00 =     979.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    146.00 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       10.49     7.63       4.813        4.19
  LONGEST FLOWPATH FROM NODE    140.00 TO NODE    146.00 =     979.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       18.70    13.63       3.311       10.04
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    146.00 =    1574.60 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      20.96       7.63        4.813
      2      25.91      13.63        3.311

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      25.91   Tc(MIN.) =   13.63
  TOTAL AREA(ACRES) =       14.2

****************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    146.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    146.00 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) =   392.90  DOWNSTREAM(FEET) =   391.00
  FLOW LENGTH(FEET) =    84.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.44
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.91
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   13.74
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    154.00 =    1658.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 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.) =   13.74
  RAINFALL INTENSITY(INCH/HR) =   3.29
  TOTAL STREAM AREA(ACRES) =    14.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.91

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    152.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   140.00
  UPSTREAM ELEVATION(FEET) =    401.00
  DOWNSTREAM ELEVATION(FEET) =    400.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.563
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    56.43
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.842
  SUBAREA RUNOFF(CFS) =      0.52
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    154.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
```



```
  UPSTREAM ELEVATION(FEET) =  400.00  DOWNSTREAM ELEVATION(FEET) =  391.00
  STREET LENGTH(FEET) =   358.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.99
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =    9.56
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.164
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    1.40      SUBAREA RUNOFF(CFS) =    3.50
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       3.95

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.27
  FLOW VELOCITY(FEET/SEC.) =  3.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    154.00 =     498.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 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.) =    9.56
  RAINFALL INTENSITY(INCH/HR) =   4.16
  TOTAL STREAM AREA(ACRES) =     1.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.95

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    153.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   140.00
  UPSTREAM ELEVATION(FEET) =    401.00
  DOWNSTREAM ELEVATION(FEET) =    400.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.563
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    56.43
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.842
```

```
  SUBAREA RUNOFF(CFS) =      0.52
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  400.00  DOWNSTREAM ELEVATION(FEET) =  391.40
  STREET LENGTH(FEET) =   358.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    5.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   2.32   Tc(MIN.) =    9.88
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.076
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    1.39
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       1.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.36
  FLOW VELOCITY(FEET/SEC.) =  2.78   DEPTH*VELOCITY(FT*FT/SEC.) =   0.76
  LONGEST FLOWPATH FROM NODE    151.00 TO NODE    154.00 =     498.00 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 =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.88
  RAINFALL INTENSITY(INCH/HR) =   4.08
  TOTAL STREAM AREA(ACRES) =     0.75
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.83

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       25.91    13.74        3.294         14.23
      2        3.95     9.56        4.164          1.58
      3        1.83     9.88        4.076          0.75

  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       23.74     9.56        4.164
      2       24.32     9.88        4.076
      3       30.52    13.74        3.294

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.52   Tc(MIN.) =   13.74
  TOTAL AREA(ACRES) =       16.6
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    154.00 =    1658.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    169.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   391.40  DOWNSTREAM(FEET) =   390.10
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.32
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.52
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   13.77
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    169.00 =    1688.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    169.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    162.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   108.00
  UPSTREAM ELEVATION(FEET) =    396.00
  DOWNSTREAM ELEVATION(FEET) =    395.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.707
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    62.78
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.807
  SUBAREA RUNOFF(CFS) =      0.54
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.54

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    164.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  396.00  DOWNSTREAM ELEVATION(FEET) =  392.30
```

```
  STREET LENGTH(FEET) =   340.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.36
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   2.53   Tc(MIN.) =    8.24
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.583
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    4.23
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       4.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  2.43   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
  LONGEST FLOWPATH FROM NODE    160.00 TO NODE    164.00 =     448.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 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) =   392.30  DOWNSTREAM(FEET) =   390.00
  FLOW LENGTH(FEET) =   233.00   MANNING'S N =  0.012
  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.) =   5.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.65
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =    8.89
  LONGEST FLOWPATH FROM NODE    160.00 TO NODE    168.00 =     681.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    168.00 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.) =    8.89
  RAINFALL INTENSITY(INCH/HR) =   4.36
  TOTAL STREAM AREA(ACRES) =     1.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.65

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    163.00 IS CODE =  21
----------------------------------------------------------------------------
```



```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   118.00
  UPSTREAM ELEVATION(FEET) =    396.00
  DOWNSTREAM ELEVATION(FEET) =    395.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.766
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.42
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.768
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    168.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  395.00  DOWNSTREAM ELEVATION(FEET) =  390.00
  STREET LENGTH(FEET) =   580.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.50
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.37   FLOOD WIDTH(FEET) =   12.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.16
    SPLIT DEPTH(FEET) =    0.16   SPLIT FLOOD WIDTH(FEET) =    1.54
    SPLIT FLOW(CFS) =    0.13   SPLIT VELOCITY(FEET/SEC.) =    0.94
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.16
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
  STREET FLOW TRAVEL TIME(MIN.) =   4.47   Tc(MIN.) =   10.24
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.983
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    5.94
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       6.31

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  2.16   DEPTH*VELOCITY(FT*FT/SEC.) =   0.79
  LONGEST FLOWPATH FROM NODE    161.00 TO NODE    168.00 =     698.00 FEET.

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

```
 FLOW PROCESS FROM NODE    168.00 TO NODE    168.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.24
 RAINFALL INTENSITY(INCH/HR) =   3.98
 TOTAL STREAM AREA(ACRES) =     2.23
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.31

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    167.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   121.00
 UPSTREAM ELEVATION(FEET) =    394.20
 DOWNSTREAM ELEVATION(FEET) =    392.80
 ELEVATION DIFFERENCE(FEET) =      1.40
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.456
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    66.57
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.977
 SUBAREA RUNOFF(CFS) =      0.64
 TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.64

****************************************************************************
 FLOW PROCESS FROM NODE    167.00 TO NODE    168.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  392.80  DOWNSTREAM ELEVATION(FEET) =  390.00
 STREET LENGTH(FEET) =   284.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.58
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.39
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.92
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.56
 STREET FLOW TRAVEL TIME(MIN.) =   2.47   Tc(MIN.) =    7.92
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.699
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
```



```
 SUBAREA AREA(ACRES) =    0.56      SUBAREA RUNOFF(CFS) =    1.87
 TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.37

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.08
 FLOW VELOCITY(FEET/SEC.) =  2.09   DEPTH*VELOCITY(FT*FT/SEC.) =   0.68
 LONGEST FLOWPATH FROM NODE    165.00 TO NODE    168.00 =     405.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    168.00 TO NODE    169.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   391.00  DOWNSTREAM(FEET) =   390.50
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.012
 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.) =   4.99
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.37
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    8.09
 LONGEST FLOWPATH FROM NODE    165.00 TO NODE    169.00 =     455.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    169.00 TO NODE    169.00 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.) =    8.09
 RAINFALL INTENSITY(INCH/HR) =   4.64
 TOTAL STREAM AREA(ACRES) =     0.71
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.37

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        4.65     8.89        4.364          1.43
     2        6.31    10.24        3.983          2.23
     3        2.37     8.09        4.636          0.71

 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       11.59     8.09       4.636
     2       12.36     8.89       4.364
     3       12.59    10.24       3.983

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      12.59   Tc(MIN.) =   10.24
 TOTAL AREA(ACRES) =        4.4
 LONGEST FLOWPATH FROM NODE    161.00 TO NODE    169.00 =     698.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    169.00 TO NODE    169.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
```

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==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       12.59    10.24       3.983        4.37
  LONGEST FLOWPATH FROM NODE    161.00 TO NODE    169.00 =     698.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       30.52    13.77       3.289       16.56
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    169.00 =    1688.60 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      35.27      10.24       3.983
      2      40.91      13.77       3.289

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.91   Tc(MIN.) =   13.77
  TOTAL AREA(ACRES) =       20.9

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    169.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    198.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   390.10  DOWNSTREAM(FEET) =   388.90
  FLOW LENGTH(FEET) =   113.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.30
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.91
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   13.96
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    198.00 =    1801.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    172.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   120.00
  UPSTREAM ELEVATION(FEET) =    440.00
  DOWNSTREAM ELEVATION(FEET) =    410.00
  ELEVATION DIFFERENCE(FEET) =     30.00
```



```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    176.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  408.00  DOWNSTREAM ELEVATION(FEET) =  388.50
  STREET LENGTH(FEET) =   671.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.55
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   3.63   Tc(MIN.) =    9.90
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.070
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.667
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    3.64
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.89
  FLOW VELOCITY(FEET/SEC.) =  3.54   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    176.00 =     791.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 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.) =    9.90
  RAINFALL INTENSITY(INCH/HR) =   4.07
  TOTAL STREAM AREA(ACRES) =     1.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.88

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    173.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    394.50
 DOWNSTREAM ELEVATION(FEET) =    394.00
 ELEVATION DIFFERENCE(FEET) =      0.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.778
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.760
 SUBAREA RUNOFF(CFS) =      0.29
 TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.29

****************************************************************************
 FLOW PROCESS FROM NODE    173.00 TO NODE    176.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
 UPSTREAM ELEVATION(FEET) =  394.00  DOWNSTREAM ELEVATION(FEET) =  388.50
 STREET LENGTH(FEET) =   460.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.84
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    8.67
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.11
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
 STREET FLOW TRAVEL TIME(MIN.) =   3.63   Tc(MIN.) =    9.41
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.206
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
 SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    3.05
 TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       3.25

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.02
 FLOW VELOCITY(FEET/SEC.) =  2.44   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
 LONGEST FLOWPATH FROM NODE    171.00 TO NODE    176.00 =     520.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 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.) =    9.41
 RAINFALL INTENSITY(INCH/HR) =   4.21
```



```
 TOTAL STREAM AREA(ACRES) =     1.09
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.25

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        3.88     9.90        4.070          1.43
     2        3.25     9.41        4.206          1.09

 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        6.95     9.41       4.206
     2        7.03     9.90       4.070

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       7.03   Tc(MIN.) =    9.90
 TOTAL AREA(ACRES) =        2.5
 LONGEST FLOWPATH FROM NODE    170.00 TO NODE    176.00 =     791.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    176.00 TO NODE    198.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   388.50  DOWNSTREAM(FEET) =   388.25
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.64
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.03
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.96
 LONGEST FLOWPATH FROM NODE    170.00 TO NODE    198.00 =     816.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        7.03     9.96       4.054        2.52
 LONGEST FLOWPATH FROM NODE    170.00 TO NODE    198.00 =     816.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       40.91    13.96       3.261       20.93
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    198.00 =    1801.60 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      36.23       9.96       4.054
     2      46.57      13.96       3.261

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      46.57   Tc(MIN.) =   13.96
  TOTAL AREA(ACRES) =       23.5

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    182.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    409.50
  DOWNSTREAM ELEVATION(FEET) =    408.50
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.354
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    67.50
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.050
  SUBAREA RUNOFF(CFS) =      0.52
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    184.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  406.00  DOWNSTREAM ELEVATION(FEET) =  394.40
  STREET LENGTH(FEET) =   529.30   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
  STREET FLOW TRAVEL TIME(MIN.) =   2.65   Tc(MIN.) =    8.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.668
```



```
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  94
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.786
  SUBAREA AREA(ACRES) =    2.15      SUBAREA RUNOFF(CFS) =    7.93
  TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       8.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  3.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    184.00 =     609.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    196.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.50  DOWNSTREAM(FEET) =   390.50
  FLOW LENGTH(FEET) =   421.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.33
  PIPE TRAVEL TIME(MIN.) =   1.04    Tc(MIN.) =    9.04
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    196.00 =    1030.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    196.00 TO NODE    196.00 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.) =    9.04
  RAINFALL INTENSITY(INCH/HR) =   4.31
  TOTAL STREAM AREA(ACRES) =     2.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.33

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    192.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    96.00
  UPSTREAM ELEVATION(FEET) =    404.00
  DOWNSTREAM ELEVATION(FEET) =    403.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.601
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    65.42
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.877
  SUBAREA RUNOFF(CFS) =      0.42
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.42

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    194.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  403.00  DOWNSTREAM ELEVATION(FEET) =  395.30
  STREET LENGTH(FEET) =   704.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.75
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.37   FLOOD WIDTH(FEET) =   12.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.43
    SPLIT DEPTH(FEET) =    0.34   SPLIT FLOOD WIDTH(FEET) =   10.83
    SPLIT FLOW(CFS) =    2.96   SPLIT VELOCITY(FEET/SEC.) =    2.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   4.82   Tc(MIN.) =   10.42
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.938
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    4.41      SUBAREA RUNOFF(CFS) =   12.33
  TOTAL AREA(ACRES) =        4.5        PEAK FLOW RATE(CFS) =      12.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  2.97   DEPTH*VELOCITY(FT*FT/SEC.) =   1.23
  LONGEST FLOWPATH FROM NODE    190.00 TO NODE    194.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    194.00 TO NODE    196.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.30  DOWNSTREAM(FEET) =   390.00
  FLOW LENGTH(FEET) =    42.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.83
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.61
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.46
  LONGEST FLOWPATH FROM NODE    190.00 TO NODE    196.00 =     842.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    196.00 TO NODE    196.00 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.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   3.93
  TOTAL STREAM AREA(ACRES) =     4.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.61

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.33     9.04        4.314          2.27
      2       12.61    10.46        3.929          4.51

  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       19.24     9.04        4.314
      2       20.19    10.46        3.929

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.19   Tc(MIN.) =   10.46
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    196.00 =    1030.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    196.00 TO NODE    198.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   390.00  DOWNSTREAM(FEET) =   388.90
  FLOW LENGTH(FEET) =   115.30   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.36
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.19
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   10.69
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    198.00 =    1145.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 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       20.19    10.69        3.875        6.78
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    198.00 =    1145.60 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1       46.57    13.96        3.261       23.45
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    198.00 =    1801.60 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
```

```
     1      55.85      10.69        3.875
     2      63.57      13.96        3.261

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.57   Tc(MIN.) =   13.96
  TOTAL AREA(ACRES) =       30.2

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 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) =   388.90  DOWNSTREAM(FEET) =   379.20
  FLOW LENGTH(FEET) =   262.50   MANNING'S N =  0.012
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.67
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      63.57
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   14.19
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    204.00 =    2064.10 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.) =   14.19
  RAINFALL INTENSITY(INCH/HR) =   3.23
  TOTAL STREAM AREA(ACRES) =    30.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     63.57

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    392.80
  DOWNSTREAM ELEVATION(FEET) =    391.80
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.511
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    66.11
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.939
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  62
```



```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  391.80  DOWNSTREAM ELEVATION(FEET) =  379.20
  STREET LENGTH(FEET) =   481.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   2.96   Tc(MIN.) =    8.48
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.499
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    0.69      SUBAREA RUNOFF(CFS) =    2.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.11
  FLOW VELOCITY(FEET/SEC.) =  3.09   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     571.00 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.) =    8.48
  RAINFALL INTENSITY(INCH/HR) =   4.50
  TOTAL STREAM AREA(ACRES) =     0.75
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.40

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       63.57    14.19        3.226         30.23
      2        2.40     8.48        4.499          0.75

  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       40.36     8.48       4.499
```

```
     2       65.29    14.19       3.226

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      65.29   Tc(MIN.) =   14.19
  TOTAL AREA(ACRES) =       31.0
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    204.00 =    2064.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE      2.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   375.00  DOWNSTREAM(FEET) =   374.00
  FLOW LENGTH(FEET) =    51.50   MANNING'S N =  0.012
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.67
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      65.29
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   14.25
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE      2.00 =    2115.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE      2.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.218
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6174
  SUBAREA AREA(ACRES) =    1.74   SUBAREA RUNOFF(CFS) =    1.96
  TOTAL AREA(ACRES) =       32.7   TOTAL RUNOFF(CFS) =      65.29
  TC(MIN.) =   14.25
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    212.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   138.00
  UPSTREAM ELEVATION(FEET) =    392.60
  DOWNSTREAM ELEVATION(FEET) =    390.00
  ELEVATION DIFFERENCE(FEET) =      2.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.884
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    73.84
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.49
```



```
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.49

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    214.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  390.00  DOWNSTREAM ELEVATION(FEET) =  384.20
  STREET LENGTH(FEET) =   474.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.32
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.37   FLOOD WIDTH(FEET) =   12.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.58
    SPLIT DEPTH(FEET) =    0.27   SPLIT FLOOD WIDTH(FEET) =    7.36
    SPLIT FLOW(CFS) =    1.31   SPLIT VELOCITY(FEET/SEC.) =    1.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =    7.95
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.688
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    9.65
  TOTAL AREA(ACRES) =        3.0        PEAK FLOW RATE(CFS) =      10.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  2.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.08
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =     612.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    224.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   384.20  DOWNSTREAM(FEET) =   379.20
  FLOW LENGTH(FEET) =   526.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.02
  PIPE TRAVEL TIME(MIN.) =   1.26    Tc(MIN.) =    9.21
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    224.00 =    1138.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    224.00 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.) =    9.21
  RAINFALL INTENSITY(INCH/HR) =   4.26
  TOTAL STREAM AREA(ACRES) =     3.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.02

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    222.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    92.00
  UPSTREAM ELEVATION(FEET) =    396.70
  DOWNSTREAM ELEVATION(FEET) =    396.00
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.847
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    57.83
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.716
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    224.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  396.00  DOWNSTREAM ELEVATION(FEET) =  390.60
  STREET LENGTH(FEET) =   458.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.18
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   3.50   Tc(MIN.) =    9.34
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.225
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    3.54
```



```
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.77
  FLOW VELOCITY(FEET/SEC.) =  2.52   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    224.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    224.00 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.) =    9.34
  RAINFALL INTENSITY(INCH/HR) =   4.22
  TOTAL STREAM AREA(ACRES) =     1.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.78

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.02     9.21        4.263          3.01
      2        3.78     9.34        4.225          1.26

  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       13.75     9.21        4.263
      2       13.71     9.34        4.225

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.75   Tc(MIN.) =    9.21
  TOTAL AREA(ACRES) =        4.3
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    224.00 =    1138.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE      2.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   375.40  DOWNSTREAM(FEET) =   374.00
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.76
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.75
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    9.52
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE      2.00 =    1278.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 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       13.75     9.52       4.175        4.27
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE      2.00 =    1278.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       65.29    14.25       3.218       32.72
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE      2.00 =    2115.60 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      57.34       9.52       4.175
     2      75.88      14.25       3.218

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      75.88   Tc(MIN.) =   14.25
 TOTAL AREA(ACRES) =       37.0

****************************************************************************
 FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      2.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   374.00  DOWNSTREAM(FEET) =   310.00
 FLOW LENGTH(FEET) =   503.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  30.63
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      75.88
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   14.52
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE     10.00 =    2618.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   14.52
 RAINFALL INTENSITY(INCH/HR) =   3.18
 TOTAL STREAM AREA(ACRES) =    36.99
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     75.88

****************************************************************************
 FLOW PROCESS FROM NODE    230.00 TO NODE    232.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    379.20
```



```
 DOWNSTREAM ELEVATION(FEET) =    374.00
 ELEVATION DIFFERENCE(FEET) =      5.20
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.272
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    90.40
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.61
 TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.61

****************************************************************************
 FLOW PROCESS FROM NODE    232.00 TO NODE     10.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  374.00  DOWNSTREAM ELEVATION(FEET) =  320.00
 STREET LENGTH(FEET) =   480.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.61
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    5.89
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.61
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.37
 STREET FLOW TRAVEL TIME(MIN.) =   1.43   Tc(MIN.) =    3.70
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.73      SUBAREA RUNOFF(CFS) =    4.02
 TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.62

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.92
 FLOW VELOCITY(FEET/SEC.) =  6.20   DEPTH*VELOCITY(FT*FT/SEC.) =   1.76
 LONGEST FLOWPATH FROM NODE    230.00 TO NODE     10.00 =     580.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 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.) =    3.70
 RAINFALL INTENSITY(INCH/HR) =   6.32
 TOTAL STREAM AREA(ACRES) =     0.84
```

```
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.62

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       75.88    14.52        3.179         36.99
     2        4.62     3.70        6.323          0.84

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       23.94     3.70       6.323
     2       78.20    14.52       3.179

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      78.20   Tc(MIN.) =   14.52
 TOTAL AREA(ACRES) =       37.8
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE     10.00 =    2618.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   320.00  DOWNSTREAM(FEET) =   276.20
 FLOW LENGTH(FEET) =   535.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  26.33
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      78.20
 PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   14.86
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE     14.00 =    3153.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 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.) =   14.86
 RAINFALL INTENSITY(INCH/HR) =   3.13
 TOTAL STREAM AREA(ACRES) =    37.83
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     78.20

****************************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    233.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    323.00
 DOWNSTREAM ELEVATION(FEET) =    315.00
 ELEVATION DIFFERENCE(FEET) =      8.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.489
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
```



```
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.55
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.55

****************************************************************************
 FLOW PROCESS FROM NODE    233.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  315.00  DOWNSTREAM ELEVATION(FEET) =  274.00
 STREET LENGTH(FEET) =   449.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.48
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.05
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.12
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.26
 STREET FLOW TRAVEL TIME(MIN.) =   1.46   Tc(MIN.) =    2.95
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    3.85
 TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.40

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.11
 FLOW VELOCITY(FEET/SEC.) =  5.67   DEPTH*VELOCITY(FT*FT/SEC.) =   1.64
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE     14.00 =     509.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 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.) =    2.95
 RAINFALL INTENSITY(INCH/HR) =   6.32
 TOTAL STREAM AREA(ACRES) =     0.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.40

+----------------------------------------------------------------------------+
| OFFSET FLOW FROM NORTHEAST                                                 |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+
```

```
**************************************************************************
 FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
--------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   134.00
 UPSTREAM ELEVATION(FEET) =    400.00
 DOWNSTREAM ELEVATION(FEET) =    350.00
 ELEVATION DIFFERENCE(FEET) =     50.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.38

**************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  52
--------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    350.00  DOWNSTREAM(FEET) =    260.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1386.00   CHANNEL SLOPE =  0.0649
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.38
 FLOW VELOCITY(FEET/SEC) =   3.82 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   6.04   Tc(MIN.) =   12.31
 LONGEST FLOWPATH FROM NODE     12.00 TO NODE     14.00 =    1520.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  81
--------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.536
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =   10.10   SUBAREA RUNOFF(CFS) =   12.50
 TOTAL AREA(ACRES) =       10.3   TOTAL RUNOFF(CFS) =      12.75
 TC(MIN.) =   12.31

**************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 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.) =   12.31
 RAINFALL INTENSITY(INCH/HR) =   3.54
 TOTAL STREAM AREA(ACRES) =    10.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.75

