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HYDROLOGY REPORT
OUTER LOOP FREEWAY
CAP AQUEDUCT TO
SALT RIVER INDIAN RESERVATION

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HYDROLOGY REPORT

OUTER LOOP FREEWAY

CAP AQUEDUCT TO

SALT RIVER INDIAN RESERVATION

Submitted To:

DeLeuw, Cather & Company
One Gateway Center
426 North 44th Street, Suite 252
Phoenix, Arizona 85008

FLOOD CONTROL DISTRICT
AUG 29 '89
ADMIN
FINANCE
REMARKS

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August 19, 1986

Registered Professional Engineer
CERTIFICATE NO.
13505
ROBERT L.
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Date Signed 8/29/86
ARIZONA, U.S.A.

TABLE OF CONTENTS

Page

LIST OF FIGURES ii

LIST OF TABLES ii

I. INTRODUCTION 1

II. DRAINAGE BASIN CHARACTERISTICS 2

2.1 Drainage Area 2
2.2 Land Use 2
2.3 Soil Type and Vegetation 5
2.4 Existing Drainage Facilities 7

III. RAINFALL CHARACTERISTICS 9

IV. HYDROLOGIC MODEL (HEC-1) 12

4.1 Delineation of Drainage Sub-Basins 12
4.2 Interception/Infiltration 14
4.3 Configuration of Hydrologic Model 21

4.3.1 Overland Flow and Channel Routing Parameters 21
4.3.2 Model Components Subject to Revision as Part of the Cross-Drainage System Design Process 27

4.4 Hydrologic Modeling Results 28

4.4.1 Verification of HEC-1 Model and Selection of Design Rainfall Distribution 28
4.4.2 Hydrologic Response 31

APPENDIX A - Hydrographs

APPENDIX B - HEC-1 Printout, 100-Year Event, No Diversion at Thunderbird Road

APPENDIX C - HEC-1 Printout, 100-Year Event, Diversion at Thunderbird Road

APPENDIX D - HEC-1 Printout, 50-Year Event, No Diversion at Thunderbird Road

APPENDIX E - HEC-1 Printout, 50-Year Event, Diversion at Thunderbird Road

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LIST OF FIGURES

Page

Figure 2.1 - Vicinity Map and Drainage Area 3

Figure 2.2 - Present Watershed Land Use (Aerial Photograph) 4

Figure 2.3 - Hydrologic Soil Group Map 6

Figure 3.1 - Rainfall Distributions 11

Figure 4.1 - Drainage Area Sub-Basins (Aerial Photograph) 13

Figure 4.2 - Planned Watershed Land Use 15

Figure 4.3 - Drainage Patterns, Sub-Basin Boundaries and Concentration Points 22

Figure 4.4 - Routing Schematic for HEC-1 Model 23

Figure 4.5 - HEC-1 Output Summary (100-Year Event) 33

Figure 4.6 - HEC-1 Output Summary (50-Year Event) 34

LIST OF TABLES

Table 3.1 - Rainfall Depths as a Function of Recurrence Interval and Duration 10

Table 4.1 - Curve Numbers for Land Use Categories 16

Table 4.2 - Sub-Basin Curve Numbers 18

Table 4.3 - Sub-Basin Overland Flow Kinematic Wave Parameters 25

Table 4.4 - Channel Routing Kinematic Wave Parameters 26

Table 4.5 - Comparison of Peak Flows Based on Storm Duration and Distribution 29

Table 4.6 - Summary of Peak Discharge Rates Developed From Independent Methods 30

I. INTRODUCTION

The purpose of this report is to document the assumptions and methodologies used to develop the hydrology for the Concept Drainage Plan for 2.4 miles of the Outer Loop Freeway Project, extending south along Pima Road from the Central Arizona Project Aqueduct (CAP) to the Salt River Indian Reservation Boundary.

The following sections of this report present a discussion of drainage area characteristics, meteorological conditions, and the results of the hydrologic modeling process that was undertaken to develop the rainfall/runoff data required for the design of a cross-drainage system for this reach of the freeway.