 ** CONFLUENCE DATA **
```



```
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       78.20    14.86        3.132         37.83
     2        4.40     2.95        6.323          0.80
     3       12.75    12.31        3.536         10.30

 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       46.19     2.95        6.323
     2       84.46    12.31        3.536
     3       91.67    14.86        3.132

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      91.67   Tc(MIN.) =   14.86
 TOTAL AREA(ACRES) =       48.9
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE     14.00 =    3153.60 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     28.00 IS CODE =  52
--------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    260.00  DOWNSTREAM(FEET) =    248.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1259.00   CHANNEL SLOPE =  0.0095
 CHANNEL FLOW THRU SUBAREA(CFS) =      91.67
 FLOW VELOCITY(FEET/SEC) =   4.51 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   4.65   Tc(MIN.) =   19.51
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE     28.00 =    4412.60 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     28.00 IS CODE =  81
--------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.628
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5244
 SUBAREA AREA(ACRES) =   14.95   SUBAREA RUNOFF(CFS) =   13.75
 TOTAL AREA(ACRES) =       63.9   TOTAL RUNOFF(CFS) =      91.67
 TC(MIN.) =   19.51
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

**************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  10
--------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==========================================================================

+------------------------------------------------------------------------+
| BEGIN WEST BASIN HYD                                                   |
|                                                                        |
|                                                                        |
+------------------------------------------------------------------------+

**************************************************************************
 FLOW PROCESS FROM NODE    500.00 TO NODE    504.00 IS CODE =  21
```

```
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   218.00
  UPSTREAM ELEVATION(FEET) =    402.60
  DOWNSTREAM ELEVATION(FEET) =    400.80
  ELEVATION DIFFERENCE(FEET) =      1.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.785
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    59.77
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.756
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.43   TOTAL RUNOFF(CFS) =      1.76

************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    506.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.80  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.012
  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.) =   4.59
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.76
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    6.08
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    506.00 =     298.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    506.00 TO NODE    506.00 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.) =    6.08
  RAINFALL INTENSITY(INCH/HR) =   5.58
  TOTAL STREAM AREA(ACRES) =     0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.76

************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    503.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    97.00
  UPSTREAM ELEVATION(FEET) =    445.00
  DOWNSTREAM ELEVATION(FEET) =    412.00
  ELEVATION DIFFERENCE(FEET) =     33.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.172
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.520
  SUBAREA RUNOFF(CFS) =      0.35
```



```
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.35

************************************************************************
  FLOW PROCESS FROM NODE    503.00 TO NODE    506.00 IS CODE =  62
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  406.00  DOWNSTREAM ELEVATION(FEET) =  403.50
  STREET LENGTH(FEET) =   264.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.54
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
  STREET FLOW TRAVEL TIME(MIN.) =   2.35   Tc(MIN.) =    8.52
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.485
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.641
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    2.42
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.70

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.73
  FLOW VELOCITY(FEET/SEC.) =  2.13   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    506.00 =     361.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    506.00 TO NODE    506.00 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.) =    8.52
  RAINFALL INTENSITY(INCH/HR) =   4.48
  TOTAL STREAM AREA(ACRES) =     0.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.70

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.76     6.08        5.577          0.43
      2        2.70     8.52        4.485          0.94

  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        3.68     6.08       5.577
     2        4.12     8.52       4.485

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.12   Tc(MIN.) =    8.52
 TOTAL AREA(ACRES) =        1.4
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE    506.00 =     361.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    506.00 TO NODE    514.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   403.50  DOWNSTREAM(FEET) =   391.50
 FLOW LENGTH(FEET) =   379.00   MANNING'S N =  0.012
 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.) =   8.82
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.12
 PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =    9.23
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE    514.00 =     740.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    506.00 TO NODE    514.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.257
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.6890
 SUBAREA AREA(ACRES) =    1.72   SUBAREA RUNOFF(CFS) =    5.20
 TOTAL AREA(ACRES) =        3.1   TOTAL RUNOFF(CFS) =       9.06
 TC(MIN.) =    9.23

****************************************************************************
 FLOW PROCESS FROM NODE    514.00 TO NODE     22.50 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   391.50  DOWNSTREAM(FEET) =   387.90
 FLOW LENGTH(FEET) =   154.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.76
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.06
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    9.50
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE     22.50 =     894.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.50 TO NODE     22.50 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.) =    9.50
 RAINFALL INTENSITY(INCH/HR) =   4.18
 TOTAL STREAM AREA(ACRES) =     3.09
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.06

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   139.00
 UPSTREAM ELEVATION(FEET) =    468.00
 DOWNSTREAM ELEVATION(FEET) =    448.00
 ELEVATION DIFFERENCE(FEET) =     20.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
 SUBAREA RUNOFF(CFS) =      0.25
 TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    448.00  DOWNSTREAM(FEET) =    364.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   482.00   CHANNEL SLOPE =  0.1743
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.25
 FLOW VELOCITY(FEET/SEC) =   4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =    7.96
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     621.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.685
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    5.56   SUBAREA RUNOFF(CFS) =    9.12
 TOTAL AREA(ACRES) =        5.7   TOTAL RUNOFF(CFS) =       9.33
 TC(MIN.) =    7.96

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.50 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   364.00  DOWNSTREAM(FEET) =   363.15
```

```
 FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.03
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.33
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    8.16
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.50 =     706.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.50 TO NODE     22.50 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.) =    8.16
 RAINFALL INTENSITY(INCH/HR) =   4.61
 TOTAL STREAM AREA(ACRES) =     5.69
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.33

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     20.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    468.00
 DOWNSTREAM ELEVATION(FEET) =    450.00
 ELEVATION DIFFERENCE(FEET) =     18.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
 SUBAREA RUNOFF(CFS) =      0.21
 TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
 FLOW PROCESS FROM NODE     20.50 TO NODE     21.50 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    450.00  DOWNSTREAM(FEET) =    380.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   354.00   CHANNEL SLOPE =  0.1977
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.21
 FLOW VELOCITY(FEET/SEC) =   4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   1.24   Tc(MIN.) =    7.51
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     21.50 =     454.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     20.50 TO NODE     21.50 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.864
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
```



```
 SUBAREA AREA(ACRES) =    1.10   SUBAREA RUNOFF(CFS) =    1.87
 TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       2.06
 TC(MIN.) =    7.51

****************************************************************************
 FLOW PROCESS FROM NODE     21.50 TO NODE     22.50 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   380.00  DOWNSTREAM(FEET) =   378.00
 FLOW LENGTH(FEET) =   195.00   MANNING'S N =  0.012
 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.) =   4.84
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.06
 PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    8.18
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.50 =     649.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.50 TO NODE     22.50 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.) =    8.18
 RAINFALL INTENSITY(INCH/HR) =   4.60
 TOTAL STREAM AREA(ACRES) =     1.21
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.06

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        9.06     9.50        4.181          3.09
     2        9.33     8.16        4.610          5.69
     3        2.06     8.18        4.602          1.21

 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       19.60     8.16       4.610
     2       19.61     8.18       4.602
     3       19.40     9.50       4.181

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      19.61   Tc(MIN.) =    8.18
 TOTAL AREA(ACRES) =       10.0
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE     22.50 =     894.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.50 TO NODE    524.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   386.52  DOWNSTREAM(FEET) =   381.20
 FLOW LENGTH(FEET) =   266.00   MANNING'S N =  0.012
```

```
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.99
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.61
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    8.59
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    524.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    524.00 TO NODE    524.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.59
  RAINFALL INTENSITY(INCH/HR) =   4.46
  TOTAL STREAM AREA(ACRES) =     9.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.61

****************************************************************************
  FLOW PROCESS FROM NODE    520.00 TO NODE    522.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   103.00
  UPSTREAM ELEVATION(FEET) =    391.60
  DOWNSTREAM ELEVATION(FEET) =    390.70
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.745
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    61.21
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.782
  SUBAREA RUNOFF(CFS) =      0.49
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.49

****************************************************************************
  FLOW PROCESS FROM NODE    522.00 TO NODE    524.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  390.00  DOWNSTREAM ELEVATION(FEET) =  381.20
  STREET LENGTH(FEET) =   353.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.70
```



```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   2.13   Tc(MIN.) =    7.87
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.719
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    0.64      SUBAREA RUNOFF(CFS) =    2.14
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.48
  FLOW VELOCITY(FEET/SEC.) =  3.04   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE    520.00 TO NODE    524.00 =     456.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    524.00 TO NODE    524.00 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.) =    7.87
  RAINFALL INTENSITY(INCH/HR) =   4.72
  TOTAL STREAM AREA(ACRES) =     0.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.55

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       19.61     8.59        4.462          9.99
      2        2.55     7.87        4.719          0.76

  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       21.09     7.87       4.719
      2       22.02     8.59       4.462

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.02   Tc(MIN.) =    8.59
  TOTAL AREA(ACRES) =       10.8
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    524.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    524.00 TO NODE    556.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   381.00  DOWNSTREAM(FEET) =   380.40
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.62
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.02
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    8.70
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    556.00 =    1220.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    556.00 TO NODE    556.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    530.00 TO NODE    532.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    403.40
  DOWNSTREAM ELEVATION(FEET) =    401.80
  ELEVATION DIFFERENCE(FEET) =      1.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.057
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    71.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.277
  SUBAREA RUNOFF(CFS) =      0.49
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.49

****************************************************************************
  FLOW PROCESS FROM NODE    532.00 TO NODE    534.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  401.50  DOWNSTREAM ELEVATION(FEET) =  395.80
  STREET LENGTH(FEET) =   246.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.64
  STREET FLOW TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =    6.66
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.255
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.60
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       2.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
```



```
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.73
  FLOW VELOCITY(FEET/SEC.) =  2.81   DEPTH*VELOCITY(FT*FT/SEC.) =   0.79
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    534.00 =     346.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    534.00 TO NODE    544.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.50  DOWNSTREAM(FEET) =   392.00
  FLOW LENGTH(FEET) =   153.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.39
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.01
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    7.06
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    544.00 =     499.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    544.00 TO NODE    544.00 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.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   5.06
  TOTAL STREAM AREA(ACRES) =     0.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.01

****************************************************************************
  FLOW PROCESS FROM NODE    540.00 TO NODE    542.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    89.00
  UPSTREAM ELEVATION(FEET) =    397.60
  DOWNSTREAM ELEVATION(FEET) =    396.50
  ELEVATION DIFFERENCE(FEET) =      1.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.369
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    67.36
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.040
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    542.00 TO NODE    544.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  396.50  DOWNSTREAM ELEVATION(FEET) =  393.40
  STREET LENGTH(FEET) =   258.60   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
  STREET FLOW TRAVEL TIME(MIN.) =   2.01   Tc(MIN.) =    7.38
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.921
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    0.84      SUBAREA RUNOFF(CFS) =    2.94
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.28

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.11
  FLOW VELOCITY(FEET/SEC.) =  2.43   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE    540.00 TO NODE    544.00 =     347.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    544.00 TO NODE    544.00 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.) =    7.38
  RAINFALL INTENSITY(INCH/HR) =   4.92
  TOTAL STREAM AREA(ACRES) =     0.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.28

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.01     7.06        5.061          0.54
      2        3.28     7.38        4.921          0.94

  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        5.16     7.06       5.061
      2        5.24     7.38       4.921

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.24   Tc(MIN.) =    7.38
  TOTAL AREA(ACRES) =        1.5
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    544.00 =     499.00 FEET.

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



```
  FLOW PROCESS FROM NODE    544.00 TO NODE    545.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   392.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.24
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    7.68
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    545.00 =     659.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    545.00 TO NODE    545.00 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.) =    7.68
  RAINFALL INTENSITY(INCH/HR) =   4.79
  TOTAL STREAM AREA(ACRES) =     1.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.24

****************************************************************************
  FLOW PROCESS FROM NODE    541.00 TO NODE    543.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    397.60
  DOWNSTREAM ELEVATION(FEET) =    396.00
  ELEVATION DIFFERENCE(FEET) =      1.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.825
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    75.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    543.00 TO NODE    545.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  396.00  DOWNSTREAM ELEVATION(FEET) =  389.70
  STREET LENGTH(FEET) =   278.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.18
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.81
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.65   Tc(MIN.) =    6.47
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.353
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    0.93      SUBAREA RUNOFF(CFS) =    3.53
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.36
  FLOW VELOCITY(FEET/SEC.) =  3.25   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    541.00 TO NODE    545.00 =     358.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    545.00 TO NODE    545.00 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.) =    6.47
  RAINFALL INTENSITY(INCH/HR) =   5.35
  TOTAL STREAM AREA(ACRES) =     1.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.88

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.24     7.68        4.793          1.48
      2        3.88     6.47        5.353          1.02

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        8.57     6.47       5.353
      2        8.71     7.68       4.793

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.71   Tc(MIN.) =    7.68
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    545.00 =     659.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    545.00 TO NODE    548.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```



```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   388.00  DOWNSTREAM(FEET) =   385.00
  FLOW LENGTH(FEET) =   145.00   MANNING'S N =  0.012
  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.) =   9.22
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.71
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    7.94
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    548.00 =     804.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    548.00 TO NODE    548.00 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.) =    7.94
  RAINFALL INTENSITY(INCH/HR) =   4.69
  TOTAL STREAM AREA(ACRES) =     2.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.71

****************************************************************************
  FLOW PROCESS FROM NODE    546.00 TO NODE    547.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    393.90
  DOWNSTREAM ELEVATION(FEET) =    392.50
  ELEVATION DIFFERENCE(FEET) =      1.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.960
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    72.50
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    547.00 TO NODE    548.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  392.50  DOWNSTREAM ELEVATION(FEET) =  386.80
  STREET LENGTH(FEET) =   280.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.28
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.39
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.77
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.82
  STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =    6.64
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.264
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    3.74
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       4.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.83
  FLOW VELOCITY(FEET/SEC.) =  3.16   DEPTH*VELOCITY(FT*FT/SEC.) =   1.08
  LONGEST FLOWPATH FROM NODE    546.00 TO NODE    548.00 =     360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    548.00 TO NODE    548.00 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.) =    6.64
  RAINFALL INTENSITY(INCH/HR) =   5.26
  TOTAL STREAM AREA(ACRES) =     1.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.07

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.71     7.94        4.691          2.50
      2        4.07     6.64        5.264          1.09

  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       11.84     6.64       5.264
      2       12.34     7.94       4.691

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.34   Tc(MIN.) =    7.94
  TOTAL AREA(ACRES) =        3.6
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    548.00 =     804.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    548.00 TO NODE    554.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   384.50  DOWNSTREAM(FEET) =   383.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.75
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.34
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    8.04
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    554.00 =     864.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    554.00 TO NODE    554.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.04
  RAINFALL INTENSITY(INCH/HR) =   4.66
  TOTAL STREAM AREA(ACRES) =     3.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.34

****************************************************************************
  FLOW PROCESS FROM NODE    550.00 TO NODE    552.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   144.00
  UPSTREAM ELEVATION(FEET) =    403.00
  DOWNSTREAM ELEVATION(FEET) =    399.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.597
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    77.78
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE    552.00 TO NODE    554.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  398.80  DOWNSTREAM ELEVATION(FEET) =  383.00
  STREET LENGTH(FEET) =   675.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.33
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   3.60   Tc(MIN.) =    6.20
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.503
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    1.05      SUBAREA RUNOFF(CFS) =    5.03
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       5.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.95
  FLOW VELOCITY(FEET/SEC.) =  3.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.30
  LONGEST FLOWPATH FROM NODE    550.00 TO NODE    554.00 =     819.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    554.00 TO NODE    554.00 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.) =    6.20
  RAINFALL INTENSITY(INCH/HR) =   5.50
  TOTAL STREAM AREA(ACRES) =     1.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.51

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.34     8.04        4.656          3.59
      2        5.51     6.20        5.503          1.15

  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       15.95     6.20       5.503
      2       17.00     8.04       4.656

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.00   Tc(MIN.) =    8.04
  TOTAL AREA(ACRES) =        4.7
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    554.00 =     864.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    554.00 TO NODE    556.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   383.00  DOWNSTREAM(FEET) =   382.20
  FLOW LENGTH(FEET) =    36.70   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.07
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.00
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.09
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    556.00 =     900.70 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    556.00 TO NODE    556.00 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       17.00     8.09       4.635        4.74
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    556.00 =     900.70 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       22.02     8.70       4.423       10.75
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    556.00 =    1220.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      37.48       8.09        4.635
      2      38.24       8.70        4.423

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      38.24   Tc(MIN.) =    8.70
  TOTAL AREA(ACRES) =       15.5

****************************************************************************
  FLOW PROCESS FROM NODE    556.00 TO NODE    556.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    556.00 TO NODE    568.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   382.20  DOWNSTREAM(FEET) =   352.00
  FLOW LENGTH(FEET) =   388.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.64
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.24
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    9.00
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    568.00 =    1608.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    568.00 TO NODE    568.00 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.) =    9.00
  RAINFALL INTENSITY(INCH/HR) =   4.33
  TOTAL STREAM AREA(ACRES) =    15.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     38.24

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

```
 FLOW PROCESS FROM NODE    560.00 TO NODE    562.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
 UPSTREAM ELEVATION(FEET) =    394.00
 DOWNSTREAM ELEVATION(FEET) =    384.50
 ELEVATION DIFFERENCE(FEET) =      9.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.091
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.45
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
 FLOW PROCESS FROM NODE    562.00 TO NODE    564.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  384.00  DOWNSTREAM ELEVATION(FEET) =  378.00
 STREET LENGTH(FEET) =   564.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.60
   ***STREET FLOW SPLITS OVER STREET-CROWN***
   FULL DEPTH(FEET) =    0.37   FLOOD WIDTH(FEET) =   12.00
   FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.40
   SPLIT DEPTH(FEET) =    0.25   SPLIT FLOOD WIDTH(FEET) =    6.14
   SPLIT FLOW(CFS) =    0.86   SPLIT VELOCITY(FEET/SEC.) =    1.74
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   12.00
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.40
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
 STREET FLOW TRAVEL TIME(MIN.) =   3.91   Tc(MIN.) =    7.01
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.087
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
 SUBAREA AREA(ACRES) =    2.30      SUBAREA RUNOFF(CFS) =    8.31
 TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       8.67

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.00
 FLOW VELOCITY(FEET/SEC.) =  2.55   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
 LONGEST FLOWPATH FROM NODE    560.00 TO NODE    564.00 =     654.00 FEET.

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



```
 FLOW PROCESS FROM NODE    564.00 TO NODE    566.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   378.00  DOWNSTREAM(FEET) =   374.20
 FLOW LENGTH(FEET) =   322.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.42
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.67
 PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =    7.73
 LONGEST FLOWPATH FROM NODE    560.00 TO NODE    566.00 =     976.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    564.00 TO NODE    566.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.775
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7100
 SUBAREA AREA(ACRES) =    1.64   SUBAREA RUNOFF(CFS) =    5.56
 TOTAL AREA(ACRES) =        4.0   TOTAL RUNOFF(CFS) =      13.70
 TC(MIN.) =    7.73

****************************************************************************
 FLOW PROCESS FROM NODE    566.00 TO NODE    568.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   374.00  DOWNSTREAM(FEET) =   350.00
 FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  23.28
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      13.70
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.82
 LONGEST FLOWPATH FROM NODE    560.00 TO NODE    568.00 =    1106.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    568.00 TO NODE    568.00 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.) =    7.82
 RAINFALL INTENSITY(INCH/HR) =   4.74
 TOTAL STREAM AREA(ACRES) =     4.04
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.70

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       38.24     9.00        4.328         15.49
     2       13.70     7.82        4.738          4.04
```

```
 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       46.93     7.82       4.738
     2       50.75     9.00       4.328

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      50.75   Tc(MIN.) =    9.00
 TOTAL AREA(ACRES) =       19.5
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE    568.00 =    1608.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    568.00 TO NODE     19.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   353.00  DOWNSTREAM(FEET) =   335.00
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  25.03
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      50.75
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    9.12
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE     19.00 =    1788.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 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.) =    9.12
 RAINFALL INTENSITY(INCH/HR) =   4.29
 TOTAL STREAM AREA(ACRES) =    19.53
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     50.75

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   237.00
 UPSTREAM ELEVATION(FEET) =    370.00
 DOWNSTREAM ELEVATION(FEET) =    340.00
 ELEVATION DIFFERENCE(FEET) =     30.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
 SUBAREA RUNOFF(CFS) =      0.46
 TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      0.46