II. DRAINAGE BASIN CHARACTERISTICS

2.1 Drainage Area

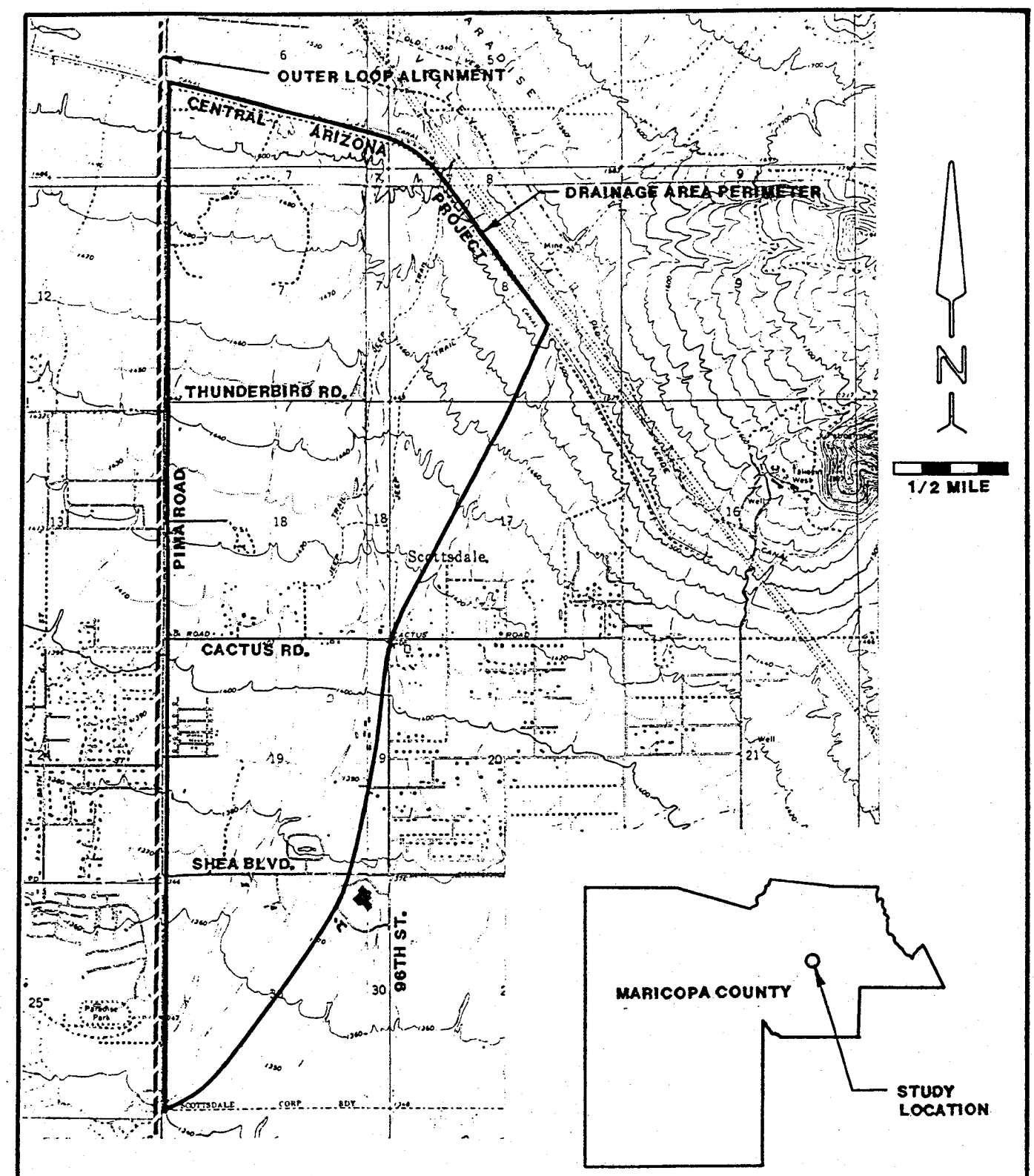
Figure 2.1 presents a vicinity map showing the preliminary freeway alignment and the perimeter of the drainage area contributing runoff to this segment of the freeway. The total contributing drainage area shown on Figure 2.1 is 4.22 square miles.

Although the natural watershed for this reach of the Outer Loop extends into the McDowell Mountains, and encompasses nearly 22 square miles, a major change to the watershed boundaries occurred with construction of the CAP aqueduct. In order to protect this reach of the aqueduct from flooding, the Bureau of Reclamation has constructed a series of earth-embankment, flood control structures known as the Paradise Valley Detention Dikes. The design storage requirement for these structures was based on the summation of the water volume from the maximum probable and 100-year floods, plus an allowance for the estimated 100-year sediment inflow. Since these structures were designed with a high hazard potential (due to high downstream population density), and for a flood event in excess of the design requirements for the Outer Loop cross-drainage system (100-year), justification exists for excluding the drainage area controlled by these structures from the contributing drainage area used in the hydrologic model for this reach of the Outer Loop. Accordingly, the hydrologic model discussed in Section IV of this report, is based on the 4.22 square mile drainage area shown in Figure 2.1.

2.2 Land Use

The northeastern part of Scottsdale, in which the project area is located, is undergoing very rapid development. As of June 1986, approximately 50% of the contributing watershed is still undeveloped. Figure 2.2 is an aerial photograph of the project area which shows the degree of development existing as of June 25, 1986. In reviewing (via aerial photographs) the degree of development that has taken place from 1985 to 1986, it appears certain that the entire 4.22 square mile drainage area will be developed within the next few years.

It is important to consider future land use plans for the watershed because of the impact that land use changes may have on the hydrologic response of the area. The increase in the amount of impervious surface area



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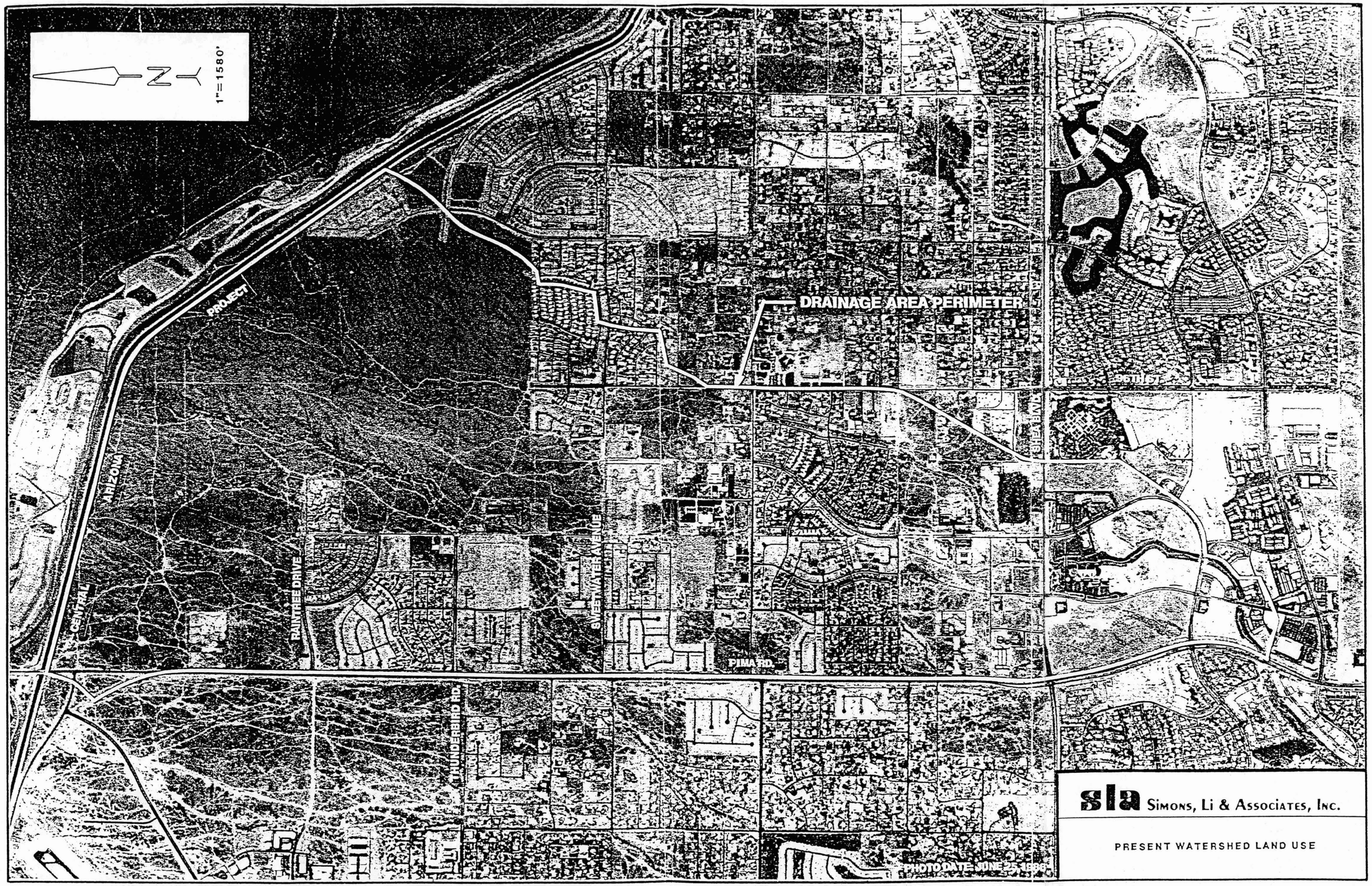
VICINITY MAP & DRAINAGE AREA