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



```
 FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 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.) =    6.27
 RAINFALL INTENSITY(INCH/HR) =   5.47
 TOTAL STREAM AREA(ACRES) =     0.24
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.46

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       50.75     9.12        4.291         19.53
     2        0.46     6.27        5.466          0.24

 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       40.30     6.27       5.466
     2       51.11     9.12       4.291

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      51.11   Tc(MIN.) =    9.12
 TOTAL AREA(ACRES) =       19.8
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE     19.00 =    1788.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE    586.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   335.00  DOWNSTREAM(FEET) =   315.00
 FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  25.04
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      51.11
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    9.25
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE    586.00 =    1988.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    586.00 TO NODE    586.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    570.00 TO NODE    572.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   104.00
 UPSTREAM ELEVATION(FEET) =    387.90
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  DOWNSTREAM ELEVATION(FEET) =    387.00
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.752
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.96
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.777
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    572.00 TO NODE    574.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  387.00  DOWNSTREAM ELEVATION(FEET) =  380.00
  STREET LENGTH(FEET) =   292.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.42
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   1.86   Tc(MIN.) =    7.62
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.821
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    0.59      SUBAREA RUNOFF(CFS) =    2.02
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.20
  FLOW VELOCITY(FEET/SEC.) =  2.94   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE    570.00 TO NODE    574.00 =     396.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    574.00 TO NODE    575.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   380.00  DOWNSTREAM(FEET) =   376.80
  FLOW LENGTH(FEET) =   208.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.80
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.33
```



```
  PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =    8.21
  LONGEST FLOWPATH FROM NODE    570.00 TO NODE    575.00 =     604.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    575.00 TO NODE    575.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.21
  RAINFALL INTENSITY(INCH/HR) =   4.59
  TOTAL STREAM AREA(ACRES) =     0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.33

****************************************************************************
  FLOW PROCESS FROM NODE    571.00 TO NODE    573.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   117.00
  UPSTREAM ELEVATION(FEET) =    383.70
  DOWNSTREAM ELEVATION(FEET) =    383.00
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.062
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    52.95
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.585
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE    573.00 TO NODE    575.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  383.00  DOWNSTREAM ELEVATION(FEET) =  376.80
  STREET LENGTH(FEET) =   476.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.74
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
  STREET FLOW TRAVEL TIME(MIN.) =   3.05   Tc(MIN.) =    9.11
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.294
```

```
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
 SUBAREA AREA(ACRES) =    2.13      SUBAREA RUNOFF(CFS) =    6.49
 TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       6.86

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
 FLOW VELOCITY(FEET/SEC.) =  2.66   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
 LONGEST FLOWPATH FROM NODE    571.00 TO NODE    575.00 =     593.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    575.00 TO NODE    575.00 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.) =    9.11
 RAINFALL INTENSITY(INCH/HR) =   4.29
 TOTAL STREAM AREA(ACRES) =     2.25
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.86

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        2.33     8.21        4.591          0.68
     2        6.86     9.11        4.294          2.25

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        8.51     8.21       4.591
     2        9.04     9.11       4.294

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       9.04   Tc(MIN.) =    9.11
 TOTAL AREA(ACRES) =        2.9
 LONGEST FLOWPATH FROM NODE    570.00 TO NODE    575.00 =     604.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    575.00 TO NODE    578.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   376.80  DOWNSTREAM(FEET) =   373.00
 FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.50
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.04
 PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =    9.82
 LONGEST FLOWPATH FROM NODE    570.00 TO NODE    578.00 =     924.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    575.00 TO NODE    578.00 IS CODE =  81
----------------------------------------------------------------------------
```



```
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.090
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7100
 SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    2.90
 TOTAL AREA(ACRES) =        3.9   TOTAL RUNOFF(CFS) =      11.41
 TC(MIN.) =    9.82

****************************************************************************
 FLOW PROCESS FROM NODE    578.00 TO NODE    584.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   373.00  DOWNSTREAM(FEET) =   370.50
 FLOW LENGTH(FEET) =   189.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.16
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.41
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   10.21
 LONGEST FLOWPATH FROM NODE    570.00 TO NODE    584.00 =    1113.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    584.00 TO NODE    584.00 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) =   3.99
 TOTAL STREAM AREA(ACRES) =     3.93
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.41

****************************************************************************
 FLOW PROCESS FROM NODE    580.00 TO NODE    582.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   110.00
 UPSTREAM ELEVATION(FEET) =    378.00
 DOWNSTREAM ELEVATION(FEET) =    376.50
 ELEVATION DIFFERENCE(FEET) =      1.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.245
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    68.64
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.131
 SUBAREA RUNOFF(CFS) =      0.52
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
 FLOW PROCESS FROM NODE    582.00 TO NODE    584.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  376.50  DOWNSTREAM ELEVATION(FEET) =  370.50
  STREET LENGTH(FEET) =   478.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.04
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.37   FLOOD WIDTH(FEET) =   12.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.61
    SPLIT DEPTH(FEET) =    0.25   SPLIT FLOOD WIDTH(FEET) =    6.33
    SPLIT FLOW(CFS) =    0.97   SPLIT VELOCITY(FEET/SEC.) =    1.88
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   3.05   Tc(MIN.) =    8.30
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.561
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    2.79      SUBAREA RUNOFF(CFS) =    9.03
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =       9.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  2.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.05
  LONGEST FLOWPATH FROM NODE    580.00 TO NODE    584.00 =     588.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    584.00 TO NODE    584.00 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.) =    8.30
  RAINFALL INTENSITY(INCH/HR) =   4.56
  TOTAL STREAM AREA(ACRES) =     2.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.42

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       11.41    10.21        3.990          3.93
      2        9.42     8.30        4.561          2.91

  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       19.41     8.30        4.561
      2       19.66    10.21        3.990

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.66   Tc(MIN.) =   10.21
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE    570.00 TO NODE    584.00 =    1113.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    584.00 TO NODE    586.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   370.50  DOWNSTREAM(FEET) =   315.00
  FLOW LENGTH(FEET) =   161.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.66
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.29
  LONGEST FLOWPATH FROM NODE    570.00 TO NODE    586.00 =    1274.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    586.00 TO NODE    586.00 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       19.66    10.29        3.969         6.84
  LONGEST FLOWPATH FROM NODE    570.00 TO NODE    586.00 =    1274.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1       51.11     9.25        4.251        19.77
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    586.00 =    1988.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      68.78       9.25        4.251
      2      67.38      10.29        3.969

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      68.78   Tc(MIN.) =    9.25
  TOTAL AREA(ACRES) =       26.6

****************************************************************************
  FLOW PROCESS FROM NODE    586.00 TO NODE    586.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    586.00 TO NODE    594.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   315.00  DOWNSTREAM(FEET) =   295.00
  FLOW LENGTH(FEET) =   186.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.11
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.78
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    9.36
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    594.00 =    2174.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    594.00 TO NODE    594.00 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.) =    9.36
  RAINFALL INTENSITY(INCH/HR) =   4.22
  TOTAL STREAM AREA(ACRES) =    26.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     68.78

****************************************************************************
  FLOW PROCESS FROM NODE    590.00 TO NODE    592.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    92.00
  UPSTREAM ELEVATION(FEET) =    382.20
  DOWNSTREAM ELEVATION(FEET) =    378.00
  ELEVATION DIFFERENCE(FEET) =      4.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.339
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    87.83
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.88
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.88

****************************************************************************
  FLOW PROCESS FROM NODE    592.00 TO NODE    594.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  378.00  DOWNSTREAM ELEVATION(FEET) =  295.00
  STREET LENGTH(FEET) =   826.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
```



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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.83
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.91
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.67
  STREET FLOW TRAVEL TIME(MIN.) =   2.33   Tc(MIN.) =    4.67
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    1.25      SUBAREA RUNOFF(CFS) =    6.88
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       7.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.17
  FLOW VELOCITY(FEET/SEC.) =  6.73   DEPTH*VELOCITY(FT*FT/SEC.) =   2.22
  LONGEST FLOWPATH FROM NODE    590.00 TO NODE    594.00 =     918.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    594.00 TO NODE    594.00 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.) =    4.67
  RAINFALL INTENSITY(INCH/HR) =   6.32
  TOTAL STREAM AREA(ACRES) =     1.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.76

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       68.78     9.36        4.219         26.61
      2        7.76     4.67        6.323          1.41

  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       42.05     4.67       6.323
      2       73.96     9.36       4.219

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      73.96   Tc(MIN.) =    9.36
  TOTAL AREA(ACRES) =       28.0
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    594.00 =    2174.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    594.00 TO NODE      1.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   295.00  DOWNSTREAM(FEET) =   294.00
```

```
  FLOW LENGTH(FEET) =    71.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.34
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      73.96
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.45
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE      1.00 =    2245.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    594.00 TO NODE      1.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.193
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6113
  SUBAREA AREA(ACRES) =    2.07   SUBAREA RUNOFF(CFS) =    3.04
  TOTAL AREA(ACRES) =       30.1   TOTAL RUNOFF(CFS) =      77.13
  TC(MIN.) =    9.45

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   294.00  DOWNSTREAM(FEET) =   285.00
  FLOW LENGTH(FEET) =    98.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.54
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      77.13
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.51
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE     27.00 =    2343.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| BEGIN OFFSITE HYD                                                        |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    66.00
  UPSTREAM ELEVATION(FEET) =    476.00
  DOWNSTREAM ELEVATION(FEET) =    460.00
  ELEVATION DIFFERENCE(FEET) =     16.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.091
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
```



```
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.250
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    372.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   336.00   CHANNEL SLOPE =  0.2619
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.35
  FLOW VELOCITY(FEET/SEC) =   4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.18   Tc(MIN.) =    6.27
  LONGEST FLOWPATH FROM NODE     23.00 TO NODE     25.00 =     402.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.464
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.46   SUBAREA RUNOFF(CFS) =    4.70
  TOTAL AREA(ACRES) =        2.6   TOTAL RUNOFF(CFS) =       5.01
  TC(MIN.) =    6.27

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   372.00  DOWNSTREAM(FEET) =   305.00
  FLOW LENGTH(FEET) =   897.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.69
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.01
  PIPE TRAVEL TIME(MIN.) =   1.18    Tc(MIN.) =    7.45
  LONGEST FLOWPATH FROM NODE     23.00 TO NODE     26.00 =    1299.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   305.00  DOWNSTREAM(FEET) =   284.00
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.72
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.01
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    7.66
```

```
 LONGEST FLOWPATH FROM NODE     23.00 TO NODE     27.00 =    1484.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 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        5.01     7.66       4.803        2.62
 LONGEST FLOWPATH FROM NODE     23.00 TO NODE     27.00 =    1484.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       77.13     9.51       4.176       30.09
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE     27.00 =    2343.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      67.12       7.66        4.803
     2      81.49       9.51        4.176

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      81.49   Tc(MIN.) =    9.51
 TOTAL AREA(ACRES) =       32.7

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   283.90  DOWNSTREAM(FEET) =   264.00
 FLOW LENGTH(FEET) =   343.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  23.49
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      81.49
 PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    9.75
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE     28.00 =    2686.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 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.) =    9.75
 RAINFALL INTENSITY(INCH/HR) =   4.11
 TOTAL STREAM AREA(ACRES) =    32.71
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     81.49
```



```
****************************************************************************
 FLOW PROCESS FROM NODE    600.00 TO NODE    602.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    296.00
 DOWNSTREAM ELEVATION(FEET) =    285.00
 ELEVATION DIFFERENCE(FEET) =     11.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.664
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.66
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.66

****************************************************************************
 FLOW PROCESS FROM NODE    602.00 TO NODE     28.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  285.00  DOWNSTREAM ELEVATION(FEET) =  262.00
 STREET LENGTH(FEET) =   386.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.26
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.52
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.16
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
 STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =    3.21
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.58      SUBAREA RUNOFF(CFS) =    3.19
 TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.85

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.39
 FLOW VELOCITY(FEET/SEC.) =  4.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE     28.00 =     461.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 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.) = 3.21
RAINFALL INTENSITY(INCH/HR) = 6.32
TOTAL STREAM AREA(ACRES) = 0.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.85

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	81.49	9.75	4.109	32.71
2	3.85	3.21	6.323	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	30.68	3.21	6.323
2	83.99	9.75	4.109

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 83.99 Tc(MIN.) = 9.75
TOTAL AREA(ACRES) = 33.4
LONGEST FLOWPATH FROM NODE 501.00 TO NODE 28.00 = 2686.00 FEET.

****

FLOW PROCESS FROM NODE 28.00 TO NODE 28.00 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	83.99	9.75	4.109	33.41

LONGEST FLOWPATH FROM NODE 501.00 TO NODE 28.00 = 2686.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	91.67	19.51	2.628	63.88

LONGEST FLOWPATH FROM NODE 110.00 TO NODE 28.00 = 4412.60 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	129.82	9.75	4.109
2	145.38	19.51	2.628

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 145.38 Tc(MIN.) = 19.51
TOTAL AREA(ACRES) = 97.3

****

FLOW PROCESS FROM NODE 28.00 TO NODE 28.00 IS CODE = 12

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

****

FLOW PROCESS FROM NODE 28.00 TO NODE 126.00 IS CODE = 52

>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 248.00 DOWNSTREAM(FEET) = 232.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 249.00 CHANNEL SLOPE = 0.0643
CHANNEL FLOW THRU SUBAREA(CFS) = 145.38
FLOW VELOCITY(FEET/SEC) = 13.48 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 19.82
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 4661.60 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.) = 19.82
RAINFALL INTENSITY(INCH/HR) = 2.60
TOTAL STREAM AREA(ACRES) = 97.29
PEAK FLOW RATE(CFS) AT CONFLUENCE = 145.38

****

FLOW PROCESS FROM NODE 30.00 TO NODE 32.00 IS CODE = 21

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

NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) = 88
INITIAL SUBAREA FLOW-LENGTH(FEET) = 123.00
UPSTREAM ELEVATION(FEET) = 452.00
DOWNSTREAM ELEVATION(FEET) = 420.00
ELEVATION DIFFERENCE(FEET) = 32.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) = 6.267
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
THE MAXIMUM OVERLAND FLOW LENGTH = 100.00
(Reference: Table 3-1B of Hydrology Manual)
THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.466
SUBAREA RUNOFF(CFS) = 0.63
TOTAL AREA(ACRES) = 0.33 TOTAL RUNOFF(CFS) = 0.63

****

FLOW PROCESS FROM NODE 32.00 TO NODE 34.00 IS CODE = 52

>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 418.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 391.00 CHANNEL SLOPE = 0.0051
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
CHANNEL FLOW THRU SUBAREA(CFS) = 0.63
FLOW VELOCITY(FEET/SEC) = 1.07 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) = 6.07 Tc(MIN.) = 12.34
LONGEST FLOWPATH FROM NODE 30.00 TO NODE 34.00 = 514.00 FEET.

****

FLOW PROCESS FROM NODE 32.00 TO NODE 34.00 IS CODE = 81

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.531
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6300
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5973
  SUBAREA AREA(ACRES) =    2.50   SUBAREA RUNOFF(CFS) =    5.56
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =       5.97
  TC(MIN.) =   12.34

********************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE    126.00 IS CODE =  52
--------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    418.00  DOWNSTREAM(FEET) =    232.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1437.70   CHANNEL SLOPE =  0.1294
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       5.97
  FLOW VELOCITY(FEET/SEC) =   6.96 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.44   Tc(MIN.) =   15.78
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE    126.00 =    1951.70 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE    126.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.012
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3846
  SUBAREA AREA(ACRES) =   17.40   SUBAREA RUNOFF(CFS) =   18.35
  TOTAL AREA(ACRES) =       20.2   TOTAL RUNOFF(CFS) =      23.44
  TC(MIN.) =   15.78

********************************************************************************
  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.) =   15.78
  RAINFALL INTENSITY(INCH/HR) =   3.01
  TOTAL STREAM AREA(ACRES) =    20.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     23.44

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      145.38    19.82        2.601         97.29
      2       23.44    15.78        3.012         20.23

  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      139.23    15.78        3.012
      2      165.62    19.82        2.601

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     165.62   Tc(MIN.) =   19.82
  TOTAL AREA(ACRES) =      117.5
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    126.00 =    4661.60 FEET.

+----------------------------------------------------------------------------+
| EDN PROPOSED CONDITION HYD                                                 |
| SUNBOW PA-23                                                               |
|                                                                            |
+----------------------------------------------------------------------------+
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      117.5  TC(MIN.) =     19.82
  PEAK FLOW RATE(CFS)   =     165.62
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

PROPOSED CONDITION (ATTENUATED)

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2015 Advanced Engineering Software (aes)
              Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                            Analysis prepared by:




------------------------------------------------------------------------
  FILE NAME: R:\1561\HYD\DR\CALCS\TM\AES\PRATT.DAT
  TIME/DATE OF STUDY: 12:36 06/19/2020
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  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-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   12.0      6.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.33    1.50 0.0313 0.125 0.0130

  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.*

+-------------------------------------------------------------------------+
| APPLY THE ATTENUATED FLOW DATA AS BASIN INFLOW                          |
|                                                                         |
|                                                                         |
+-------------------------------------------------------------------------+

************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    102.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    88.00
  UPSTREAM ELEVATION(FEET) =    474.00
  DOWNSTREAM ELEVATION(FEET) =    460.00
  ELEVATION DIFFERENCE(FEET) =     14.00
```



```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.879
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.696
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.40

************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    104.00 IS CODE =  52
------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    438.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   317.00   CHANNEL SLOPE =  0.0694
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.40
  FLOW VELOCITY(FEET/SEC) =   3.95 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.34   Tc(MIN.) =    7.22
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     405.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    104.00 IS CODE =  81
------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.991
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    1.73   SUBAREA RUNOFF(CFS) =    3.02
  TOTAL AREA(ACRES) =        1.9   TOTAL RUNOFF(CFS) =       3.37
  TC(MIN.) =    7.22

************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    128.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.00  DOWNSTREAM(FEET) =   403.20
  FLOW LENGTH(FEET) =   594.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.37
  PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =    8.17
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    128.00 =     999.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  10
------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
========================================================================

************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    112.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   342.00
  UPSTREAM ELEVATION(FEET) =    464.00
  DOWNSTREAM ELEVATION(FEET) =    434.00
  ELEVATION DIFFERENCE(FEET) =     30.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.546
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.315
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    114.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.00  DOWNSTREAM(FEET) =   408.60
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   0.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.54
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.35
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    6.64
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    114.00 =     402.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 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.) =    6.64
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    114.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  UPSTREAM ELEVATION(FEET) =    440.00
  DOWNSTREAM ELEVATION(FEET) =    412.00
  ELEVATION DIFFERENCE(FEET) =     28.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
  SUBAREA RUNOFF(CFS) =      0.42
  TOTAL AREA(ACRES) =      0.22   TOTAL RUNOFF(CFS) =      0.42
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 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.) =    6.27
  RAINFALL INTENSITY(INCH/HR) =   5.47
  TOTAL STREAM AREA(ACRES) =     0.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.42

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.35     6.64        5.265          0.19
      2        0.42     6.27        5.466          0.22

  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        0.75     6.27       5.466
      2        0.76     6.64       5.265

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       0.76   Tc(MIN.) =    6.64
  TOTAL AREA(ACRES) =        0.4
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    114.00 =     402.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 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) =   408.00  DOWNSTREAM(FEET) =   402.70
  FLOW LENGTH(FEET) =   650.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.76
  PIPE TRAVEL TIME(MIN.) =   3.25    Tc(MIN.) =    9.89
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    124.00 =    1052.00 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.) =    9.89
  RAINFALL INTENSITY(INCH/HR) =   4.07
  TOTAL STREAM AREA(ACRES) =     0.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.76

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    122.00 IS CODE =  21
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    460.00
  DOWNSTREAM ELEVATION(FEET) =    420.00
  ELEVATION DIFFERENCE(FEET) =     40.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    124.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  408.60  DOWNSTREAM ELEVATION(FEET) =  402.70
  STREET LENGTH(FEET) =   788.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.15
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.37   FLOOD WIDTH(FEET) =   12.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.01
    SPLIT DEPTH(FEET) =    0.27   SPLIT FLOOD WIDTH(FEET) =    7.27
    SPLIT FLOW(CFS) =    1.01   SPLIT VELOCITY(FEET/SEC.) =    1.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.01
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.74
  STREET FLOW TRAVEL TIME(MIN.) =   6.52   Tc(MIN.) =   12.79
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.451
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.695
  SUBAREA AREA(ACRES) =    3.17      SUBAREA RUNOFF(CFS) =    7.77
  TOTAL AREA(ACRES) =        3.3        PEAK FLOW RATE(CFS) =       7.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  2.20   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =     888.00 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.) =   12.79
  RAINFALL INTENSITY(INCH/HR) =   3.45
  TOTAL STREAM AREA(ACRES) =     3.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.94

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.76     9.89        4.072          0.41
      2        7.94    12.79        3.451          3.31

  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        6.90     9.89       4.072
      2        8.58    12.79       3.451

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.58   Tc(MIN.) =   12.79
  TOTAL AREA(ACRES) =        3.7
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    124.00 =    1052.00 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) =   402.70  DOWNSTREAM(FEET) =   402.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.58
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   12.92
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    127.00 =    1112.00 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.) =   12.92
  RAINFALL INTENSITY(INCH/HR) =   3.43
  TOTAL STREAM AREA(ACRES) =     3.72
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.58

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    123.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
```

```
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   143.00
 UPSTREAM ELEVATION(FEET) =    474.00
 DOWNSTREAM ELEVATION(FEET) =    460.00
 ELEVATION DIFFERENCE(FEET) =     14.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.311
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.441
 SUBAREA RUNOFF(CFS) =      0.34
 TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
 FLOW PROCESS FROM NODE    123.00 TO NODE    125.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    440.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   229.00   CHANNEL SLOPE =  0.0873
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.34
 FLOW VELOCITY(FEET/SEC) =   4.43 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   0.86   Tc(MIN.) =    7.17
 LONGEST FLOWPATH FROM NODE    121.00 TO NODE    125.00 =     372.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    123.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.011
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    1.39   SUBAREA RUNOFF(CFS) =    2.44
 TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       2.75
 TC(MIN.) =    7.17

****************************************************************************
 FLOW PROCESS FROM NODE    125.00 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) =   408.00  DOWNSTREAM(FEET) =   402.00
 FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.76
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.75
 PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =    7.89
 LONGEST FLOWPATH FROM NODE    121.00 TO NODE    127.00 =     662.00 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.) =    7.89
 RAINFALL INTENSITY(INCH/HR) =   4.71
 TOTAL STREAM AREA(ACRES) =     1.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.75

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        8.58    12.92        3.428          3.72
     2        2.75     7.89        4.713          1.57

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        8.99     7.89       4.713
     2       10.58    12.92       3.428

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      10.58   Tc(MIN.) =   12.92
 TOTAL AREA(ACRES) =        5.3
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    127.00 =    1112.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   404.00  DOWNSTREAM(FEET) =   403.20
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.14
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.58
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   13.11
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    128.00 =    1192.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 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       10.58    13.11       3.396        5.29
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    128.00 =    1192.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        3.37     8.17       4.607        1.93
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    128.00 =     999.00 FEET.

 ** PEAK FLOW RATE TABLE **
```

```
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       9.97       8.17        4.607
      2      13.07      13.11        3.396

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.07   Tc(MIN.) =   13.11
  TOTAL AREA(ACRES) =        7.2

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 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) =   403.20  DOWNSTREAM(FEET) =   402.45
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.87
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.07
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   13.15
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    134.00 =    1222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    134.00 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.) =   13.15
  RAINFALL INTENSITY(INCH/HR) =   3.39
  TOTAL STREAM AREA(ACRES) =     7.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.07

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    132.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   101.00
  UPSTREAM ELEVATION(FEET) =    450.00
  DOWNSTREAM ELEVATION(FEET) =    417.00
  ELEVATION DIFFERENCE(FEET) =     33.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
  SUBAREA RUNOFF(CFS) =      0.23
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.23
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    134.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  417.00  DOWNSTREAM ELEVATION(FEET) =  402.45
  STREET LENGTH(FEET) =   673.30   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  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) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.08
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.01
  STREET FLOW TRAVEL TIME(MIN.) =   3.65   Tc(MIN.) =    9.91
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.067
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.589
  SUBAREA AREA(ACRES) =    2.70      SUBAREA RUNOFF(CFS) =    6.59
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       6.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  3.42   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    134.00 =     774.30 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.) =    9.91
  RAINFALL INTENSITY(INCH/HR) =   4.07
  TOTAL STREAM AREA(ACRES) =     2.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.76

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       13.07    13.15        3.388          7.22
      2        6.76     9.91        4.067          2.82

  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       16.61     9.91       4.067
      2       18.70    13.15       3.388

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.70   Tc(MIN.) =   13.15
  TOTAL AREA(ACRES) =       10.0
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    134.00 =    1222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    146.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   402.45  DOWNSTREAM(FEET) =   392.90
  FLOW LENGTH(FEET) =   352.60   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.30
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.70
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   13.63
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    146.00 =    1574.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    146.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================


****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    142.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   106.00
  UPSTREAM ELEVATION(FEET) =    435.00
  DOWNSTREAM ELEVATION(FEET) =    415.00
  ELEVATION DIFFERENCE(FEET) =     20.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.178
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.46
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    144.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  415.60  DOWNSTREAM ELEVATION(FEET) =  398.00
  STREET LENGTH(FEET) =   643.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
```



```
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =    7.24
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.978
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    2.40      SUBAREA RUNOFF(CFS) =    7.17
  TOTAL AREA(ACRES) =        2.5        PEAK FLOW RATE(CFS) =       7.53

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE    140.00 TO NODE    144.00 =     749.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    145.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   398.00  DOWNSTREAM(FEET) =   393.00
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.82
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.53
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    7.56
  LONGEST FLOWPATH FROM NODE    140.00 TO NODE    145.00 =     934.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    145.00 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.) =    7.56
  RAINFALL INTENSITY(INCH/HR) =   4.84
  TOTAL STREAM AREA(ACRES) =     2.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.53

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    143.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   150.00
  UPSTREAM ELEVATION(FEET) =    407.00
  DOWNSTREAM ELEVATION(FEET) =    406.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.640
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    55.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.810
  SUBAREA RUNOFF(CFS) =      0.52
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    145.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  406.00  DOWNSTREAM ELEVATION(FEET) =  393.00
  STREET LENGTH(FEET) =   478.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.92
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
  STREET FLOW TRAVEL TIME(MIN.) =   2.57   Tc(MIN.) =   10.21
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.990
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    1.49      SUBAREA RUNOFF(CFS) =    3.57
  TOTAL AREA(ACRES) =        1.7        PEAK FLOW RATE(CFS) =       4.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.17
  FLOW VELOCITY(FEET/SEC.) =  3.47   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    145.00 =     628.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    145.00 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.) =   10.21
  RAINFALL INTENSITY(INCH/HR) =   3.99
```



```
  TOTAL STREAM AREA(ACRES) =     1.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.00

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.53     7.56        4.844          2.52
      2        4.00    10.21        3.990          1.67

  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       10.49     7.56       4.844
      2       10.20    10.21       3.990

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.49   Tc(MIN.) =    7.56
  TOTAL AREA(ACRES) =        4.2
  LONGEST FLOWPATH FROM NODE    140.00 TO NODE    145.00 =     934.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    146.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.00  DOWNSTREAM(FEET) =   393.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.90
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.49
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.63
  LONGEST FLOWPATH FROM NODE    140.00 TO NODE    146.00 =     979.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    146.00 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       10.49     7.63       4.813        4.19
  LONGEST FLOWPATH FROM NODE    140.00 TO NODE    146.00 =     979.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       18.70    13.63       3.311       10.04
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    146.00 =    1574.60 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      20.96       7.63        4.813
      2      25.91      13.63        3.311

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      25.91   Tc(MIN.) =   13.63
  TOTAL AREA(ACRES) =       14.2

****************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    146.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    146.00 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) =   392.90  DOWNSTREAM(FEET) =   391.00
  FLOW LENGTH(FEET) =    84.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.44
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.91
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   13.74
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    154.00 =    1658.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 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.) =   13.74
  RAINFALL INTENSITY(INCH/HR) =   3.29
  TOTAL STREAM AREA(ACRES) =    14.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.91

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    152.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   140.00
  UPSTREAM ELEVATION(FEET) =    401.00
  DOWNSTREAM ELEVATION(FEET) =    400.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.563
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    56.43
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.842
  SUBAREA RUNOFF(CFS) =      0.52
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    154.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
```



```
  UPSTREAM ELEVATION(FEET) =  400.00  DOWNSTREAM ELEVATION(FEET) =  391.00
  STREET LENGTH(FEET) =   358.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.28
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.99
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =    9.56
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.164
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    1.40      SUBAREA RUNOFF(CFS) =    3.50
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       3.95

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.27
  FLOW VELOCITY(FEET/SEC.) =  3.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    154.00 =     498.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 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.) =    9.56
  RAINFALL INTENSITY(INCH/HR) =   4.16
  TOTAL STREAM AREA(ACRES) =     1.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.95

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    153.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   140.00
  UPSTREAM ELEVATION(FEET) =    401.00
  DOWNSTREAM ELEVATION(FEET) =    400.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.563
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    56.43
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.842
```

```
  SUBAREA RUNOFF(CFS) =      0.52
  TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  400.00  DOWNSTREAM ELEVATION(FEET) =  391.40
  STREET LENGTH(FEET) =   358.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    5.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   2.32   Tc(MIN.) =    9.88
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.076
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    1.39
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       1.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.36
  FLOW VELOCITY(FEET/SEC.) =  2.78   DEPTH*VELOCITY(FT*FT/SEC.) =   0.76
  LONGEST FLOWPATH FROM NODE    151.00 TO NODE    154.00 =     498.00 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 =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.88
  RAINFALL INTENSITY(INCH/HR) =   4.08
  TOTAL STREAM AREA(ACRES) =     0.75
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.83

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       25.91    13.74        3.294         14.23
      2        3.95     9.56        4.164          1.58
      3        1.83     9.88        4.076          0.75

  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       23.74     9.56        4.164
      2       24.32     9.88        4.076
      3       30.52    13.74        3.294

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.52   Tc(MIN.) =   13.74
  TOTAL AREA(ACRES) =       16.6
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    154.00 =    1658.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    169.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   391.40  DOWNSTREAM(FEET) =   390.10
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.32
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.52
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   13.77
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    169.00 =    1688.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    169.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    162.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   108.00
  UPSTREAM ELEVATION(FEET) =    396.00
  DOWNSTREAM ELEVATION(FEET) =    395.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.707
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    62.78
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.807
  SUBAREA RUNOFF(CFS) =      0.54
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.54

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    164.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  396.00  DOWNSTREAM ELEVATION(FEET) =  392.30
```

```
  STREET LENGTH(FEET) =   340.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.36
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   2.53   Tc(MIN.) =    8.24
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.583
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    4.23
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       4.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  2.43   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
  LONGEST FLOWPATH FROM NODE    160.00 TO NODE    164.00 =     448.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 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) =   392.30  DOWNSTREAM(FEET) =   390.00
  FLOW LENGTH(FEET) =   233.00   MANNING'S N =  0.012
  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.) =   5.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.65
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =    8.89
  LONGEST FLOWPATH FROM NODE    160.00 TO NODE    168.00 =     681.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    168.00 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.) =    8.89
  RAINFALL INTENSITY(INCH/HR) =   4.36
  TOTAL STREAM AREA(ACRES) =     1.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.65

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    163.00 IS CODE =  21
----------------------------------------------------------------------------
```



```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   118.00
  UPSTREAM ELEVATION(FEET) =    396.00
  DOWNSTREAM ELEVATION(FEET) =    395.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.766
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.42
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.768
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    168.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  395.00  DOWNSTREAM ELEVATION(FEET) =  390.00
  STREET LENGTH(FEET) =   580.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.50
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.37   FLOOD WIDTH(FEET) =   12.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.16
    SPLIT DEPTH(FEET) =    0.16   SPLIT FLOOD WIDTH(FEET) =    1.54
    SPLIT FLOW(CFS) =    0.13   SPLIT VELOCITY(FEET/SEC.) =    0.94
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.16
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
  STREET FLOW TRAVEL TIME(MIN.) =   4.47   Tc(MIN.) =   10.24
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.983
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    5.94
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       6.31

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  2.16   DEPTH*VELOCITY(FT*FT/SEC.) =   0.79
  LONGEST FLOWPATH FROM NODE    161.00 TO NODE    168.00 =     698.00 FEET.

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

```
 FLOW PROCESS FROM NODE    168.00 TO NODE    168.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.24
 RAINFALL INTENSITY(INCH/HR) =   3.98
 TOTAL STREAM AREA(ACRES) =     2.23
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.31

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    167.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   121.00
 UPSTREAM ELEVATION(FEET) =    394.20
 DOWNSTREAM ELEVATION(FEET) =    392.80
 ELEVATION DIFFERENCE(FEET) =      1.40
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.456
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    66.57
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.977
 SUBAREA RUNOFF(CFS) =      0.64
 TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.64

****************************************************************************
 FLOW PROCESS FROM NODE    167.00 TO NODE    168.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  392.80  DOWNSTREAM ELEVATION(FEET) =  390.00
 STREET LENGTH(FEET) =   284.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.58
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.39
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.92
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.56
 STREET FLOW TRAVEL TIME(MIN.) =   2.47   Tc(MIN.) =    7.92
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.699
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
```



```
 SUBAREA AREA(ACRES) =    0.56      SUBAREA RUNOFF(CFS) =    1.87
 TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.37

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.08
 FLOW VELOCITY(FEET/SEC.) =  2.09   DEPTH*VELOCITY(FT*FT/SEC.) =   0.68
 LONGEST FLOWPATH FROM NODE    165.00 TO NODE    168.00 =     405.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    168.00 TO NODE    169.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   391.00  DOWNSTREAM(FEET) =   390.50
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.012
 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.) =   4.99
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.37
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    8.09
 LONGEST FLOWPATH FROM NODE    165.00 TO NODE    169.00 =     455.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    169.00 TO NODE    169.00 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.) =    8.09
 RAINFALL INTENSITY(INCH/HR) =   4.64
 TOTAL STREAM AREA(ACRES) =     0.71
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.37

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        4.65     8.89        4.364          1.43
     2        6.31    10.24        3.983          2.23
     3        2.37     8.09        4.636          0.71

 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       11.59     8.09       4.636
     2       12.36     8.89       4.364
     3       12.59    10.24       3.983

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      12.59   Tc(MIN.) =   10.24
 TOTAL AREA(ACRES) =        4.4
 LONGEST FLOWPATH FROM NODE    161.00 TO NODE    169.00 =     698.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    169.00 TO NODE    169.00 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       12.59    10.24       3.983        4.37
  LONGEST FLOWPATH FROM NODE    161.00 TO NODE    169.00 =     698.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       30.52    13.77       3.289       16.56
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    169.00 =    1688.60 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      35.27      10.24       3.983
      2      40.91      13.77       3.289

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.91   Tc(MIN.) =   13.77
  TOTAL AREA(ACRES) =       20.9

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    169.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    198.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   390.10  DOWNSTREAM(FEET) =   388.90
  FLOW LENGTH(FEET) =   113.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.30
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.91
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   13.96
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    198.00 =    1801.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    172.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   120.00
  UPSTREAM ELEVATION(FEET) =    440.00
  DOWNSTREAM ELEVATION(FEET) =    410.00
  ELEVATION DIFFERENCE(FEET) =     30.00
```



```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    176.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  408.00  DOWNSTREAM ELEVATION(FEET) =  388.50
  STREET LENGTH(FEET) =   671.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.55
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   3.63   Tc(MIN.) =    9.90
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.070
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.667
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    3.64
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.89
  FLOW VELOCITY(FEET/SEC.) =  3.54   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    176.00 =     791.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 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.) =    9.90
  RAINFALL INTENSITY(INCH/HR) =   4.07
  TOTAL STREAM AREA(ACRES) =     1.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.88

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    173.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    394.50
  DOWNSTREAM ELEVATION(FEET) =    394.00
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.778
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.760
  SUBAREA RUNOFF(CFS) =      0.29
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.29

******************************************************************************
  FLOW PROCESS FROM NODE    173.00 TO NODE    176.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  394.00  DOWNSTREAM ELEVATION(FEET) =  388.50
  STREET LENGTH(FEET) =   460.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.84
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.67
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   3.63   Tc(MIN.) =    9.41
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.206
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    3.05
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       3.25

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.02
  FLOW VELOCITY(FEET/SEC.) =  2.44   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE    171.00 TO NODE    176.00 =     520.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 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.) =    9.41
  RAINFALL INTENSITY(INCH/HR) =   4.21
```



```
  TOTAL STREAM AREA(ACRES) =     1.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.25

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.88     9.90        4.070          1.43
      2        3.25     9.41        4.206          1.09

  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        6.95     9.41       4.206
      2        7.03     9.90       4.070

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.03   Tc(MIN.) =    9.90
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    176.00 =     791.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    198.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   388.50  DOWNSTREAM(FEET) =   388.25
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.64
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.03
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.96
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    198.00 =     816.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =  11
------------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.03     9.96       4.054        2.52
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    198.00 =     816.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       40.91    13.96       3.261       20.93
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    198.00 =    1801.60 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      36.23       9.96        4.054
      2      46.57      13.96        3.261

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      46.57   Tc(MIN.) =   13.96
  TOTAL AREA(ACRES) =       23.5

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    182.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    409.50
  DOWNSTREAM ELEVATION(FEET) =    408.50
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.354
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    67.50
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.050
  SUBAREA RUNOFF(CFS) =      0.52
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    184.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  406.00  DOWNSTREAM ELEVATION(FEET) =  394.40
  STREET LENGTH(FEET) =   529.30   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
  STREET FLOW TRAVEL TIME(MIN.) =   2.65   Tc(MIN.) =    8.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.668
```



```
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7900
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  94
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.786
  SUBAREA AREA(ACRES) =    2.15      SUBAREA RUNOFF(CFS) =    7.93
  TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       8.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  3.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    184.00 =     609.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    196.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   394.50  DOWNSTREAM(FEET) =   390.50
  FLOW LENGTH(FEET) =   421.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.33
  PIPE TRAVEL TIME(MIN.) =   1.04    Tc(MIN.) =    9.04
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    196.00 =    1030.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    196.00 TO NODE    196.00 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.) =    9.04
  RAINFALL INTENSITY(INCH/HR) =   4.31
  TOTAL STREAM AREA(ACRES) =     2.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.33

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    192.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    96.00
  UPSTREAM ELEVATION(FEET) =    404.00
  DOWNSTREAM ELEVATION(FEET) =    403.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.601
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    65.42
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.877
  SUBAREA RUNOFF(CFS) =      0.42
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.42

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    194.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
 UPSTREAM ELEVATION(FEET) =  403.00  DOWNSTREAM ELEVATION(FEET) =  395.30
 STREET LENGTH(FEET) =   704.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.75
   ***STREET FLOW SPLITS OVER STREET-CROWN***
   FULL DEPTH(FEET) =    0.37   FLOOD WIDTH(FEET) =   12.00
   FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.43
   SPLIT DEPTH(FEET) =    0.34   SPLIT FLOOD WIDTH(FEET) =   10.83
   SPLIT FLOW(CFS) =    2.96   SPLIT VELOCITY(FEET/SEC.) =    2.29
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   12.00
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.43
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
 STREET FLOW TRAVEL TIME(MIN.) =   4.82   Tc(MIN.) =   10.42
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.938
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
 SUBAREA AREA(ACRES) =    4.41      SUBAREA RUNOFF(CFS) =   12.33
 TOTAL AREA(ACRES) =        4.5        PEAK FLOW RATE(CFS) =      12.61

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  12.00
 FLOW VELOCITY(FEET/SEC.) =  2.97   DEPTH*VELOCITY(FT*FT/SEC.) =   1.23
 LONGEST FLOWPATH FROM NODE    190.00 TO NODE    194.00 =     800.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    194.00 TO NODE    196.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   395.30  DOWNSTREAM(FEET) =   390.00
 FLOW LENGTH(FEET) =    42.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.83
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.61
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.46
 LONGEST FLOWPATH FROM NODE    190.00 TO NODE    196.00 =     842.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    196.00 TO NODE    196.00 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.) =   10.46
 RAINFALL INTENSITY(INCH/HR) =   3.93
 TOTAL STREAM AREA(ACRES) =     4.51
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.61

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        8.33     9.04        4.314          2.27
     2       12.61    10.46        3.929          4.51

 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       19.24     9.04        4.314
     2       20.19    10.46        3.929

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      20.19   Tc(MIN.) =   10.46
 TOTAL AREA(ACRES) =        6.8
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    196.00 =    1030.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    196.00 TO NODE    198.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   390.00  DOWNSTREAM(FEET) =   388.90
 FLOW LENGTH(FEET) =   115.30   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.36
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      20.19
 PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   10.69
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    198.00 =    1145.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 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       20.19    10.69       3.875        6.78
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    198.00 =    1145.60 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
     1       46.57    13.96       3.261       23.45
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    198.00 =    1801.60 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
```

```
     1      55.85      10.69        3.875
     2      63.57      13.96        3.261

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.57   Tc(MIN.) =   13.96
  TOTAL AREA(ACRES) =       30.2

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 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) =   388.90  DOWNSTREAM(FEET) =   379.20
  FLOW LENGTH(FEET) =   262.50   MANNING'S N =  0.012
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.67
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      63.57
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   14.19
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    204.00 =    2064.10 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.) =   14.19
  RAINFALL INTENSITY(INCH/HR) =   3.23
  TOTAL STREAM AREA(ACRES) =    30.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     63.57

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    392.80
  DOWNSTREAM ELEVATION(FEET) =    391.80
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.511
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    66.11
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.939
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  62
```



```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  391.80  DOWNSTREAM ELEVATION(FEET) =  379.20
  STREET LENGTH(FEET) =   481.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   2.96   Tc(MIN.) =    8.48
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.499
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    0.69      SUBAREA RUNOFF(CFS) =    2.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.11
  FLOW VELOCITY(FEET/SEC.) =  3.09   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     571.00 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.) =    8.48
  RAINFALL INTENSITY(INCH/HR) =   4.50
  TOTAL STREAM AREA(ACRES) =     0.75
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.40

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       63.57    14.19        3.226         30.23
      2        2.40     8.48        4.499          0.75

  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       40.36     8.48       4.499
```

```
     2       65.29    14.19       3.226

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      65.29   Tc(MIN.) =   14.19
  TOTAL AREA(ACRES) =       31.0
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    204.00 =    2064.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE      2.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   375.00  DOWNSTREAM(FEET) =   374.00
  FLOW LENGTH(FEET) =    51.50   MANNING'S N =  0.012
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.67
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      65.29
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   14.25
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE      2.00 =    2115.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE      2.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.218
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6174
  SUBAREA AREA(ACRES) =    1.74   SUBAREA RUNOFF(CFS) =    1.96
  TOTAL AREA(ACRES) =       32.7   TOTAL RUNOFF(CFS) =      65.29
  TC(MIN.) =   14.25
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    212.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   138.00
  UPSTREAM ELEVATION(FEET) =    392.60
  DOWNSTREAM ELEVATION(FEET) =    390.00
  ELEVATION DIFFERENCE(FEET) =      2.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.884
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    73.84
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.49
```



```
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.49

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    214.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  390.00  DOWNSTREAM ELEVATION(FEET) =  384.20
  STREET LENGTH(FEET) =   474.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.32
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.37   FLOOD WIDTH(FEET) =   12.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.58
    SPLIT DEPTH(FEET) =    0.27   SPLIT FLOOD WIDTH(FEET) =    7.36
    SPLIT FLOW(CFS) =    1.31   SPLIT VELOCITY(FEET/SEC.) =    1.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =    7.95
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.688
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    9.65
  TOTAL AREA(ACRES) =        3.0        PEAK FLOW RATE(CFS) =      10.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.00
  FLOW VELOCITY(FEET/SEC.) =  2.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.08
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =     612.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    224.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   384.20  DOWNSTREAM(FEET) =   379.20
  FLOW LENGTH(FEET) =   526.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.02
  PIPE TRAVEL TIME(MIN.) =   1.26    Tc(MIN.) =    9.21
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    224.00 =    1138.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    224.00 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.) =    9.21
  RAINFALL INTENSITY(INCH/HR) =   4.26
  TOTAL STREAM AREA(ACRES) =     3.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.02

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    222.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    92.00
  UPSTREAM ELEVATION(FEET) =    396.70
  DOWNSTREAM ELEVATION(FEET) =    396.00
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.847
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    57.83
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.716
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    224.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  396.00  DOWNSTREAM ELEVATION(FEET) =  390.60
  STREET LENGTH(FEET) =   458.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.18
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   3.50   Tc(MIN.) =    9.34
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.225
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    3.54
```



```
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.77
  FLOW VELOCITY(FEET/SEC.) =  2.52   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    224.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    224.00 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.) =    9.34
  RAINFALL INTENSITY(INCH/HR) =   4.22
  TOTAL STREAM AREA(ACRES) =     1.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.78

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.02     9.21        4.263          3.01
      2        3.78     9.34        4.225          1.26

  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       13.75     9.21       4.263
      2       13.71     9.34       4.225

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.75   Tc(MIN.) =    9.21
  TOTAL AREA(ACRES) =        4.3
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    224.00 =    1138.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE      2.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   375.40  DOWNSTREAM(FEET) =   374.00
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.76
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.75
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    9.52
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE      2.00 =    1278.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 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       13.75     9.52       4.175        4.27
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE      2.00 =    1278.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       65.29    14.25       3.218       32.72
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE      2.00 =    2115.60 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      57.34       9.52       4.175
      2      75.88      14.25       3.218

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      75.88   Tc(MIN.) =   14.25
  TOTAL AREA(ACRES) =       37.0

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| APPLY THE ATTENUATED FLOW DATA AS BASIN INFLOW                           |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  59.25   RAIN INTENSITY(INCH/HOUR) =  1.28
  TOTAL AREA(ACRES) =    37.00   TOTAL RUNOFF(CFS) =      5.80

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   374.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =   503.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.99
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.80
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   59.77
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE     10.00 =    2618.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 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.) =   59.77
  RAINFALL INTENSITY(INCH/HR) =   1.28
  TOTAL STREAM AREA(ACRES) =    37.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.80

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    232.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    379.20
  DOWNSTREAM ELEVATION(FEET) =    374.00
  ELEVATION DIFFERENCE(FEET) =      5.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.272
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    90.40
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.61
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.61

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE     10.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  374.00  DOWNSTREAM ELEVATION(FEET) =  320.00
  STREET LENGTH(FEET) =   480.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.89
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.37
  STREET FLOW TRAVEL TIME(MIN.) =   1.43   Tc(MIN.) =    3.70
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.73      SUBAREA RUNOFF(CFS) =    4.02
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.62
```

```
 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.92
 FLOW VELOCITY(FEET/SEC.) =  6.20   DEPTH*VELOCITY(FT*FT/SEC.) =   1.76
 LONGEST FLOWPATH FROM NODE    230.00 TO NODE     10.00 =     580.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 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.) =    3.70
 RAINFALL INTENSITY(INCH/HR) =   6.32
 TOTAL STREAM AREA(ACRES) =     0.84
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.62

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        5.80    59.77        1.276         37.00
     2        4.62     3.70        6.323          0.84

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        4.98     3.70       6.323
     2        6.73    59.77       1.276

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.73   Tc(MIN.) =   59.77
 TOTAL AREA(ACRES) =       37.8
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE     10.00 =    2618.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   320.00  DOWNSTREAM(FEET) =   276.20
 FLOW LENGTH(FEET) =   535.00   MANNING'S N =  0.012
 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.) =  14.25
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.73
 PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   60.40
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE     14.00 =    3153.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 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.) =   60.40
 RAINFALL INTENSITY(INCH/HR) =   1.27
```



```
 TOTAL STREAM AREA(ACRES) =    37.84
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.73

****************************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    233.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    323.00
 DOWNSTREAM ELEVATION(FEET) =    315.00
 ELEVATION DIFFERENCE(FEET) =      8.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.489
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.55
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.55

****************************************************************************
 FLOW PROCESS FROM NODE    233.00 TO NODE     14.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  315.00  DOWNSTREAM ELEVATION(FEET) =  274.00
 STREET LENGTH(FEET) =   449.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.48
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.05
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.12
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.26
 STREET FLOW TRAVEL TIME(MIN.) =   1.46   Tc(MIN.) =    2.95
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    3.85
 TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.40

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.11
 FLOW VELOCITY(FEET/SEC.) =  5.67   DEPTH*VELOCITY(FT*FT/SEC.) =   1.64
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE     14.00 =     509.00 FEET.

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