FIGURE 2.1


1" = 1580'
PROJECT
DRAINAGE AREA PERIMETER
CENTRAL AVENUE
ARIZONA
PALATTE DRIVE
SWEETWATER AVENUE
THUNDERBIRD RD.
PIMA RD.
PHOTO DATE: JUNE 25, 1996
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PRESENT WATERSHED LAND USE

FIGURE 2.2

and the concentration of flows in streets or improved channels can significantly increase both runoff volumes and peak discharge rates. In order to investigate the potential for such changes, contact was established with the City of Scottsdale. The City provided a copy of the Land Use Element, General Plan, Scottsdale, Arizona (1/1984). This plan projects the entire contributing drainage area as ultimately becoming about 75% residential (with density varying from less than 1 dwelling unit per acre to as many as 22 dwelling units per acre) and the remaining 25% being a combination of commercial, cultural/institutional, office, industrial, utilities, and developed open space.

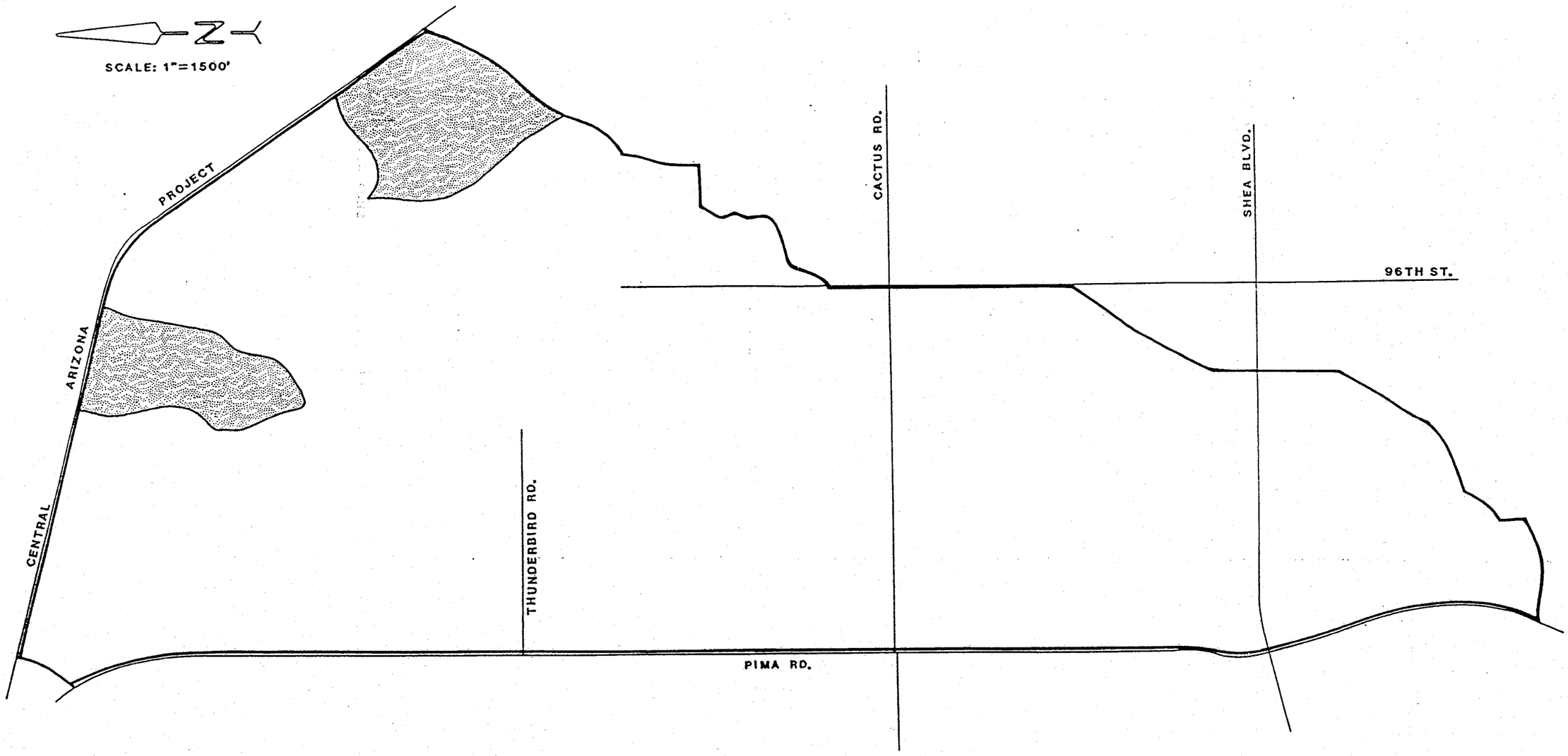
Discussions with the City of Scottsdale indicated that their drainage ordinance will require any future development to comply with the requirement that "peak rates of outflow from developed property be no greater than the peak rates of runoff from the same property under natural conditions with no development." As long as this ordinance is enforced, the undeveloped portions of the watershed can be modeled in their natural condition without the threat of future development causing an increase in flooding potential. This assumption was utilized in selecting SCS curve numbers for the HEC-1 model that was used to generate the rainfall/runoff response for the watershed.