```
 FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 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.) =    2.95
 RAINFALL INTENSITY(INCH/HR) =   6.32
 TOTAL STREAM AREA(ACRES) =     0.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.40

+--------------------------------------------------------------------------+
| APPLY THE ATTENUATED FLOW DATA AS BASIN INFLOW                           |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   134.00
 UPSTREAM ELEVATION(FEET) =    400.00
 DOWNSTREAM ELEVATION(FEET) =    350.00
 ELEVATION DIFFERENCE(FEET) =     50.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    350.00  DOWNSTREAM(FEET) =    260.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1386.00   CHANNEL SLOPE =  0.0649
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.38
 FLOW VELOCITY(FEET/SEC) =   3.82 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   6.04   Tc(MIN.) =   12.31
 LONGEST FLOWPATH FROM NODE     12.00 TO NODE     14.00 =    1520.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.536
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =   10.10   SUBAREA RUNOFF(CFS) =   12.50
```



```
 TOTAL AREA(ACRES) =       10.3   TOTAL RUNOFF(CFS) =      12.75
 TC(MIN.) =   12.31

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 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.) =   12.31
 RAINFALL INTENSITY(INCH/HR) =   3.54
 TOTAL STREAM AREA(ACRES) =    10.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.75

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        6.73    60.40        1.268         37.84
     2        4.40     2.95        6.323          0.80
     3       12.75    12.31        3.536         10.30

 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        8.81     2.95        6.323
     2       17.62    12.31        3.536
     3       12.19    60.40        1.268

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      17.62   Tc(MIN.) =   12.31
 TOTAL AREA(ACRES) =       48.9
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE     14.00 =    3153.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     28.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    260.00  DOWNSTREAM(FEET) =    248.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1259.00   CHANNEL SLOPE =  0.0095
 CHANNEL FLOW THRU SUBAREA(CFS) =      17.62
 FLOW VELOCITY(FEET/SEC) =   2.83 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   7.42   Tc(MIN.) =   19.73
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE     28.00 =    4412.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     28.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.609
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.2314
 SUBAREA AREA(ACRES) =   14.95   SUBAREA RUNOFF(CFS) =   13.65
 TOTAL AREA(ACRES) =       63.9   TOTAL RUNOFF(CFS) =      38.56
```

```
 TC(MIN.) =   19.73

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    500.00 TO NODE    504.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   218.00
 UPSTREAM ELEVATION(FEET) =    402.60
 DOWNSTREAM ELEVATION(FEET) =    400.80
 ELEVATION DIFFERENCE(FEET) =      1.80
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.785
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    59.77
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.756
 SUBAREA RUNOFF(CFS) =      1.76
 TOTAL AREA(ACRES) =      0.43   TOTAL RUNOFF(CFS) =      1.76

****************************************************************************
 FLOW PROCESS FROM NODE    504.00 TO NODE    506.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   400.80  DOWNSTREAM(FEET) =   400.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.012
 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.) =   4.59
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.76
 PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    6.08
 LONGEST FLOWPATH FROM NODE    500.00 TO NODE    506.00 =     298.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    506.00 TO NODE    506.00 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.) =    6.08
 RAINFALL INTENSITY(INCH/HR) =   5.58
 TOTAL STREAM AREA(ACRES) =     0.43
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.76

****************************************************************************
 FLOW PROCESS FROM NODE    501.00 TO NODE    503.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
```



```
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    97.00
 UPSTREAM ELEVATION(FEET) =    445.00
 DOWNSTREAM ELEVATION(FEET) =    412.00
 ELEVATION DIFFERENCE(FEET) =     33.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.172
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.520
 SUBAREA RUNOFF(CFS) =      0.35
 TOTAL AREA(ACRES) =      0.18   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
 FLOW PROCESS FROM NODE    503.00 TO NODE    506.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  406.00  DOWNSTREAM ELEVATION(FEET) =  403.50
 STREET LENGTH(FEET) =   264.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.54
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.39
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.88
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
 STREET FLOW TRAVEL TIME(MIN.) =   2.35   Tc(MIN.) =    8.52
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.485
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.641
 SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    2.42
 TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.70

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.73
 FLOW VELOCITY(FEET/SEC.) =  2.13   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE    506.00 =     361.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    506.00 TO NODE    506.00 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.) =    8.52
 RAINFALL INTENSITY(INCH/HR) =   4.48
 TOTAL STREAM AREA(ACRES) =     0.94
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.70
```

```
 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        1.76     6.08        5.577          0.43
     2        2.70     8.52        4.485          0.94

 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        3.68     6.08       5.577
     2        4.12     8.52       4.485

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.12   Tc(MIN.) =    8.52
 TOTAL AREA(ACRES) =        1.4
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE    506.00 =     361.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    506.00 TO NODE    514.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   403.50  DOWNSTREAM(FEET) =   391.50
 FLOW LENGTH(FEET) =   379.00   MANNING'S N =  0.012
 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.) =   8.82
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.12
 PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =    9.23
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE    514.00 =     740.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    506.00 TO NODE    514.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.257
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.6890
 SUBAREA AREA(ACRES) =    1.72   SUBAREA RUNOFF(CFS) =    5.20
 TOTAL AREA(ACRES) =        3.1   TOTAL RUNOFF(CFS) =       9.06
 TC(MIN.) =    9.23

****************************************************************************
 FLOW PROCESS FROM NODE    514.00 TO NODE     22.50 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   391.50  DOWNSTREAM(FEET) =   387.90
 FLOW LENGTH(FEET) =   154.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.76
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```



```
 PIPE-FLOW(CFS) =       9.06
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    9.50
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE     22.50 =     894.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.50 TO NODE     22.50 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.) =    9.50
 RAINFALL INTENSITY(INCH/HR) =   4.18
 TOTAL STREAM AREA(ACRES) =     3.09
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.06

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   139.00
 UPSTREAM ELEVATION(FEET) =    468.00
 DOWNSTREAM ELEVATION(FEET) =    448.00
 ELEVATION DIFFERENCE(FEET) =     20.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
 SUBAREA RUNOFF(CFS) =      0.25
 TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    448.00  DOWNSTREAM(FEET) =    364.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   482.00   CHANNEL SLOPE =  0.1743
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.25
 FLOW VELOCITY(FEET/SEC) =   4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =    7.96
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     621.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.685
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    5.56   SUBAREA RUNOFF(CFS) =    9.12
```

```
 TOTAL AREA(ACRES) =        5.7   TOTAL RUNOFF(CFS) =       9.33
 TC(MIN.) =    7.96

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.50 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   364.00  DOWNSTREAM(FEET) =   363.15
 FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.03
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.33
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    8.16
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.50 =     706.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.50 TO NODE     22.50 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.) =    8.16
 RAINFALL INTENSITY(INCH/HR) =   4.61
 TOTAL STREAM AREA(ACRES) =     5.69
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.33

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     20.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    468.00
 DOWNSTREAM ELEVATION(FEET) =    450.00
 ELEVATION DIFFERENCE(FEET) =     18.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
 SUBAREA RUNOFF(CFS) =      0.21
 TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
 FLOW PROCESS FROM NODE     20.50 TO NODE     21.50 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    450.00  DOWNSTREAM(FEET) =    380.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   354.00   CHANNEL SLOPE =  0.1977
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.21
 FLOW VELOCITY(FEET/SEC) =   4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   1.24   Tc(MIN.) =    7.51
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     21.50 =     454.00 FEET.
```



```
****************************************************************************
 FLOW PROCESS FROM NODE     20.50 TO NODE     21.50 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.864
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    1.10   SUBAREA RUNOFF(CFS) =    1.87
 TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       2.06
 TC(MIN.) =    7.51

****************************************************************************
 FLOW PROCESS FROM NODE     21.50 TO NODE     22.50 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   380.00  DOWNSTREAM(FEET) =   378.00
 FLOW LENGTH(FEET) =   195.00   MANNING'S N =  0.012
 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.) =   4.84
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.06
 PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    8.18
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.50 =     649.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.50 TO NODE     22.50 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.) =    8.18
 RAINFALL INTENSITY(INCH/HR) =   4.60
 TOTAL STREAM AREA(ACRES) =     1.21
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.06

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        9.06     9.50        4.181          3.09
     2        9.33     8.16        4.610          5.69
     3        2.06     8.18        4.602          1.21

 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       19.60     8.16       4.610
     2       19.61     8.18       4.602
     3       19.40     9.50       4.181

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      19.61   Tc(MIN.) =    8.18
 TOTAL AREA(ACRES) =       10.0
```

```
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE     22.50 =     894.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.50 TO NODE    524.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   386.52  DOWNSTREAM(FEET) =   381.20
 FLOW LENGTH(FEET) =   266.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.99
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      19.61
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    8.59
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE    524.00 =    1160.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    524.00 TO NODE    524.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.59
 RAINFALL INTENSITY(INCH/HR) =   4.46
 TOTAL STREAM AREA(ACRES) =     9.99
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.61

****************************************************************************
 FLOW PROCESS FROM NODE    520.00 TO NODE    522.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   103.00
 UPSTREAM ELEVATION(FEET) =    391.60
 DOWNSTREAM ELEVATION(FEET) =    390.70
 ELEVATION DIFFERENCE(FEET) =      0.90
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.745
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    61.21
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.782
 SUBAREA RUNOFF(CFS) =      0.49
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.49

****************************************************************************
 FLOW PROCESS FROM NODE    522.00 TO NODE    524.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  390.00  DOWNSTREAM ELEVATION(FEET) =  381.20
 STREET LENGTH(FEET) =   353.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.57
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.70
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.77
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
 STREET FLOW TRAVEL TIME(MIN.) =   2.13   Tc(MIN.) =    7.87
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.719
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
 SUBAREA AREA(ACRES) =    0.64      SUBAREA RUNOFF(CFS) =    2.14
 TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.55

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.48
 FLOW VELOCITY(FEET/SEC.) =  3.04   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
 LONGEST FLOWPATH FROM NODE    520.00 TO NODE    524.00 =     456.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    524.00 TO NODE    524.00 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.) =    7.87
 RAINFALL INTENSITY(INCH/HR) =   4.72
 TOTAL STREAM AREA(ACRES) =     0.76
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.55

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       19.61     8.59        4.462          9.99
     2        2.55     7.87        4.719          0.76

 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       21.09     7.87        4.719
     2       22.02     8.59        4.462

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      22.02   Tc(MIN.) =    8.59
 TOTAL AREA(ACRES) =       10.8
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE    524.00 =    1160.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    524.00 TO NODE    556.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   381.00  DOWNSTREAM(FEET) =   380.40
 FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.62
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.02
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    8.70
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE    556.00 =    1220.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    556.00 TO NODE    556.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    530.00 TO NODE    532.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    403.40
 DOWNSTREAM ELEVATION(FEET) =    401.80
 ELEVATION DIFFERENCE(FEET) =      1.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.057
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    71.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.277
 SUBAREA RUNOFF(CFS) =      0.49
 TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.49

****************************************************************************
 FLOW PROCESS FROM NODE    532.00 TO NODE    534.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  401.50  DOWNSTREAM ELEVATION(FEET) =  395.80
 STREET LENGTH(FEET) =   246.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.23
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.56
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.64
```



```
 STREET FLOW TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =    6.66
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.255
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
 SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.60
 TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       2.01

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.73
 FLOW VELOCITY(FEET/SEC.) =  2.81   DEPTH*VELOCITY(FT*FT/SEC.) =   0.79
 LONGEST FLOWPATH FROM NODE    530.00 TO NODE    534.00 =     346.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    534.00 TO NODE    544.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   395.50  DOWNSTREAM(FEET) =   392.00
 FLOW LENGTH(FEET) =   153.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.39
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.01
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    7.06
 LONGEST FLOWPATH FROM NODE    530.00 TO NODE    544.00 =     499.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    544.00 TO NODE    544.00 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.) =    7.06
 RAINFALL INTENSITY(INCH/HR) =   5.06
 TOTAL STREAM AREA(ACRES) =     0.54
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.01

****************************************************************************
 FLOW PROCESS FROM NODE    540.00 TO NODE    542.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    89.00
 UPSTREAM ELEVATION(FEET) =    397.60
 DOWNSTREAM ELEVATION(FEET) =    396.50
 ELEVATION DIFFERENCE(FEET) =      1.10
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.369
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    67.36
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.040
 SUBAREA RUNOFF(CFS) =      0.43
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    542.00 TO NODE    544.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  396.50  DOWNSTREAM ELEVATION(FEET) =  393.40
  STREET LENGTH(FEET) =   258.60   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
  STREET FLOW TRAVEL TIME(MIN.) =   2.01   Tc(MIN.) =    7.38
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.921
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    0.84      SUBAREA RUNOFF(CFS) =    2.94
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.28

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.11
  FLOW VELOCITY(FEET/SEC.) =  2.43   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE    540.00 TO NODE    544.00 =     347.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    544.00 TO NODE    544.00 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.) =    7.38
  RAINFALL INTENSITY(INCH/HR) =   4.92
  TOTAL STREAM AREA(ACRES) =     0.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.28

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.01     7.06        5.061         0.54
      2        3.28     7.38        4.921         0.94

  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        5.16     7.06        5.061
      2        5.24     7.38        4.921

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.24   Tc(MIN.) =    7.38
  TOTAL AREA(ACRES) =        1.5
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    544.00 =     499.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    544.00 TO NODE    545.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   392.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.24
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    7.68
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    545.00 =     659.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    545.00 TO NODE    545.00 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.) =    7.68
  RAINFALL INTENSITY(INCH/HR) =   4.79
  TOTAL STREAM AREA(ACRES) =     1.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.24

****************************************************************************
  FLOW PROCESS FROM NODE    541.00 TO NODE    543.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    397.60
  DOWNSTREAM ELEVATION(FEET) =    396.00
  ELEVATION DIFFERENCE(FEET) =      1.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.825
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    75.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    543.00 TO NODE    545.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  396.00  DOWNSTREAM ELEVATION(FEET) =  389.70
  STREET LENGTH(FEET) =   278.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.18
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.81
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.65   Tc(MIN.) =    6.47
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.353
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    0.93      SUBAREA RUNOFF(CFS) =    3.53
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.36
  FLOW VELOCITY(FEET/SEC.) =  3.25   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    541.00 TO NODE    545.00 =     358.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    545.00 TO NODE    545.00 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.) =    6.47
  RAINFALL INTENSITY(INCH/HR) =   5.35
  TOTAL STREAM AREA(ACRES) =     1.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.88

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.24     7.68        4.793          1.48
      2        3.88     6.47        5.353          1.02

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1        8.57     6.47        5.353
      2        8.71     7.68        4.793
```



```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.71   Tc(MIN.) =    7.68
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    545.00 =     659.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    545.00 TO NODE    548.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   388.00  DOWNSTREAM(FEET) =   385.00
  FLOW LENGTH(FEET) =   145.00   MANNING'S N =  0.012
  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.) =   9.22
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.71
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    7.94
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    548.00 =     804.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    548.00 TO NODE    548.00 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.) =    7.94
  RAINFALL INTENSITY(INCH/HR) =   4.69
  TOTAL STREAM AREA(ACRES) =     2.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.71

****************************************************************************
  FLOW PROCESS FROM NODE    546.00 TO NODE    547.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    393.90
  DOWNSTREAM ELEVATION(FEET) =    392.50
  ELEVATION DIFFERENCE(FEET) =      1.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.960
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    72.50
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    547.00 TO NODE    548.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  392.50  DOWNSTREAM ELEVATION(FEET) =  386.80
  STREET LENGTH(FEET) =   280.00   CURB HEIGHT(INCHES) =  6.0
```

```
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.28
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.39
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.77
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.82
 STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =    6.64
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.264
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
 SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    3.74
 TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       4.07

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.83
 FLOW VELOCITY(FEET/SEC.) =  3.16   DEPTH*VELOCITY(FT*FT/SEC.) =   1.08
 LONGEST FLOWPATH FROM NODE    546.00 TO NODE    548.00 =     360.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    548.00 TO NODE    548.00 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.) =    6.64
 RAINFALL INTENSITY(INCH/HR) =   5.26
 TOTAL STREAM AREA(ACRES) =     1.09
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.07

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        8.71     7.94        4.691          2.50
     2        4.07     6.64        5.264          1.09

 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       11.84     6.64       5.264
     2       12.34     7.94       4.691

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      12.34   Tc(MIN.) =    7.94
 TOTAL AREA(ACRES) =        3.6
 LONGEST FLOWPATH FROM NODE    530.00 TO NODE    548.00 =     804.00 FEET.
```



```
****************************************************************************
 FLOW PROCESS FROM NODE    548.00 TO NODE    554.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   384.50  DOWNSTREAM(FEET) =   383.00
 FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.75
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.34
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    8.04
 LONGEST FLOWPATH FROM NODE    530.00 TO NODE    554.00 =     864.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    554.00 TO NODE    554.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.04
 RAINFALL INTENSITY(INCH/HR) =   4.66
 TOTAL STREAM AREA(ACRES) =     3.59
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.34

****************************************************************************
 FLOW PROCESS FROM NODE    550.00 TO NODE    552.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   144.00
 UPSTREAM ELEVATION(FEET) =    403.00
 DOWNSTREAM ELEVATION(FEET) =    399.00
 ELEVATION DIFFERENCE(FEET) =      4.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.597
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    77.78
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.55
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.55

****************************************************************************
 FLOW PROCESS FROM NODE    552.00 TO NODE    554.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  398.80  DOWNSTREAM ELEVATION(FEET) =  383.00
 STREET LENGTH(FEET) =   675.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.33
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   3.60   Tc(MIN.) =    6.20
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.503
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    1.05      SUBAREA RUNOFF(CFS) =    5.03
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       5.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.95
  FLOW VELOCITY(FEET/SEC.) =  3.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.30
  LONGEST FLOWPATH FROM NODE    550.00 TO NODE    554.00 =     819.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    554.00 TO NODE    554.00 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.) =    6.20
  RAINFALL INTENSITY(INCH/HR) =   5.50
  TOTAL STREAM AREA(ACRES) =     1.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.51

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.34     8.04        4.656          3.59
      2        5.51     6.20        5.503          1.15

  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       15.95     6.20       5.503
      2       17.00     8.04       4.656

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.00   Tc(MIN.) =    8.04
  TOTAL AREA(ACRES) =        4.7
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    554.00 =     864.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    554.00 TO NODE    556.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```



```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   383.00  DOWNSTREAM(FEET) =   382.20
  FLOW LENGTH(FEET) =    36.70   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.07
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.00
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.09
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    556.00 =     900.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    556.00 TO NODE    556.00 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       17.00     8.09       4.635         4.74
  LONGEST FLOWPATH FROM NODE    530.00 TO NODE    556.00 =     900.70 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       22.02     8.70       4.423        10.75
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    556.00 =    1220.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      37.48       8.09        4.635
      2      38.24       8.70        4.423

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      38.24   Tc(MIN.) =    8.70
  TOTAL AREA(ACRES) =       15.5

****************************************************************************
  FLOW PROCESS FROM NODE    556.00 TO NODE    556.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    556.00 TO NODE    568.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   382.20  DOWNSTREAM(FEET) =   352.00
  FLOW LENGTH(FEET) =   388.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.64
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.24
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    9.00
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    568.00 =    1608.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    568.00 TO NODE    568.00 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.) =    9.00
 RAINFALL INTENSITY(INCH/HR) =   4.33
 TOTAL STREAM AREA(ACRES) =    15.49
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     38.24

**************************************************************************
 FLOW PROCESS FROM NODE    560.00 TO NODE    562.00 IS CODE =  21
--------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
 UPSTREAM ELEVATION(FEET) =    394.00
 DOWNSTREAM ELEVATION(FEET) =    384.50
 ELEVATION DIFFERENCE(FEET) =      9.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.091
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.45
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.45

**************************************************************************
 FLOW PROCESS FROM NODE    562.00 TO NODE    564.00 IS CODE =  62
--------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
 UPSTREAM ELEVATION(FEET) =  384.00  DOWNSTREAM ELEVATION(FEET) =  378.00
 STREET LENGTH(FEET) =   564.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.60
   ***STREET FLOW SPLITS OVER STREET-CROWN***
   FULL DEPTH(FEET) =    0.37   FLOOD WIDTH(FEET) =   12.00
   FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.40
   SPLIT DEPTH(FEET) =    0.25   SPLIT FLOOD WIDTH(FEET) =    6.14
   SPLIT FLOW(CFS) =    0.86   SPLIT VELOCITY(FEET/SEC.) =    1.74
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   12.00
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.40
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
 STREET FLOW TRAVEL TIME(MIN.) =   3.91   Tc(MIN.) =    7.01
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.087
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
```



```
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
 SUBAREA AREA(ACRES) =    2.30      SUBAREA RUNOFF(CFS) =    8.31
 TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       8.67

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.00
 FLOW VELOCITY(FEET/SEC.) =  2.55   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
 LONGEST FLOWPATH FROM NODE    560.00 TO NODE    564.00 =     654.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE    564.00 TO NODE    566.00 IS CODE =  31
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   378.00  DOWNSTREAM(FEET) =   374.20
 FLOW LENGTH(FEET) =   322.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.42
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.67
 PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =    7.73
 LONGEST FLOWPATH FROM NODE    560.00 TO NODE    566.00 =     976.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE    564.00 TO NODE    566.00 IS CODE =  81
--------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.775
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7100
 SUBAREA AREA(ACRES) =    1.64   SUBAREA RUNOFF(CFS) =    5.56
 TOTAL AREA(ACRES) =        4.0   TOTAL RUNOFF(CFS) =      13.70
 TC(MIN.) =    7.73