2.3 Soil Type and Vegetation

Soils information is needed in order to model the infiltration characteristics of the watershed. Such information is generally available from Soil Survey Reports published by the Soil Conservation Service (SCS). The watershed for this project was included in the Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona, U.S. Department of Agriculture, April 1986.

Using the standard SCS hydrologic soil group classification system, an estimate can be made of the runoff potential of the soils within any given sub-basin of the project watershed. The SCS system is based on four hydrologic soil groups, A through D. Soils in group A have very low runoff potential (i.e., high infiltration rate), those in group B have moderately low runoff potential, those in group C have moderately high runoff potential, and those in group D have high runoff potential (i.e., very slow infiltration rate).

Figure 2.3 illustrates the composition of the project watershed in terms of hydrologic soil groups. The information in this figure is based on the



LEGEND

- DRAINAGE AREA PERIMETER
- A,B SOIL
- B SOIL

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HYDROLOGIC SOIL GROUP MAP

FIGURE 2.3

previously referenced soil survey. As can be seen from Figure 2.3, the watershed is primarily composed of Group B soils, with a small mixture of A and B soils along the northeastern perimeter.

The vegetation pattern for the undeveloped portion of the watershed is typical desert brush consisting of mesquite, creosote bush, palo verde and acacia trees, cacti, etc. The developed portions of the watershed exhibit a mixture of grass and desert landscaping.

The soils and vegetation data were used in conjunction with existing land use patterns to select Soil Conservation Service (SCS) curve numbers. These curve numbers, which model the hydrologic abstractions and infiltration characteristics of the watershed, are discussed in detail in Section 4.3 of this report.

2.4 Existing Drainage Facilities

The majority of the watershed drains to the Camelback Walk channel, which crosses Pima Road approximately 3/4-mile south of Shea Boulevard. This is a large, man-made channel (bottom-width = 50 feet upstream of Pima Road, with a depth of approximately 10 feet) that extends from Shea Boulevard (just west of 92nd Street), downstream through McCormick Ranch (bottom-width of 150 feet and a depth of 7 feet), and ultimately outlets to Indian Bend Wash. Through the study area, water flows into this channel from both natural tributary channels and underground pipes connected to catch basins along the streets.

The second most prominent drainage channel in the watershed is located along the east side of Pima Road. This channel alignment varies in cross-sectional geometry as it extends from near Greenway Road on the north to Camelback Walk on the south. Improvements to the channel are occurring simultaneously with the development of land along the east side of Pima Road. In all probability, this channel will be replaced as part of the cross-drainage system to be developed for this reach of the Outer Loop.

The natural tributary washes in the watershed are also undergoing improvement as development occurs adjacent to the washes. Such improvements include widening, channel shaping and removal of vegetation. In some instances, channel lining (concrete) has also been used.

Aside from channel improvements, there are small detention/retention basins within some of the newer developments. The storage effect of these

basins was considered in the selection of SCS curve numbers. Specific curve number values used for each sub-basin are presented and discussed in Section 4.3 of this report.

III. RAINFALL CHARACTERISTICS

The hydrologic response of a watershed is dependent upon rainfall characteristics such as depth, duration, and the spatial and temporal distribution of the rainfall event. The rainfall depth is a function of the probability of occurrence and the duration of the event. This probability is expressed as a recurrence interval (50-year, 100-year, etc.), which is defined as the average interval of time within which the magnitude of an event will be equaled or exceeded once. Mathematically, recurrence interval is defined as the reciprocal of the probability of occurrence.

Evaluating storms with different recurrence intervals is required when considering the risk and economic factors associated with the design of a drainage system for a specific meteorological event. In order to incorporate a risk analysis into the freeway design process, ADOT has requested that both the 50- and 100-year storms be evaluated as part of the hydrologic analysis for the Outer Loop.

Rainfall depths for the project drainage area were developed using isopluvial maps and regression equations presented in the Precipitation-Frequency Atlas of the Western United States, Volume VIII - Arizona. Table 3.1 summarizes the precipitation calculations for the 50- and 100-year storms. Due to the small size of the project drainage area (4.22 square miles), an areal reduction factor was not applied to the point precipitation values.

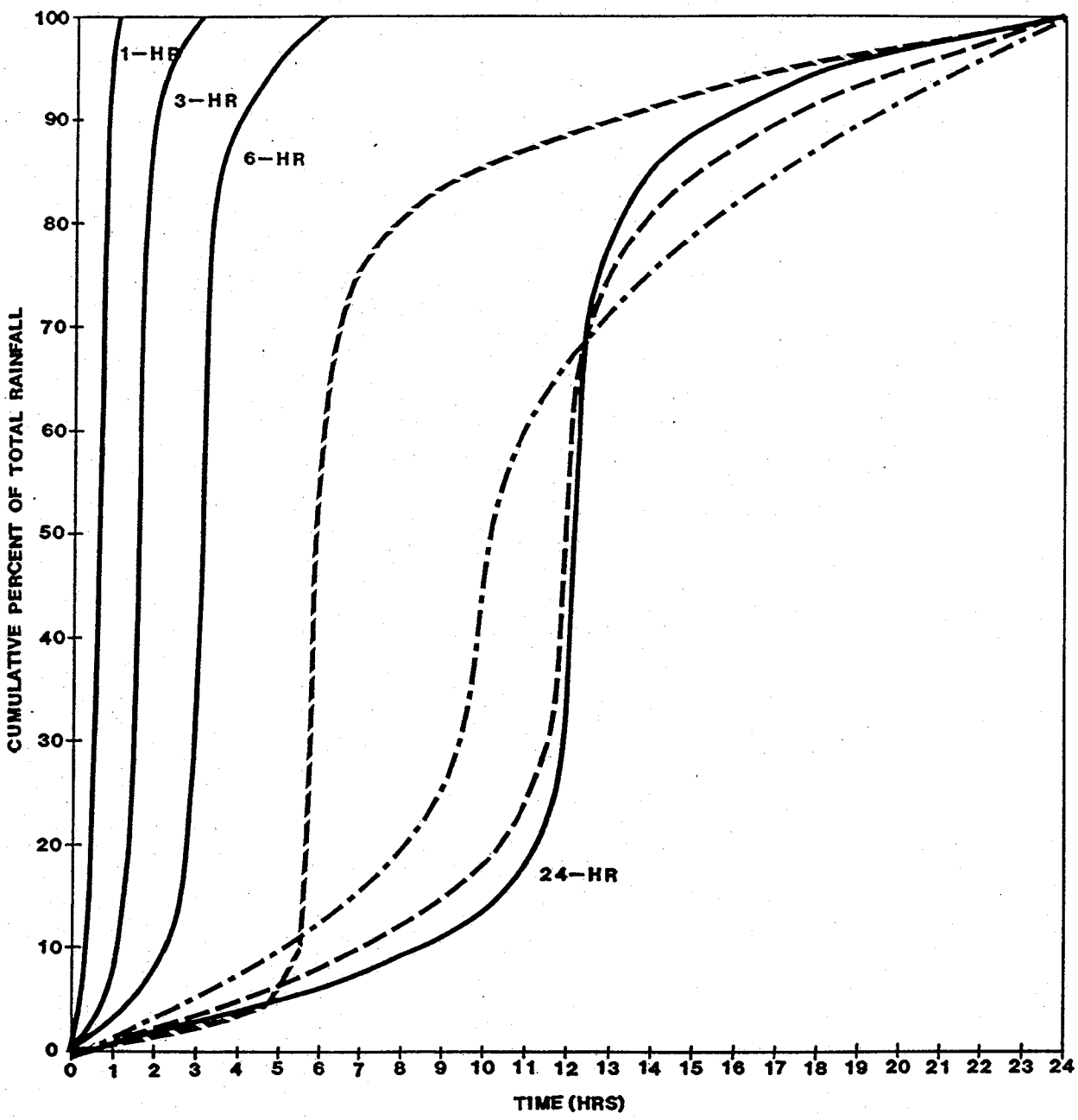
In order to analyze the sensitivity of the watershed to the temporal distribution of rainfall, 1-, 3-, 6-, and 24-hour storms were evaluated. The hypothetical storm subroutine in HEC-1 was used to distribute the rainfall for each of these events. Figure 3.1 presents a graphical comparison of the temporal distribution for each of the four referenced durations. For comparative purposes, the standard 24-hour SCS Type I, Type II, and Type IIA distributions are also shown on Figure 3.1.