**************************************************************************
 FLOW PROCESS FROM NODE    566.00 TO NODE    568.00 IS CODE =  31
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   374.00  DOWNSTREAM(FEET) =   350.00
 FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  23.28
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      13.70
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.82
 LONGEST FLOWPATH FROM NODE    560.00 TO NODE    568.00 =    1106.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE    568.00 TO NODE    568.00 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.) =    7.82
```

```
 RAINFALL INTENSITY(INCH/HR) =   4.74
 TOTAL STREAM AREA(ACRES) =     4.04
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.70

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       38.24     9.00        4.328         15.49
     2       13.70     7.82        4.738          4.04

 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       46.93     7.82       4.738
     2       50.75     9.00       4.328

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      50.75   Tc(MIN.) =    9.00
 TOTAL AREA(ACRES) =       19.5
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE    568.00 =    1608.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    568.00 TO NODE     19.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   353.00  DOWNSTREAM(FEET) =   335.00
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  25.03
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      50.75
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    9.12
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE     19.00 =    1788.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 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.) =    9.12
 RAINFALL INTENSITY(INCH/HR) =   4.29
 TOTAL STREAM AREA(ACRES) =    19.53
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     50.75

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   237.00
 UPSTREAM ELEVATION(FEET) =    370.00
 DOWNSTREAM ELEVATION(FEET) =    340.00
 ELEVATION DIFFERENCE(FEET) =     30.00
```



```
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
         THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
 SUBAREA RUNOFF(CFS) =      0.46
 TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 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.) =    6.27
 RAINFALL INTENSITY(INCH/HR) =   5.47
 TOTAL STREAM AREA(ACRES) =     0.24
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.46

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       50.75     9.12        4.291         19.53
     2        0.46     6.27        5.466          0.24

 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       40.30     6.27       5.466
     2       51.11     9.12       4.291

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      51.11   Tc(MIN.) =    9.12
 TOTAL AREA(ACRES) =       19.8
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE     19.00 =    1788.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE    586.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   335.00  DOWNSTREAM(FEET) =   315.00
 FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  25.04
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      51.11
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    9.25
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE    586.00 =    1988.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    586.00 TO NODE    586.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    570.00 TO NODE    572.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   104.00
  UPSTREAM ELEVATION(FEET) =    387.90
  DOWNSTREAM ELEVATION(FEET) =    387.00
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.752
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.96
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.777
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    572.00 TO NODE    574.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  387.00  DOWNSTREAM ELEVATION(FEET) =  380.00
  STREET LENGTH(FEET) =   292.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.42
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   1.86   Tc(MIN.) =    7.62
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.821
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
  SUBAREA AREA(ACRES) =    0.59      SUBAREA RUNOFF(CFS) =    2.02
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.20
  FLOW VELOCITY(FEET/SEC.) =  2.94   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE    570.00 TO NODE    574.00 =     396.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    574.00 TO NODE    575.00 IS CODE =  31
----------------------------------------------------------------------------
```



```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   380.00  DOWNSTREAM(FEET) =   376.80
  FLOW LENGTH(FEET) =   208.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.80
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.33
  PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =    8.21
  LONGEST FLOWPATH FROM NODE    570.00 TO NODE    575.00 =     604.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    575.00 TO NODE    575.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.21
  RAINFALL INTENSITY(INCH/HR) =   4.59
  TOTAL STREAM AREA(ACRES) =     0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.33

****************************************************************************
  FLOW PROCESS FROM NODE    571.00 TO NODE    573.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  92
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   117.00
  UPSTREAM ELEVATION(FEET) =    383.70
  DOWNSTREAM ELEVATION(FEET) =    383.00
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.062
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    52.95
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.585
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE    573.00 TO NODE    575.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  383.00  DOWNSTREAM ELEVATION(FEET) =  376.80
  STREET LENGTH(FEET) =   476.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
```

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.74
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.48
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.60
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
 STREET FLOW TRAVEL TIME(MIN.) =   3.05   Tc(MIN.) =    9.11
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.294
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
 SUBAREA AREA(ACRES) =    2.13      SUBAREA RUNOFF(CFS) =    6.49
 TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       6.86

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.00
 FLOW VELOCITY(FEET/SEC.) =  2.66   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
 LONGEST FLOWPATH FROM NODE    571.00 TO NODE    575.00 =     593.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    575.00 TO NODE    575.00 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.) =    9.11
 RAINFALL INTENSITY(INCH/HR) =   4.29
 TOTAL STREAM AREA(ACRES) =     2.25
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.86

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        2.33     8.21        4.591          0.68
     2        6.86     9.11        4.294          2.25

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        8.51     8.21       4.591
     2        9.04     9.11       4.294

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       9.04   Tc(MIN.) =    9.11
 TOTAL AREA(ACRES) =        2.9
 LONGEST FLOWPATH FROM NODE    570.00 TO NODE    575.00 =     604.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    575.00 TO NODE    578.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   376.80  DOWNSTREAM(FEET) =   373.00
 FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.012
```



```
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.50
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.04
 PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =    9.82
 LONGEST FLOWPATH FROM NODE    570.00 TO NODE    578.00 =     924.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    575.00 TO NODE    578.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.090
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7100
 SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    2.90
 TOTAL AREA(ACRES) =        3.9   TOTAL RUNOFF(CFS) =      11.41
 TC(MIN.) =    9.82

****************************************************************************
 FLOW PROCESS FROM NODE    578.00 TO NODE    584.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   373.00  DOWNSTREAM(FEET) =   370.50
 FLOW LENGTH(FEET) =   189.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.16
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.41
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   10.21
 LONGEST FLOWPATH FROM NODE    570.00 TO NODE    584.00 =    1113.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    584.00 TO NODE    584.00 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) =   3.99
 TOTAL STREAM AREA(ACRES) =     3.93
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.41

****************************************************************************
 FLOW PROCESS FROM NODE    580.00 TO NODE    582.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   110.00
 UPSTREAM ELEVATION(FEET) =    378.00
 DOWNSTREAM ELEVATION(FEET) =    376.50
 ELEVATION DIFFERENCE(FEET) =      1.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.245
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    68.64
```

```
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.131
SUBAREA RUNOFF(CFS) =      0.52
TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
 FLOW PROCESS FROM NODE    582.00 TO NODE    584.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  376.50  DOWNSTREAM ELEVATION(FEET) =  370.50
 STREET LENGTH(FEET) =   478.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.04
   ***STREET FLOW SPLITS OVER STREET-CROWN***
   FULL DEPTH(FEET) =    0.37   FLOOD WIDTH(FEET) =   12.00
   FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.61
   SPLIT DEPTH(FEET) =    0.25   SPLIT FLOOD WIDTH(FEET) =    6.33
   SPLIT FLOW(CFS) =    0.97   SPLIT VELOCITY(FEET/SEC.) =    1.88
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   12.00
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.61
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
 STREET FLOW TRAVEL TIME(MIN.) =   3.05   Tc(MIN.) =    8.30
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.561
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7100
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  92
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.710
 SUBAREA AREA(ACRES) =    2.79      SUBAREA RUNOFF(CFS) =    9.03
 TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =       9.42

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.00
 FLOW VELOCITY(FEET/SEC.) =  2.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.05
 LONGEST FLOWPATH FROM NODE    580.00 TO NODE    584.00 =     588.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    584.00 TO NODE    584.00 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.) =    8.30
 RAINFALL INTENSITY(INCH/HR) =   4.56
 TOTAL STREAM AREA(ACRES) =     2.91
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.42
```



```
 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       11.41    10.21        3.990          3.93
     2        9.42     8.30        4.561          2.91

 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       19.41     8.30        4.561
     2       19.66    10.21        3.990

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      19.66   Tc(MIN.) =   10.21
 TOTAL AREA(ACRES) =        6.8
 LONGEST FLOWPATH FROM NODE    570.00 TO NODE    584.00 =    1113.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    584.00 TO NODE    586.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   370.50  DOWNSTREAM(FEET) =   315.00
 FLOW LENGTH(FEET) =   161.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  32.25
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      19.66
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.29
 LONGEST FLOWPATH FROM NODE    570.00 TO NODE    586.00 =    1274.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    586.00 TO NODE    586.00 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       19.66    10.29        3.969         6.84
 LONGEST FLOWPATH FROM NODE    570.00 TO NODE    586.00 =    1274.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
     1       51.11     9.25        4.251       19.77
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE    586.00 =    1988.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      68.78       9.25        4.251
     2      67.38      10.29        3.969

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      68.78   Tc(MIN.) =    9.25
 TOTAL AREA(ACRES) =       26.6
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    586.00 TO NODE    586.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    586.00 TO NODE    594.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   315.00  DOWNSTREAM(FEET) =   295.00
  FLOW LENGTH(FEET) =   186.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.11
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.78
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    9.36
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    594.00 =    2174.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    594.00 TO NODE    594.00 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.) =    9.36
  RAINFALL INTENSITY(INCH/HR) =   4.22
  TOTAL STREAM AREA(ACRES) =    26.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     68.78

****************************************************************************
  FLOW PROCESS FROM NODE    590.00 TO NODE    592.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    92.00
  UPSTREAM ELEVATION(FEET) =    382.20
  DOWNSTREAM ELEVATION(FEET) =    378.00
  ELEVATION DIFFERENCE(FEET) =      4.20
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.339
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    87.83
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.88
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.88

****************************************************************************
  FLOW PROCESS FROM NODE    592.00 TO NODE    594.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  378.00  DOWNSTREAM ELEVATION(FEET) =  295.00
```



```
  STREET LENGTH(FEET) =   826.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.83
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.91
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.67
  STREET FLOW TRAVEL TIME(MIN.) =   2.33   Tc(MIN.) =    4.67
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    1.25      SUBAREA RUNOFF(CFS) =    6.88
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       7.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.17
  FLOW VELOCITY(FEET/SEC.) =  6.73   DEPTH*VELOCITY(FT*FT/SEC.) =   2.22
  LONGEST FLOWPATH FROM NODE    590.00 TO NODE    594.00 =     918.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    594.00 TO NODE    594.00 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.) =    4.67
  RAINFALL INTENSITY(INCH/HR) =   6.32
  TOTAL STREAM AREA(ACRES) =     1.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.76

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       68.78     9.36        4.219         26.61
      2        7.76     4.67        6.323          1.41

  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       42.05     4.67       6.323
      2       73.96     9.36       4.219

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      73.96   Tc(MIN.) =    9.36
```

```
  TOTAL AREA(ACRES) =       28.0
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    594.00 =    2174.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    594.00 TO NODE      1.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   295.00  DOWNSTREAM(FEET) =   294.00
  FLOW LENGTH(FEET) =    71.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.34
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      73.96
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.45
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE      1.00 =    2245.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    594.00 TO NODE      1.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.193
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6113
  SUBAREA AREA(ACRES) =    2.07   SUBAREA RUNOFF(CFS) =    3.04
  TOTAL AREA(ACRES) =       30.1   TOTAL RUNOFF(CFS) =      77.13
  TC(MIN.) =    9.45

+--------------------------------------------------------------------------+
| APPLY THE ATTENUATED FLOW DATA AS BASIN INFLOW                           |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  59.45   RAIN INTENSITY(INCH/HOUR) =  1.28
  TOTAL AREA(ACRES) =    30.10   TOTAL RUNOFF(CFS) =      4.70

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   294.00  DOWNSTREAM(FEET) =   285.00
  FLOW LENGTH(FEET) =    98.00   MANNING'S N =  0.012
  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.) =  13.39
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.70
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   59.57
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE     27.00 =    2343.00 FEET.
```



```
****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| APPLY THE ATTENUATED FLOW DATA AS BASIN INFLOW                           |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    66.00
  UPSTREAM ELEVATION(FEET) =    476.00
  DOWNSTREAM ELEVATION(FEET) =    460.00
  ELEVATION DIFFERENCE(FEET) =     16.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.091
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.250
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    372.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   336.00   CHANNEL SLOPE =  0.2619
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.35
  FLOW VELOCITY(FEET/SEC) =   4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.18   Tc(MIN.) =    6.27
  LONGEST FLOWPATH FROM NODE     23.00 TO NODE     25.00 =     402.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.464
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.46   SUBAREA RUNOFF(CFS) =    4.70
  TOTAL AREA(ACRES) =        2.6   TOTAL RUNOFF(CFS) =       5.01
  TC(MIN.) =    6.27

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   372.00  DOWNSTREAM(FEET) =   305.00
 FLOW LENGTH(FEET) =   897.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.69
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.01
 PIPE TRAVEL TIME(MIN.) =   1.18    Tc(MIN.) =    7.45
 LONGEST FLOWPATH FROM NODE     23.00 TO NODE     26.00 =    1299.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   305.00  DOWNSTREAM(FEET) =   284.00
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.72
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.01
 PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    7.66
 LONGEST FLOWPATH FROM NODE     23.00 TO NODE     27.00 =    1484.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 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        5.01     7.66       4.803        2.62
 LONGEST FLOWPATH FROM NODE     23.00 TO NODE     27.00 =    1484.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        4.70    59.57       1.279       30.10
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE     27.00 =    2343.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       5.61       7.66        4.803
     2       6.03      59.57        1.279

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.03   Tc(MIN.) =   59.57
 TOTAL AREA(ACRES) =       32.7

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

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



```
 FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   283.90  DOWNSTREAM(FEET) =   264.00
 FLOW LENGTH(FEET) =   343.00   MANNING'S N =  0.012
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.20
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.03
 PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   60.04
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE     28.00 =    2686.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 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.) =   60.04
 RAINFALL INTENSITY(INCH/HR) =   1.27
 TOTAL STREAM AREA(ACRES) =    32.72
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.03

****************************************************************************
 FLOW PROCESS FROM NODE    600.00 TO NODE    602.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    296.00
 DOWNSTREAM ELEVATION(FEET) =    285.00
 ELEVATION DIFFERENCE(FEET) =     11.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.664
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.66
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.66