All seven of these distributions were evaluated using the HEC-1 model. The selection of the design storm is discussed in Section 4.4.

TABLE 3.1

RAINFALL DEPTHS AS A FUNCTION OF RECURRENCE INTERVAL AND DURATION

Recurrence Interval (Years)	Point Precipitation Values (inches)					
	Duration (hours)					
	1	2	3	6	12	24
50	2.23	2.49	2.67	3.01	3.41	3.82
100	2.47	2.77	2.97	3.35	3.81	4.28



LEGEND

- HEC-1 HYPOTHETICAL
- SCS 24-HR TYPE I
- SCS 24-HR TYPE II
- SCS 24-HR TYPE IIA

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RAINFALL DISTRIBUTIONS

FIGURE 3.1

IV. HYDROLOGIC MODEL (HEC-1)

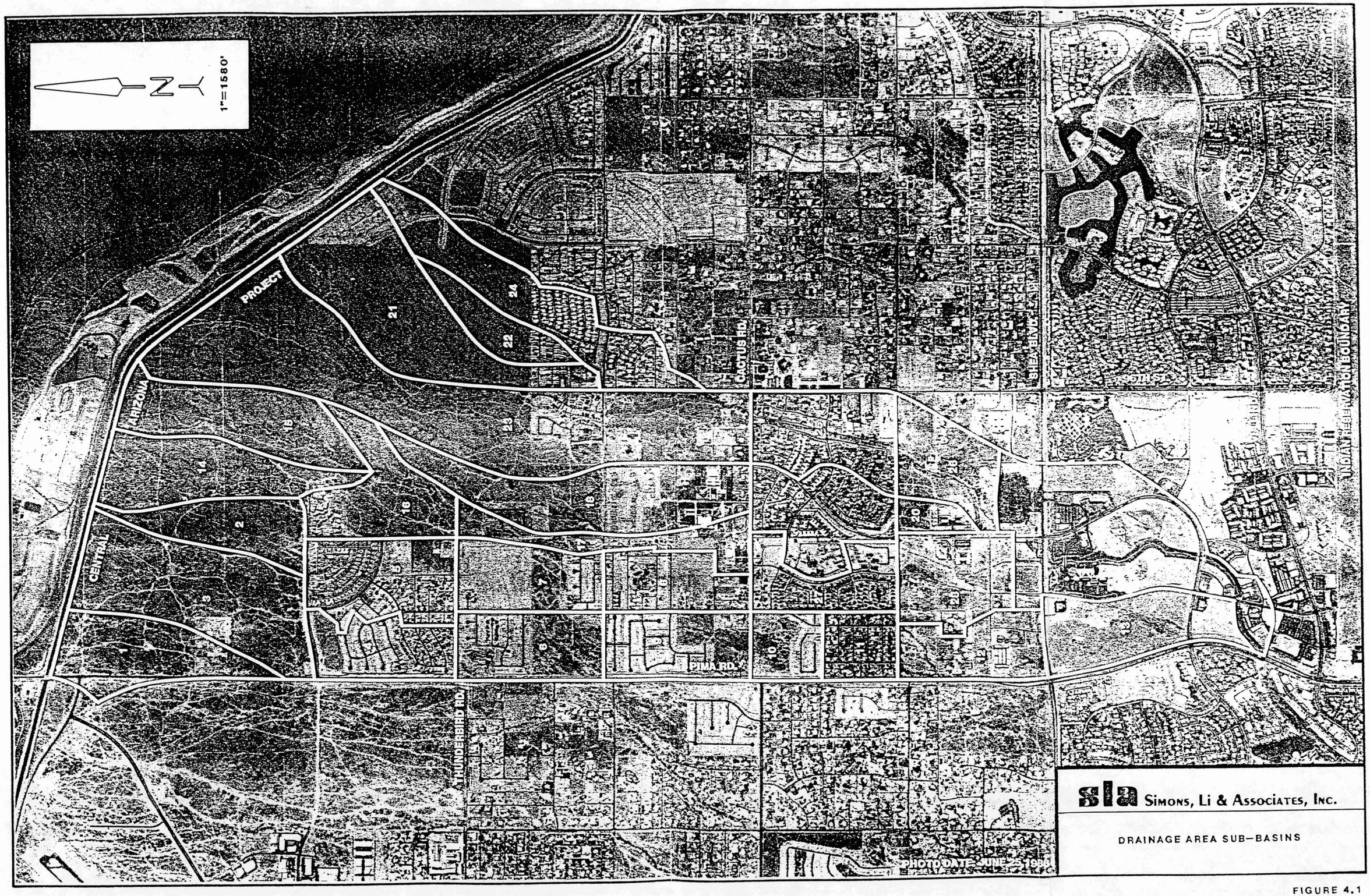
A computerized rainfall/runoff model was developed for the watershed using the U.S. Army Corps of Engineers Flood Hydrograph Package (HEC-1). HEC-1 uses numerical parameters to describe the amount and temporal distribution of rainfall, the runoff characteristics of the watershed, and the hydraulic properties of channels that collect and convey the direct runoff to concentration points. The computer output provides a runoff hydrograph at user selected locations. These hydrographs can be used to design drainage channels, detention/retention basins, or to evaluate the capacity of existing drainage facilities.

This section of the report presents a detailed discussion of specific components of the computer model that was created to simulate the rainfall/runoff response of the watershed. The results of the modeling process are also presented along with a brief discussion of model verification.

4.1 Delineation of Drainage Sub-Basins