****************************************************************************
 FLOW PROCESS FROM NODE    602.00 TO NODE     28.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  285.00  DOWNSTREAM ELEVATION(FEET) =  262.00
 STREET LENGTH(FEET) =   386.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 12.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
 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) =   0.0160
```

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.26
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.52
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.16
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
 STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =    3.21
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  98
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 SUBAREA AREA(ACRES) =    0.58      SUBAREA RUNOFF(CFS) =    3.19
 TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.85

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.39
 FLOW VELOCITY(FEET/SEC.) =  4.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE     28.00 =     461.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 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.) =    3.21
 RAINFALL INTENSITY(INCH/HR) =   6.32
 TOTAL STREAM AREA(ACRES) =     0.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.85

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        6.03    60.04        1.273        32.72
     2        3.85     3.21        6.323         0.70

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        4.17     3.21       6.323
     2        6.81    60.04       1.273

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.81   Tc(MIN.) =   60.04
 TOTAL AREA(ACRES) =       33.4
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE     28.00 =    2686.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 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        6.81    60.04        1.273       33.42
 LONGEST FLOWPATH FROM NODE    501.00 TO NODE     28.00 =    2686.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       38.56    19.73        2.609       63.89
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE     28.00 =    4412.60 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      40.80      19.73        2.609
     2      25.62      60.04        1.273

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      40.80   Tc(MIN.) =   19.73
 TOTAL AREA(ACRES) =       97.3

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE    126.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    248.00  DOWNSTREAM(FEET) =    232.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   249.00   CHANNEL SLOPE =  0.0643
 CHANNEL FLOW THRU SUBAREA(CFS) =      40.80
 FLOW VELOCITY(FEET/SEC) =   9.26 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   0.45   Tc(MIN.) =   20.18
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    126.00 =    4661.60 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.) =   20.18
 RAINFALL INTENSITY(INCH/HR) =   2.57
 TOTAL STREAM AREA(ACRES) =    97.31
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     40.80

****************************************************************************
 FLOW PROCESS FROM NODE     30.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  88
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   123.00
 UPSTREAM ELEVATION(FEET) =    452.00
 DOWNSTREAM ELEVATION(FEET) =    420.00
```

```
  ELEVATION DIFFERENCE(FEET) =     32.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.466
  SUBAREA RUNOFF(CFS) =      0.63
  TOTAL AREA(ACRES) =      0.33   TOTAL RUNOFF(CFS) =      0.63

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     34.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    420.00  DOWNSTREAM(FEET) =    418.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   391.00   CHANNEL SLOPE =  0.0051
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.63
  FLOW VELOCITY(FEET/SEC) =   1.07 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   6.07   Tc(MIN.) =   12.34
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     34.00 =     514.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     34.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.531
  RESIDENTIAL (14.5 DU/AC OR LESS) RUNOFF COEFFICIENT = .6300
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5973
  SUBAREA AREA(ACRES) =    2.50   SUBAREA RUNOFF(CFS) =    5.56
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =       5.97
  TC(MIN.) =   12.34

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE    126.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    418.00  DOWNSTREAM(FEET) =    232.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1437.70   CHANNEL SLOPE =  0.1294
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       5.97
  FLOW VELOCITY(FEET/SEC) =   6.96 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.44   Tc(MIN.) =   15.78
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE    126.00 =    1951.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE    126.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.012
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3846
  SUBAREA AREA(ACRES) =   17.40   SUBAREA RUNOFF(CFS) =   18.35
```



```
  TOTAL AREA(ACRES) =       20.2   TOTAL RUNOFF(CFS) =      23.44
  TC(MIN.) =   15.78

****************************************************************************
  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.) =   15.78
  RAINFALL INTENSITY(INCH/HR) =   3.01
  TOTAL STREAM AREA(ACRES) =    20.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     23.44

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       40.80    20.18        2.571         97.31
      2       23.44    15.78        3.012         20.23

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

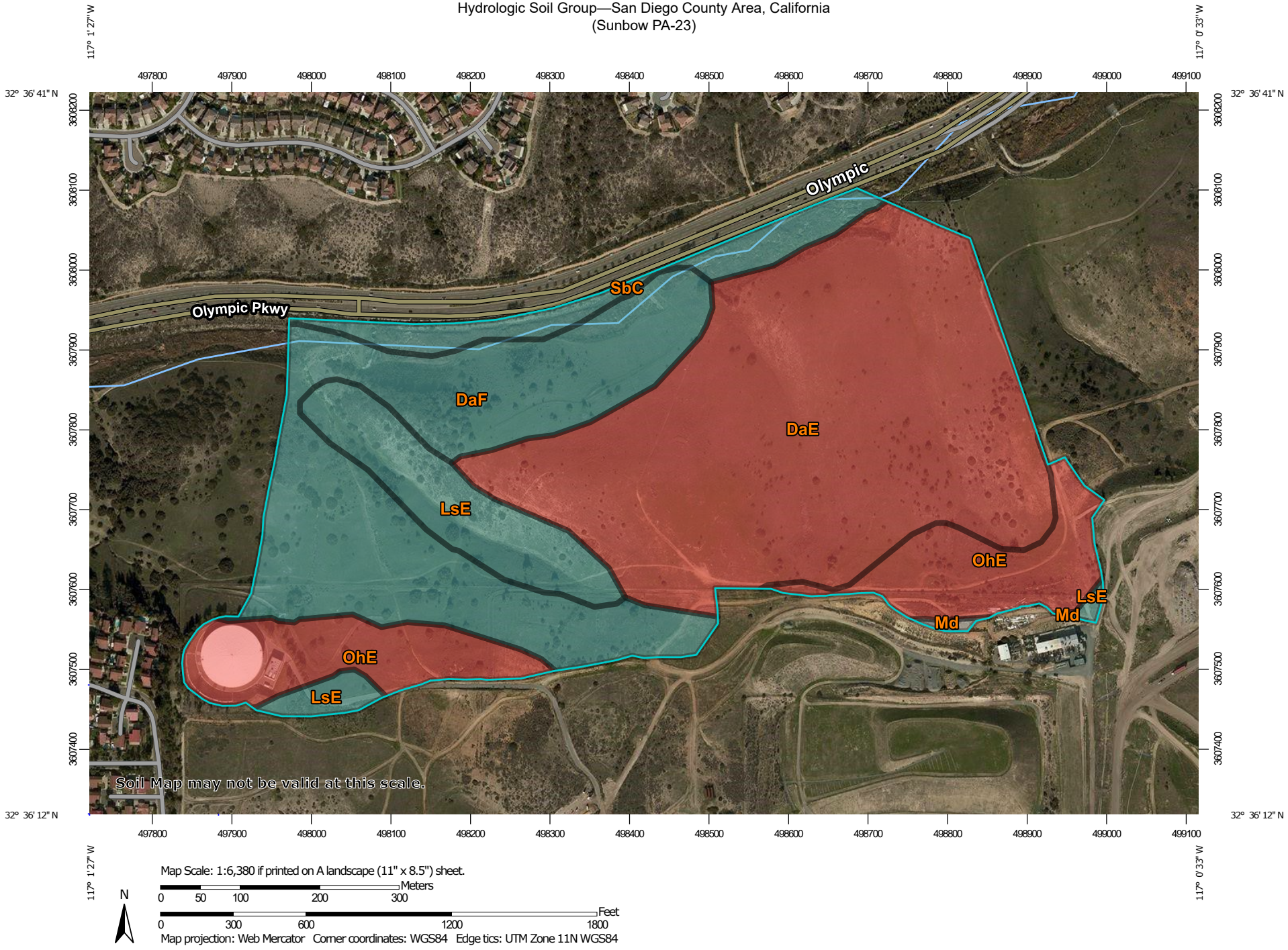
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       55.36    15.78       3.012
      2       60.81    20.18       2.571

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      60.81   Tc(MIN.) =   20.18
  TOTAL AREA(ACRES) =      117.5
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    126.00 =    4661.60 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      117.5  TC(MIN.) =     20.18
  PEAK FLOW RATE(CFS)   =      60.81
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

CHAPTER 4

HYDROLOGIC SOIL GROUP

Hydrologic Soil Group—San Diego County Area, California
(Sunbow PA-23)



Map Scale: 1:6,380 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 14, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 7, 2014—Jan 4, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DaE	Diablo clay, 15 to 30 percent slopes	D	53.0	45.2%
DaF	Diablo clay, 30 to 50 percent slopes, warm MAAT, MLRA 20	C	31.9	27.2%
LsE	Linne clay loam, 9 to 30 percent slopes	C	10.3	8.7%
Md	Made land		0.3	0.2%
OhE	Olivenhain cobbly loam, 9 to 30 percent slopes	D	16.3	13.9%
SbC	Salinas clay loam, 2 to 9 percent slopes	C	5.6	4.8%
Totals for Area of Interest			**117.3**	**100.0%**

CHAPTER 5

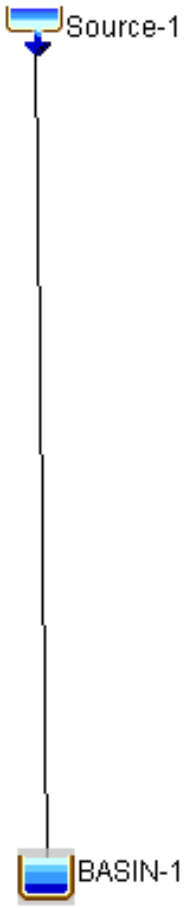
DETENTION ANALYSIS & CALCULATIONS

HEC-HMS

Project : Sunbow Detention

Basin Model : Basin 1

Jan 20 12:02:27 PST 2020



RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 6/16/2020
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 10 MIN.
6 HOUR RAINFALL 2.4 INCHES
BASIN AREA 30.1 ACRES
RUNOFF COEFFICIENT 0.6113
PEAK DISCHARGE 77.13 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 2.6
TIME (MIN) = 20	DISCHARGE (CFS) = 2.7
TIME (MIN) = 30	DISCHARGE (CFS) = 2.8
TIME (MIN) = 40	DISCHARGE (CFS) = 2.9
TIME (MIN) = 50	DISCHARGE (CFS) = 3
TIME (MIN) = 60	DISCHARGE (CFS) = 3
TIME (MIN) = 70	DISCHARGE (CFS) = 3.2
TIME (MIN) = 80	DISCHARGE (CFS) = 3.3
TIME (MIN) = 90	DISCHARGE (CFS) = 3.4
TIME (MIN) = 100	DISCHARGE (CFS) = 3.5
TIME (MIN) = 110	DISCHARGE (CFS) = 3.8
TIME (MIN) = 120	DISCHARGE (CFS) = 3.9
TIME (MIN) = 130	DISCHARGE (CFS) = 4.2
TIME (MIN) = 140	DISCHARGE (CFS) = 4.3
TIME (MIN) = 150	DISCHARGE (CFS) = 4.7
TIME (MIN) = 160	DISCHARGE (CFS) = 4.9
TIME (MIN) = 170	DISCHARGE (CFS) = 5.5
TIME (MIN) = 180	DISCHARGE (CFS) = 5.8
TIME (MIN) = 190	DISCHARGE (CFS) = 6.6
TIME (MIN) = 200	DISCHARGE (CFS) = 7.2
TIME (MIN) = 210	DISCHARGE (CFS) = 8.8
TIME (MIN) = 220	DISCHARGE (CFS) = 10
TIME (MIN) = 230	DISCHARGE (CFS) = 14.7
TIME (MIN) = 240	DISCHARGE (CFS) = 18
TIME (MIN) = 250	DISCHARGE (CFS) = 77.13
TIME (MIN) = 260	DISCHARGE (CFS) = 11.8
TIME (MIN) = 270	DISCHARGE (CFS) = 7.9
TIME (MIN) = 280	DISCHARGE (CFS) = 6.2
TIME (MIN) = 290	DISCHARGE (CFS) = 5.2
TIME (MIN) = 300	DISCHARGE (CFS) = 4.5
TIME (MIN) = 310	DISCHARGE (CFS) = 4
TIME (MIN) = 320	DISCHARGE (CFS) = 3.7
TIME (MIN) = 330	DISCHARGE (CFS) = 3.4
TIME (MIN) = 340	DISCHARGE (CFS) = 3.1
TIME (MIN) = 350	DISCHARGE (CFS) = 2.9
TIME (MIN) = 360	DISCHARGE (CFS) = 2.7
TIME (MIN) = 370	DISCHARGE (CFS) = 0

Basin 1 (West Basin)
Elevation-Area & Elevation-Discharge Function

Elevation-Area Function

Elevation (FT)	Area (AC)
0.00	0.57870
0.05	0.58097
0.10	0.58325
0.15	0.58552
0.20	0.58780
0.25	0.59008
0.30	0.59235
0.35	0.59463
0.40	0.59691
0.45	0.59918
0.50	0.60146
0.55	0.60373
0.60	0.60601
0.65	0.60829
0.70	0.61056
0.75	0.61284
0.80	0.61511
0.85	0.61739
0.90	0.61967
0.95	0.62194
1.00	0.62422
1.05	0.62656
1.10	0.62890
1.15	0.63124
1.20	0.63359
1.25	0.63593
1.30	0.63827
1.35	0.64061
1.40	0.64295
1.45	0.64529
1.50	0.64764
1.55	0.64998
1.60	0.65232
1.65	0.65466
1.70	0.65700
1.75	0.65934
1.80	0.66169
1.85	0.66403
1.90	0.66637
1.95	0.66871
2.00	0.67105
2.05	0.67346
2.10	0.67586
2.15	0.67827
2.20	0.68067
2.25	0.68308
2.30	0.68549
2.35	0.68789
2.40	0.69030

Elevation (FT)	Area (AC)
2.40	0.69030
2.45	0.69270
2.50	0.69511
2.55	0.69752
2.60	0.69992
2.65	0.70233
2.70	0.70473
2.75	0.70714
2.80	0.70955
2.85	0.71195
2.90	0.71436
2.95	0.71676
3.00	0.71917
3.05	0.72164
3.10	0.72411
3.15	0.72659
3.20	0.72906
3.25	0.73153
3.30	0.73400
3.35	0.73648
3.40	0.73895
3.45	0.74142
3.50	0.74389
3.55	0.74637
3.60	0.74884
3.65	0.75131
3.70	0.75378
3.75	0.75626
3.80	0.75873
3.85	0.76120
3.90	0.76367
3.95	0.76615
4.00	0.76862
4.05	0.77115
4.10	0.77369
4.15	0.77623
4.20	0.77876
4.25	0.78130
4.30	0.78384
4.35	0.78638
4.40	0.78891
4.45	0.79145
4.50	0.79399
4.55	0.79652
4.60	0.79906
4.65	0.80160
4.70	0.80413
4.75	0.80667
4.80	0.80921
4.85	0.81174

4.80	0.80921
4.85	0.81174
4.90	0.81428
4.95	0.81682
5.00	0.81935
5.05	0.82196
5.10	0.82456
5.15	0.82716
5.20	0.82977
5.25	0.83237
5.30	0.83497
5.35	0.83758
5.40	0.84018
5.45	0.84278
5.50	0.84539
5.55	0.84799
5.60	0.85059
5.65	0.85320
5.70	0.85580
5.75	0.85840
5.80	0.86101
5.85	0.86361
5.90	0.86621
5.95	0.86882
6.00	0.87142

Elevation-Discharge Function

Elevation (FT)	Discharge (CFS)
0.00	0.80300
0.05	0.80400
0.10	0.80500
0.15	0.80600
0.20	0.80700
0.25	0.80800
0.30	0.80900
0.35	0.81000
0.40	0.81100
0.45	0.81200
0.50	0.81300
0.55	0.81400
0.60	0.81500
0.65	0.81600
0.70	0.81700
0.75	0.81800
0.80	0.81900
0.85	0.82000
0.90	0.82100
0.95	0.82200
1.00	0.82300
1.05	0.82515
1.10	0.82945
1.15	0.83179
1.20	0.83362
1.25	0.83519
1.30	0.83657
1.35	0.83783
1.40	0.83898
1.45	0.84006
1.50	0.84108
1.55	0.84204
1.60	0.84295
1.65	0.84382
1.70	0.84466
1.75	0.84547
1.80	0.84625
1.85	0.84700
1.90	0.84774
1.95	0.84845
2.00	0.84914
2.05	0.85311
2.10	0.86263
2.15	0.87588
2.20	0.88821
2.25	0.89595
2.30	0.90266
2.35	0.90869
2.40	0.91422

Elevation (FT)	Discharge (CFS)
2.40	0.91422
2.45	0.91935
2.50	0.92418
2.55	0.92875
2.60	0.93309
2.65	0.93725
2.70	0.94125
2.75	0.94510
2.80	0.94881
2.85	0.95241
2.90	0.95591
2.95	0.95931
3.00	0.96261
3.05	0.96999
3.10	0.98474
3.15	1.00557
3.20	1.03095
3.25	1.05920
3.30	1.08145
3.35	1.09774
3.40	1.11256
3.45	1.12627
3.50	1.13913
3.55	1.15128
3.60	1.16284
3.65	1.17390
3.70	1.18453
3.75	1.19478
3.80	1.20469
3.85	1.21430
3.90	1.22363
3.95	1.23270
4.00	1.24155
4.05	1.62249
4.10	2.31166
4.15	3.20144
4.20	4.25341
4.25	5.44539
4.30	6.76242
4.35	8.19350
4.40	9.73012
4.45	11.36543
4.50	13.09377
4.55	14.91036
4.60	16.81106
4.65	18.79231
4.70	20.85094
4.75	22.98411
4.80	25.18932

4.80	25.18932
4.85	27.46426
4.90	29.80686
4.95	32.21521
5.00	34.68755
5.05	37.22226
5.10	39.81784
5.15	42.47290
5.20	45.18611
5.25	47.95627
5.30	50.78221
5.35	53.66287
5.40	56.59720
5.45	59.58425
5.50	62.62311
5.55	65.71289
5.60	68.02977
5.65	71.21897
5.70	74.45673
5.75	77.74233
5.80	81.07509
5.85	84.45434
5.90	87.87946
5.95	91.34983
6.00	94.86487

Project: Sunbow Detention Simulation Run: Run 1

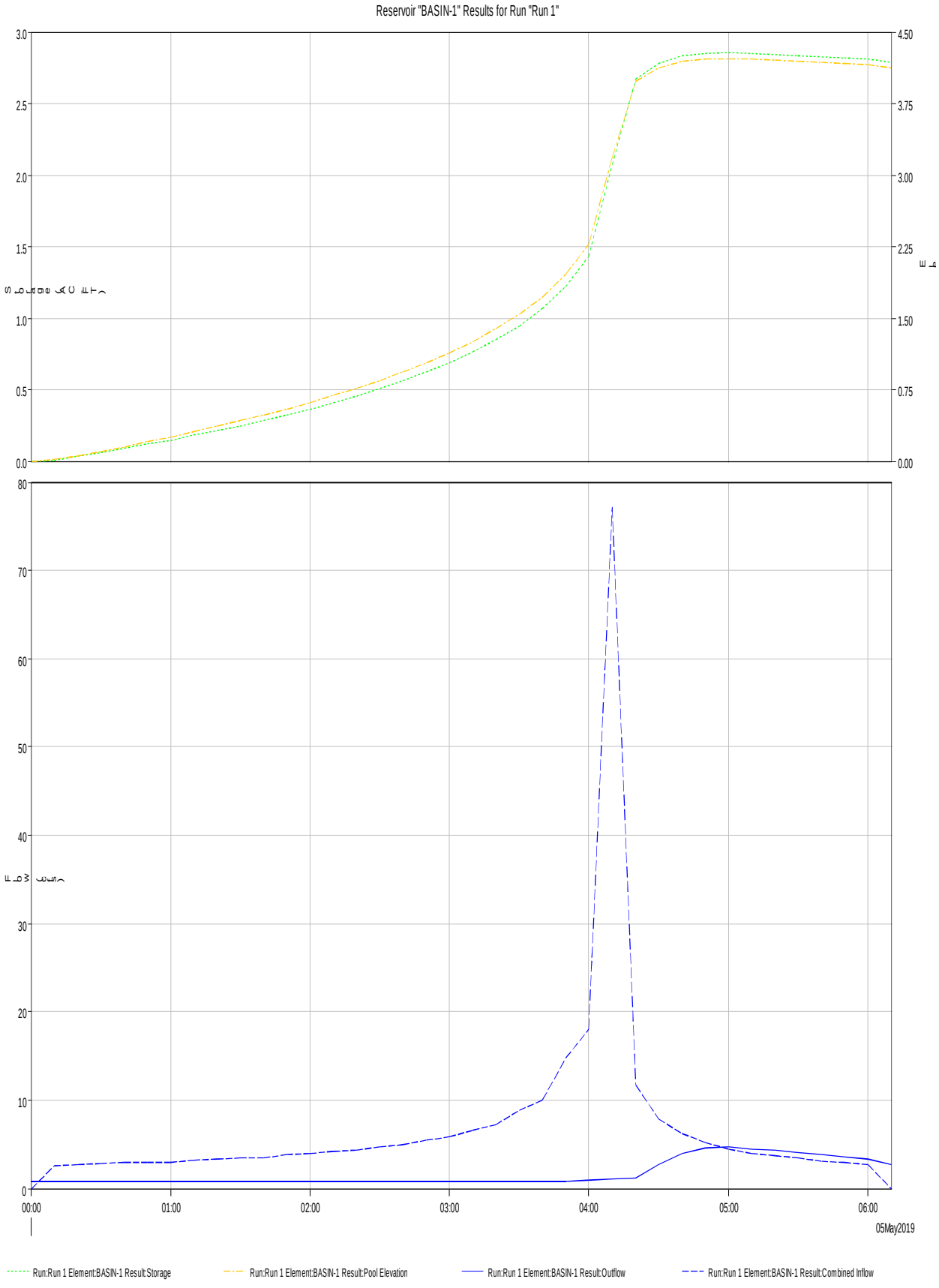
Reservoir: BASIN-1

Start of Run:	05May2019, 00:00	Basin Model:	Basin 1
End of Run:	05May2019, 06:10	Meteorologic Model:	Met 1
Compute Time:	16Jun2020, 13:51:06	Control Specifications:	Control 1

Volume Units: IN

Computed Results

Peak Inflow:	77.1 (CFS)	Date/Time of Peak Inflow:	05May2019, 04:10
Peak Discharge:	4.7 (CFS)	Date/Time of Peak Discharge:	05May2019, 05:00
Inflow Volume:	0.20 (IN)	Peak Storage:	2.9 (AC-FT)
Discharge Volume:	0.05 (IN)	Peak Elevation:	4.2 (FT)


Reservoir "BASIN-1" Results for Run "Run 1"
Storage (AC-FT)
Elev (FT)
Flow (CFS)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
4.50
3.75
3.00
2.25
1.50
0.75
0.00
80
70
60
50
40
30
20
10
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
05May2019
Run:Run 1 Element:BASIN-1 Result:Storage
Run:Run 1 Element:BASIN-1 Result:Pool Elevation
Run:Run 1 Element:BASIN-1 Result:Outflow
Run:Run 1 Element:BASIN-1 Result:Combined Inflow

Project: Sunbow Detention Simulation Run: Run 1
Reservoir: BASIN-1

Start of Run:	05May2019, 00:00	Basin Model:	Basin 1
End of Run:	05May2019, 06:10	Meteorologic Model:	Met 1
Compute Time:	16Jun2020, 13:51:06	Control Specifications:	Control 1

Date	Time	Inflow (CFS)	Storage (AC-FT)	Elevation (FT)	Outflow (CFS)
05May2019	00:00	0.0	0.0	0.0	0.8
05May2019	00:10	2.6	0.0	0.0	0.8
05May2019	00:20	2.7	0.0	0.1	0.8
05May2019	00:30	2.8	0.1	0.1	0.8
05May2019	00:40	2.9	0.1	0.1	0.8
05May2019	00:50	3.0	0.1	0.2	0.8
05May2019	01:00	3.0	0.1	0.3	0.8
05May2019	01:10	3.2	0.2	0.3	0.8
05May2019	01:20	3.3	0.2	0.4	0.8
05May2019	01:30	3.4	0.2	0.4	0.8
05May2019	01:40	3.5	0.3	0.5	0.8
05May2019	01:50	3.8	0.3	0.5	0.8
05May2019	02:00	3.9	0.4	0.6	0.8
05May2019	02:10	4.2	0.4	0.7	0.8
05May2019	02:20	4.3	0.5	0.8	0.8
05May2019	02:30	4.7	0.5	0.8	0.8
05May2019	02:40	4.9	0.6	0.9	0.8
05May2019	02:50	5.5	0.6	1.0	0.8
05May2019	03:00	5.8	0.7	1.1	0.8
05May2019	03:10	6.6	0.8	1.3	0.8
05May2019	03:20	7.2	0.8	1.4	0.8
05May2019	03:30	8.8	0.9	1.5	0.8
05May2019	03:40	10.0	1.1	1.7	0.8
05May2019	03:50	14.7	1.2	2.0	0.8
05May2019	04:00	18.0	1.4	2.3	0.9

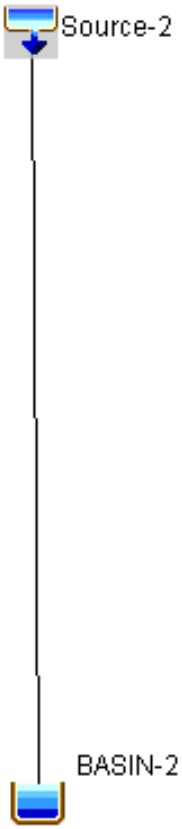
Date	Time	Inflow (CFS)	Storage (AC-FT)	Elevation (FT)	Outflow (CFS)
05May2019	04:10	77.1	2.1	3.2	1.0
05May2019	04:20	11.8	2.7	4.0	1.2
05May2019	04:30	7.9	2.8	4.1	2.7
05May2019	04:40	6.2	2.8	4.2	4.0
05May2019	04:50	5.2	2.9	4.2	4.5
05May2019	05:00	4.5	2.9	4.2	4.7
05May2019	05:10	4.0	2.9	4.2	4.5
05May2019	05:20	3.7	2.8	4.2	4.3
05May2019	05:30	3.4	2.8	4.2	4.0
05May2019	05:40	3.1	2.8	4.2	3.8
05May2019	05:50	2.9	2.8	4.2	3.5
05May2019	06:00	2.7	2.8	4.2	3.3
05May2019	06:10	0.0	2.8	4.1	2.8

HEC-HMS

Project : Sunbow Detention

Basin Model : Basin 1

Jan 20 12:02:27 PST 2020



RATIONAL METHOD HYDROGRAPH PROGRAM
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RUN DATE 1/20/2020
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 15 MIN.
6 HOUR RAINFALL 2.4 INCHES
BASIN AREA 37 ACRES
RUNOFF COEFFICIENT 0.637
PEAK DISCHARGE 75.88 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 15	DISCHARGE (CFS) = 3.4
TIME (MIN) = 30	DISCHARGE (CFS) = 3.5
TIME (MIN) = 45	DISCHARGE (CFS) = 3.7
TIME (MIN) = 60	DISCHARGE (CFS) = 3.8
TIME (MIN) = 75	DISCHARGE (CFS) = 4.1
TIME (MIN) = 90	DISCHARGE (CFS) = 4.3
TIME (MIN) = 105	DISCHARGE (CFS) = 4.6
TIME (MIN) = 120	DISCHARGE (CFS) = 4.9
TIME (MIN) = 135	DISCHARGE (CFS) = 5.4
TIME (MIN) = 150	DISCHARGE (CFS) = 5.7
TIME (MIN) = 165	DISCHARGE (CFS) = 6.6
TIME (MIN) = 180	DISCHARGE (CFS) = 7.1
TIME (MIN) = 195	DISCHARGE (CFS) = 8.7
TIME (MIN) = 210	DISCHARGE (CFS) = 9.9
TIME (MIN) = 225	DISCHARGE (CFS) = 14.5
TIME (MIN) = 240	DISCHARGE (CFS) = 18
TIME (MIN) = 255	DISCHARGE (CFS) = 75.88
TIME (MIN) = 270	DISCHARGE (CFS) = 11.7
TIME (MIN) = 285	DISCHARGE (CFS) = 7.8
TIME (MIN) = 300	DISCHARGE (CFS) = 6.1
TIME (MIN) = 315	DISCHARGE (CFS) = 5.1
TIME (MIN) = 330	DISCHARGE (CFS) = 4.4
TIME (MIN) = 345	DISCHARGE (CFS) = 4
TIME (MIN) = 360	DISCHARGE (CFS) = 3.6
TIME (MIN) = 375	DISCHARGE (CFS) = 0

Basin 2 (East Basin)
Elevation-Area & Elevation-Discharge Function

Elevation-Area Function

Elevation (FT)	Area (AC)
0.00	0.68655
0.05	0.68930
0.10	0.69206
0.15	0.69481
0.20	0.69757
0.25	0.70032
0.30	0.70308
0.35	0.70583
0.40	0.70859
0.45	0.71134
0.50	0.71410
0.55	0.71686
0.60	0.71961
0.65	0.72237
0.70	0.72512
0.75	0.72788
0.80	0.73063
0.85	0.73339
0.90	0.73614
0.95	0.73890
1.00	0.73905
1.05	0.74174
1.10	0.74443
1.15	0.74712
1.20	0.74981
1.25	0.75250
1.30	0.75519
1.35	0.75788
1.40	0.76057
1.45	0.76326
1.50	0.76596
1.55	0.76865
1.60	0.77134
1.65	0.77403
1.70	0.77672
1.75	0.77941
1.80	0.78210
1.85	0.78479
1.90	0.78748
1.95	0.79017
2.00	0.79286
2.05	0.79562
2.10	0.79837
2.15	0.80112
2.20	0.80388
2.25	0.80663
2.30	0.80939
2.35	0.81214
2.40	0.81490
2.45	0.81765

Elevation (FT)	Area (AC)
2.40	0.81490
2.45	0.81765
2.50	0.82041
2.55	0.82316
2.60	0.82592
2.65	0.82867
2.70	0.83143
2.75	0.83418
2.80	0.83694
2.85	0.83969
2.90	0.84245
2.95	0.84520
3.00	0.84796
3.05	0.85078
3.10	0.85360
3.15	0.85642
3.20	0.85924
3.25	0.86206
3.30	0.86488
3.35	0.86770
3.40	0.87052
3.45	0.87334
3.50	0.87616
3.55	0.87898
3.60	0.88180
3.65	0.88462
3.70	0.88744
3.75	0.89026
3.80	0.89308
3.85	0.89590
3.90	0.89872
3.95	0.90154
4.00	0.90436
4.05	0.90725
4.10	0.91013
4.15	0.91302
4.20	0.91590
4.25	0.91879
4.30	0.92168
4.35	0.92456
4.40	0.92745
4.45	0.93033
4.50	0.93322
4.55	0.93610
4.60	0.93899
4.65	0.94188
4.70	0.94476
4.75	0.94765
4.80	0.95053
4.85	0.95342

4.80	0.95053
4.85	0.95342
4.90	0.95630
4.95	0.95919
5.00	0.96208
5.05	0.96503
5.10	0.96798
5.15	0.97093
5.20	0.97388
5.25	0.97683
5.30	0.97978
5.35	0.98272
5.40	0.98567
5.45	0.98862
5.50	0.99157
5.55	0.99452
5.60	0.99747
5.65	1.00040
5.70	1.00340
5.75	1.00630
5.80	1.00930
5.85	1.01220
5.90	1.01520
5.95	1.01810
6.00	1.02110

Elevation-Discharge Function

Elevation (FT)	Discharge (CFS)
0.00	1.8210
0.05	1.8220
0.10	1.8230
0.15	1.8240
0.20	1.8250
0.25	1.8260
0.30	1.8270
0.35	1.8280
0.40	1.8290
0.45	1.8300
0.50	1.8310
0.55	1.8331
0.60	1.8374
0.65	1.8398
0.70	1.8416
0.75	1.8432
0.80	1.8446
0.85	1.8458
0.90	1.8470
0.95	1.8481
1.00	1.8491
1.05	1.8533
1.10	1.8631
1.15	1.8766
1.20	1.8891
1.25	1.8971
1.30	1.9040
1.35	1.9102
1.40	1.9158
1.45	1.9211
1.50	1.9261
1.55	1.9308
1.60	1.9352
1.65	1.9395
1.70	1.9436
1.75	1.9475
1.80	1.9514
1.85	1.9551
1.90	1.9586
1.95	1.9621
2.00	1.9655
2.05	1.9688
2.10	1.9720
2.15	1.9752
2.20	1.9782
2.25	1.9813
2.30	1.9842
2.35	1.9871
2.40	1.9899

Elevation (FT)	Discharge (CFS)
2.40	1.9899
2.45	1.9927
2.50	1.9955
2.55	1.9982
2.60	2.0008
2.65	2.0034
2.70	2.0060
2.75	2.0086
2.80	2.0111
2.85	2.0135
2.90	2.0159
2.95	2.0183
3.00	2.0207
3.05	2.0272
3.10	2.0411
3.15	2.0612
3.20	2.0858
3.25	2.1133
3.30	2.1349
3.35	2.1505
3.40	2.1647
3.45	2.1778
3.50	2.1901
3.55	2.2017
3.60	2.2127
3.65	2.2233
3.70	2.2334
3.75	2.2432
3.80	2.2526
3.85	2.2618
3.90	2.2707
3.95	2.2794
4.00	2.2878
4.05	2.6684
4.10	3.3572
4.15	4.2466
4.20	5.2982
4.25	6.4898
4.30	7.8065
4.35	9.2373
4.40	10.7740
4.45	12.4090
4.50	14.1370
4.55	15.9530
4.60	17.8530
4.65	19.8340
4.70	21.8930
4.75	24.0260
4.80	26.2310

4.80	26.2310
4.85	28.5050
4.90	30.8480
4.95	33.2560
5.00	35.7280
5.05	38.2620
5.10	40.8580
5.15	43.5120
5.20	46.2250
5.25	48.9950
5.30	51.8210
5.35	54.7020
5.40	57.6360
5.45	60.6230
5.50	63.6610
5.55	66.7510
5.60	68.0600
5.65	71.2490
5.70	74.4860
5.75	77.7720
5.80	81.1040
5.85	84.4830
5.90	87.9080
5.95	91.3780
6.00	94.8930

Project: Sunbow Detention Simulation Run: Run 2

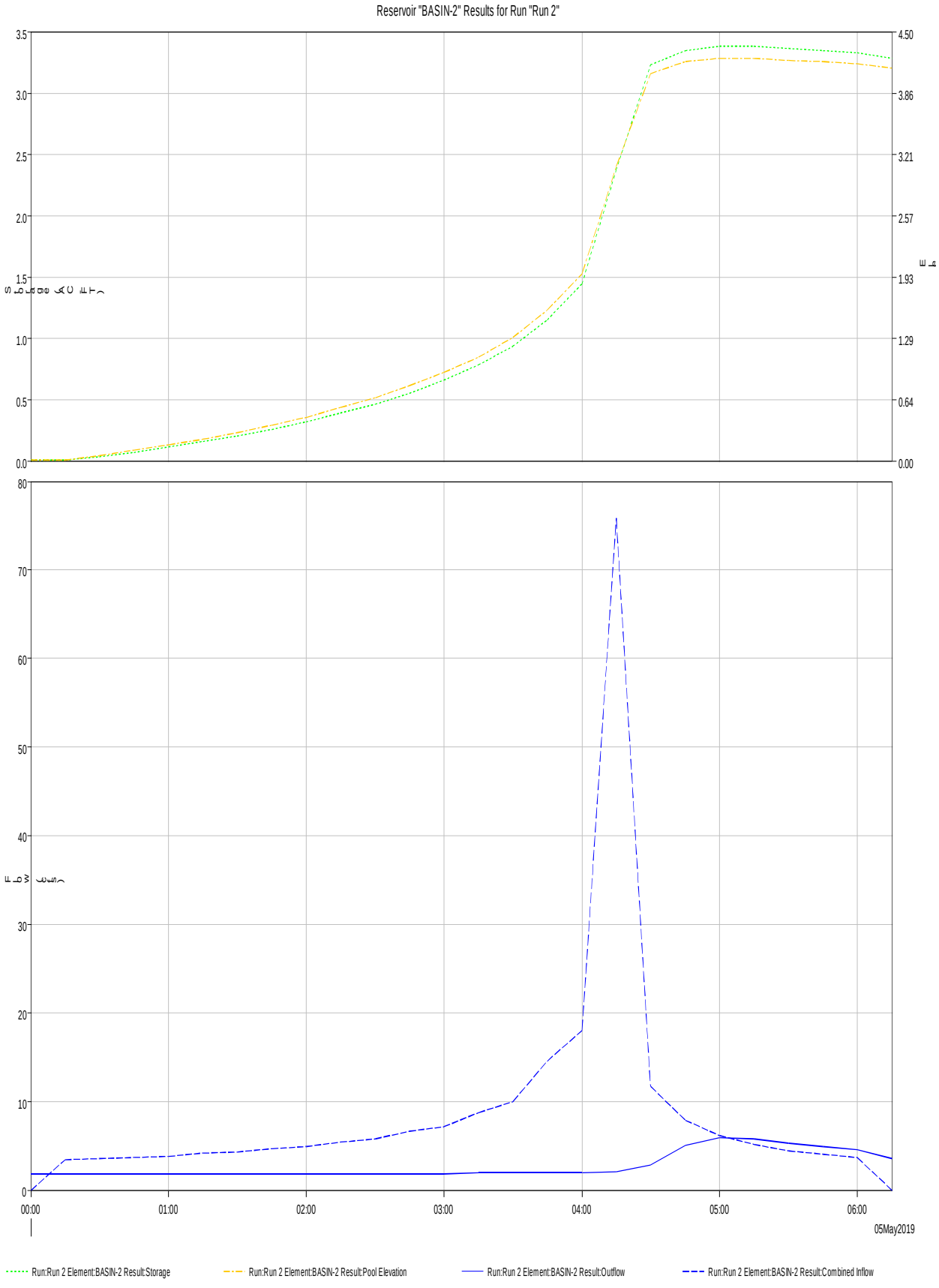
Reservoir: BASIN-2

Start of Run:	05May2019, 00:00	Basin Model:	Basin 2
End of Run:	05May2019, 06:15	Meteorologic Model:	Met 1
Compute Time:	19Jun2020, 12:23:53	Control Specifications:	Control 2

Volume Units: IN

Computed Results

Peak Inflow:	75.9 (CFS)	Date/Time of Peak Inflow:	05May2019, 04:15
Peak Discharge:	5.8 (CFS)	Date/Time of Peak Discharge:	05May2019, 05:00
Inflow Volume:	0.25 (IN)	Peak Storage:	3.4 (AC-FT)
Discharge Volume:	0.08 (IN)	Peak Elevation:	4.2 (FT)


Reservoir "BASIN-2" Results for Run "Run 2"
Storage (AC-FT)
Elev (ft)
Flow (cfs)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
4.50
3.86
3.21
2.57
1.93
1.29
0.64
0.00
80
70
60
50
40
30
20
10
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
05May2019
Run:Run 2 Element:BASIN-2 Result:Storage
Run:Run 2 Element:BASIN-2 Result:Pool Elevation
Run:Run 2 Element:BASIN-2 Result:Outflow
Run:Run 2 Element:BASIN-2 Result:Combined Inflow

Project: Sunbow Detention Simulation Run: Run 2
Reservoir: BASIN-2

Start of Run:	05May2019, 00:00	Basin Model:	Basin 2
End of Run:	05May2019, 06:15	Meteorologic Model:	Met 1
Compute Time:	19Jun2020, 12:23:53	Control Specifications:	Control 2

Date	Time	Inflow (CFS)	Storage (AC-FT)	Elevation (FT)	Outflow (CFS)
05May2019	00:00	0.0	0.0	0.0	1.8
05May2019	00:15	3.4	0.0	0.0	1.8
05May2019	00:30	3.5	0.0	0.1	1.8
05May2019	00:45	3.7	0.1	0.1	1.8
05May2019	01:00	3.8	0.1	0.2	1.8
05May2019	01:15	4.1	0.2	0.2	1.8
05May2019	01:30	4.3	0.2	0.3	1.8
05May2019	01:45	4.6	0.3	0.4	1.8
05May2019	02:00	4.9	0.3	0.5	1.8
05May2019	02:15	5.4	0.4	0.6	1.8
05May2019	02:30	5.7	0.5	0.7	1.8
05May2019	02:45	6.6	0.6	0.8	1.8
05May2019	03:00	7.1	0.7	0.9	1.8
05May2019	03:15	8.7	0.8	1.1	1.9
05May2019	03:30	9.9	0.9	1.3	1.9
05May2019	03:45	14.5	1.1	1.6	1.9
05May2019	04:00	18.0	1.4	2.0	2.0
05May2019	04:15	75.9	2.4	3.1	2.0
05May2019	04:30	11.7	3.2	4.1	2.7
05May2019	04:45	7.8	3.3	4.2	5.0
05May2019	05:00	6.1	3.4	4.2	5.8
05May2019	05:15	5.1	3.4	4.2	5.7
05May2019	05:30	4.4	3.4	4.2	5.3
05May2019	05:45	4.0	3.3	4.2	4.9
05May2019	06:00	3.6	3.3	4.2	4.5

Date	Time	Inflow (CFS)	Storage (AC-FT)	Elevation (FT)	Outflow (CFS)
05May2019	06:15	0.0	3.3	4.1	3.5

CHAPTER 6
HYDROLOGY MAPS

Drainage Study for
Sunbow II, Phase 3

EXISTING CONDITION
HYDROLOGY MAPS

126 — Q_{100} = 90.81 cfs. A = 117.3 ac. T_c = 26.16 min.

126 232'
124 264'
134 418'
132 420'
130 452'
110 452'
122 435'
120 444'
114 272'
112 445'
104 274'
100 474'
102 460'

3.17 ACRES
21.4 ac 1830' ft
11.19 ac 1048 ft
27.07 ac 1683 ft
2.5 ac 391 ft
0.33 ac 123 ft
0.26 ac 136 ft
0.22 ac 149 ft
5.75 ac 707 ft
18.92 ac 1550' ft
27.29 ac 2118 ft
0.20 ac 116 ft

100 0 100 200 300
SCALE 1" = 100'

LEGEND

- PROJECT BOUNDARY
- DRAINAGE BOUNDARY
- INITIAL SUBAREA
- FLOW DIRECTION
- NODE #/ELEVATION (200 / 1665)
- ACREAGE / FLOW LENGTH (0.22 ac / 81.5 ft)

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DRAINAGE MAP
EXISTING CONDITION
SUNBOW II, PHASE 3
CITY OF CHULA VISTA, CALIFORNIA

MAP 1 OF 1

W.O. 2167-0151

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PROPOSED CONDITION
HYDROLOGY MAPS

SEE SHEET 2 OF 2

14 — Q_{100} = 91.67cfs. — A = 48.9 ac. — T_c = 14.86min.

14 — $Q_{100ATT.}$ = 17.62cfs. — A = 48.9 ac. — T_c = 12.31min.

14.95 ACRES

OS-6a — LOT AREA: 1.00 AC.

OS-3 MSCP — LOT AREA: 9.64 AC. — 10.1 ACRES

OS-5 — LOT AREA: 10.04 AC.

OS-6b

OLYMPIC PKWY (EXIST.)

STREET 'B' (PUBLIC)

OS-12 — LOT AREA: 5.85 AC.

OS-10 — LOT AREA: 4.84 AC.

R-1 — LOT AREA: 6.14 AC. — PAD AREA: 4.79 AC.

CPF-1 — LOT AREA: 0.93 AC. — PAD AREA: 0.79 AC.

R-4 — LOT AREA: 6.14 AC. — PAD AREA: 4.79 AC.

R-6 — LOT AREA: 2.41 AC. — PAD AREA: 1.93 AC.

R-2 — LOT AREA: 4.62 AC. — PAD AREA: 3.70 AC.

R-3 — LOT AREA: 8.14 AC. — PAD AREA: 7.70 AC.

OS-13 — LOT AREA: 4.62 AC.

OS-14 — LOT AREA: 4.62 AC.

OS-11 — LOT AREA: 1.25 AC.

0.70 ACRES | 0.73 ACRES | 0.10 ACRES | 0.11 ACRES | 1.74 ACRES | 0.56 ACRES | 0.69 ACRES | 2.10 ACRES | 1.30 ACRES | 0.15 ACRES | 0.13 ACRES | 0.20 ACRES | 1.18 ACRES | 0.11 ACRES | 2.90 ACRES | 2.30 ACRES | 0.10 ACRES | 0.06 ACRES | 1.02 ACRES | 0.08 ACRES | 0.07 ACRES | 0.57 ACRES | 1.40 ACRES | 1.49 ACRES | 2.40 ACRES | 1.64 ACRES | 1.05 ACRES | 0.16 ACRES | 0.84 ACRES | 0.93 ACRES | 1.00 ACRES | 4.41 ACRES | 2.15 ACRES | 0.43 ACRES | 0.64 ACRES | 2.13 ACRES | 0.09 ACRES | 0.12 ACRES | 0.59 ACRES | 1.48 ACRES | 0.76 ACRES | 3.17 ACRES | 0.24 ACRES | 0.18 ACRES | 0.22 ACRES | 0.19 ACRES | 0.14 ACRES | 0.17 ACRES | 1.39 ACRES | 0.18 ACRES | 0.20 ACRES | 1.73 ACRES | 2.70 ACRES | 1.26 ACRES | 0.18 ACRES | 1.1 ACRES | 5.56 ACRES

60 0 60 120 180
SCALE 1" = 60'

LEGEND

- PROJECT BOUNDARY
- DRAINAGE BOUNDARY
- INITIAL SUBAREA
- FLOW DIRECTION
- NODE # (939)
- SUBAREA ACREAGE (46.5 ACRES)

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DRAINAGE MAP
PROPOSED CONDITION
SUNBOW II, PHASE 3
CITY OF CHULA VISTA, CALIFORNIA

MAP 1 OF 2

W.O. 2167-0151

28 — Q_{100}= 145.38cfs. | A= 97.3 ac. | T_c =19.51min.

14 — Q_{100}= 91.67cfs. | A= 48.9 ac. | T_c =14.86min.

126 — Q_{100}= 165.62cfs. | A=117.5 ac. | T_c =19.82min.

126 — $Q_{100ATT.}$= 60.81cfs. | A=117.5 ac. | T_c =20.18min.

14 — $Q_{100ATT.}$= 17.62cfs. | A= 48.9 ac. | T_c =12.31min.

28 — $Q_{100ATT.}$= 40.8cfs. | A= 97.3 ac. | T_c =19.73min.

OS-1 MSCP LOT AREA: 42.79 AC.

OS-2 MSCP LOT AREA: 10.04 AC.

OS-4 LOT AREA: 2.60 AC.

OS-5 LOT AREA: 0.66 AC.

OS-6 LOT AREA: 0.55 AC.

OS-7 LOT AREA: 3.18 AC.

OS-9a LOT AREA: 0.46 AC.

OS-9b LOT AREA: 1.12 AC.

OS-10 LOT AREA: 4.89 AC.

OS-14 LOT AREA: 10.04 AC.

CPF-1 LOT AREA: 0.93 AC. PAD AREA: 0.79 AC.

R-1 LOT AREA: 7.10 AC.

R-4 LOT AREA: 4.62 AC.

R-5 LOT AREA: 4.62 AC.

R-6 LOT AREA: 4.62 AC.

OLYMPIC PKWY (EXIST.)

STREET 'A' (PUBLIC)

STREET 'B' (PUBLIC)

EXIST. 30" PVC WATER

EXIST. 36" DIA. RECYCLED WATER PER DWG. 55-12

EXIST. 4" PVC RECYCLED WATER

17.4 ACRES | 14.95 ACRES | 2.46 ACRES | 1.1 ACRES | 5.56 ACRES | 2.5 ACRES | 2.07 ACRES | 2.79 ACRES | 1.25 ACRES | 2.13 ACRES | 1.64 ACRES | 2.30 ACRES | 2.90 ACRES | 1.05 ACRES | 0.84 ACRES | 0.93 ACRES | 1.00 ACRES | 0.64 ACRES | 0.59 ACRES | 1.48 ACRES | 0.76 ACRES | 0.70 ACRES | 0.10 ACRES | 0.58 ACRES | 0.12 ACRES | 0.24 ACRES | 0.18 ACRES | 0.33 ACRES | 0.16 ACRES | 0.11 ACRES | 0.13 ACRES | 0.09 ACRES | 0.08 ACRES | 0.43 ACRES | 0.09 ACRES | 0.11 ACRES

SEE SHEET 1 OF 2

LEGEND

- PROJECT BOUNDARY
- DRAINAGE BOUNDARY
- INITIAL SUBAREA
- FLOW DIRECTION
- NODE # (9.35)
- SUBAREA ACREAGE (46.5 ACRES)

SCALE 1" = 60'

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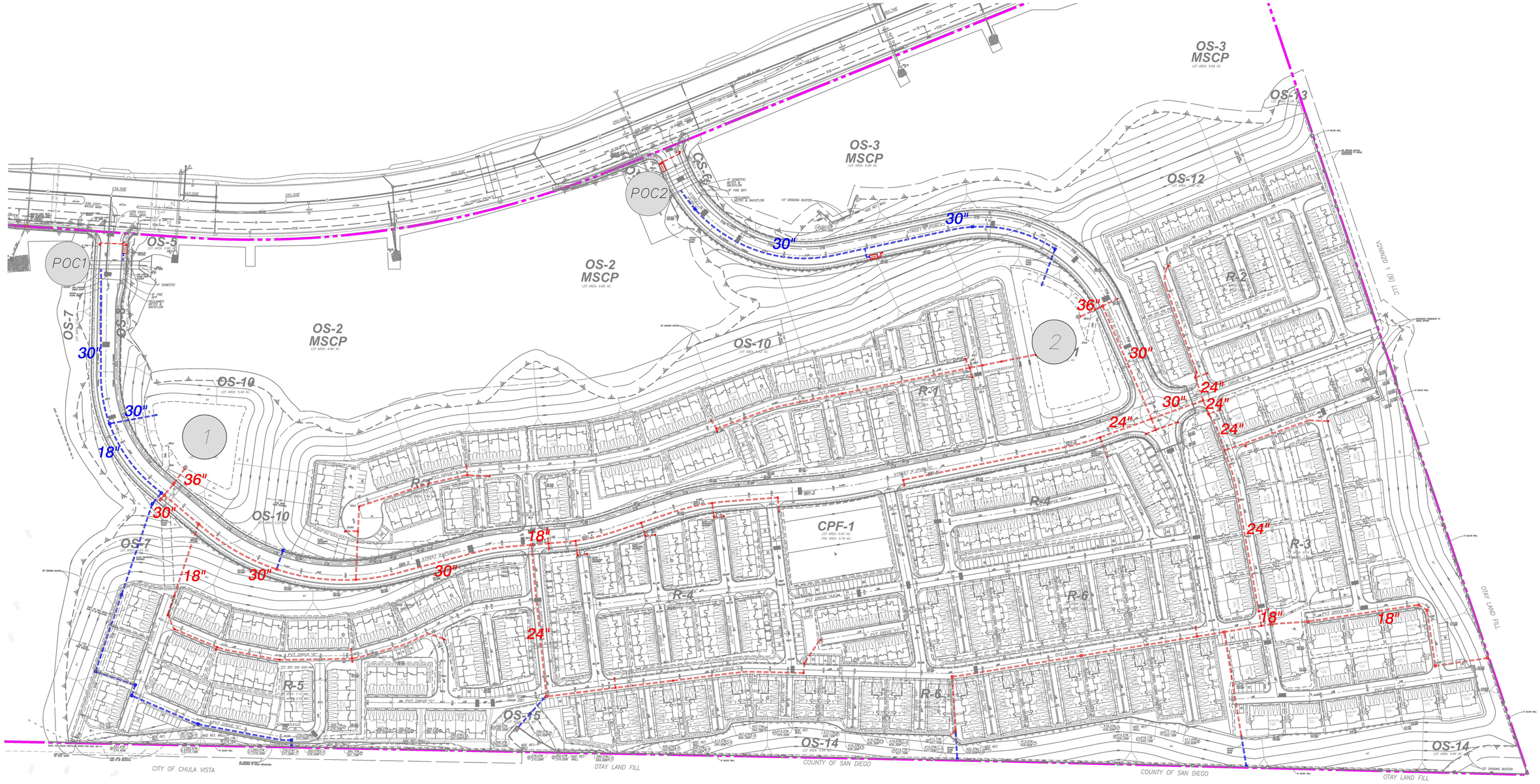
DRAINAGE MAP
PROPOSED CONDITION
SUNBOW II, PHASE 3
CITY OF CHULA VISTA, CALIFORNIA

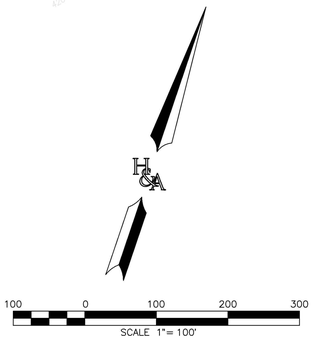
MAP 2 OF 2

W.O. 2167-0151

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CHAPTER 7
Preliminary Pipe Sizing





LEGEND

BYPASS STORMDRAIN

URBAN OR UNTREATED RUNOFF STORM DRAIN

1 WATER QUALITY HYDROMODIFICATION BASIN

NOTE: PIPES 18" UNLESS OTHERWISE NOTED

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PROPOSED CONDITION STORMDRAIN SIZING EXHIBIT SUNBOW II, PHASE 3

CITY OF CHULA VISTA, CALIFORNIA

MAP 1 OF 1

W.O. 2167-0151

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