The 4.22 square mile watershed was subdivided into 29 sub-basins that were considered to have relatively homogeneous hydrologic properties within their boundaries. Since current topographic maps for the drainage area were not available, sub-basin delineations were based on a review of aerial photographs, U.S.G.S. 7.5-minute quadrangle maps, and extensive field inspections. Where available, grading and drainage plans were also obtained from the City of Scottsdale for individual developments within the watershed. Figure 4.1 presents a June 1986 aerial photograph of the project area with superimposed sub-basin boundaries.

It should be noted that there is a trapezoidal shaped area of approximately 0.4 square miles which lies west of 96th Street between the Salt River Indian Reservation Boundary and the southern bondaries of Sub-Basins 13 and 29. This area drains primarily to the intersection of Pima Road and Via Linda, at which point it will continue southerly along the east side of Pima Road. Since it is not feasible to force this drainage north to the Camelback Walk channel, this area has been excluded from the hydrologic analysis for this reach of the Outer Loop. It is recommended that this small sub-basin be included as part of the hydrologic analysis for that reach of the Outer Loop extending south of the reservation boundary.



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DRAINAGE AREA SUB-BASINS

FIGURE 4.1

4.2 Interception/Infiltration

Precipitation losses due to interception and infiltration were modeled using the SCS curve number option in HEC-1. Selection of curve numbers was based on information gathered on type of soil cover, planned land use, soil moisture conditions, and detention/retention basins. Composite curve numbers were developed for each sub-basin to account for the combined effect of these drainage basin characteristics.

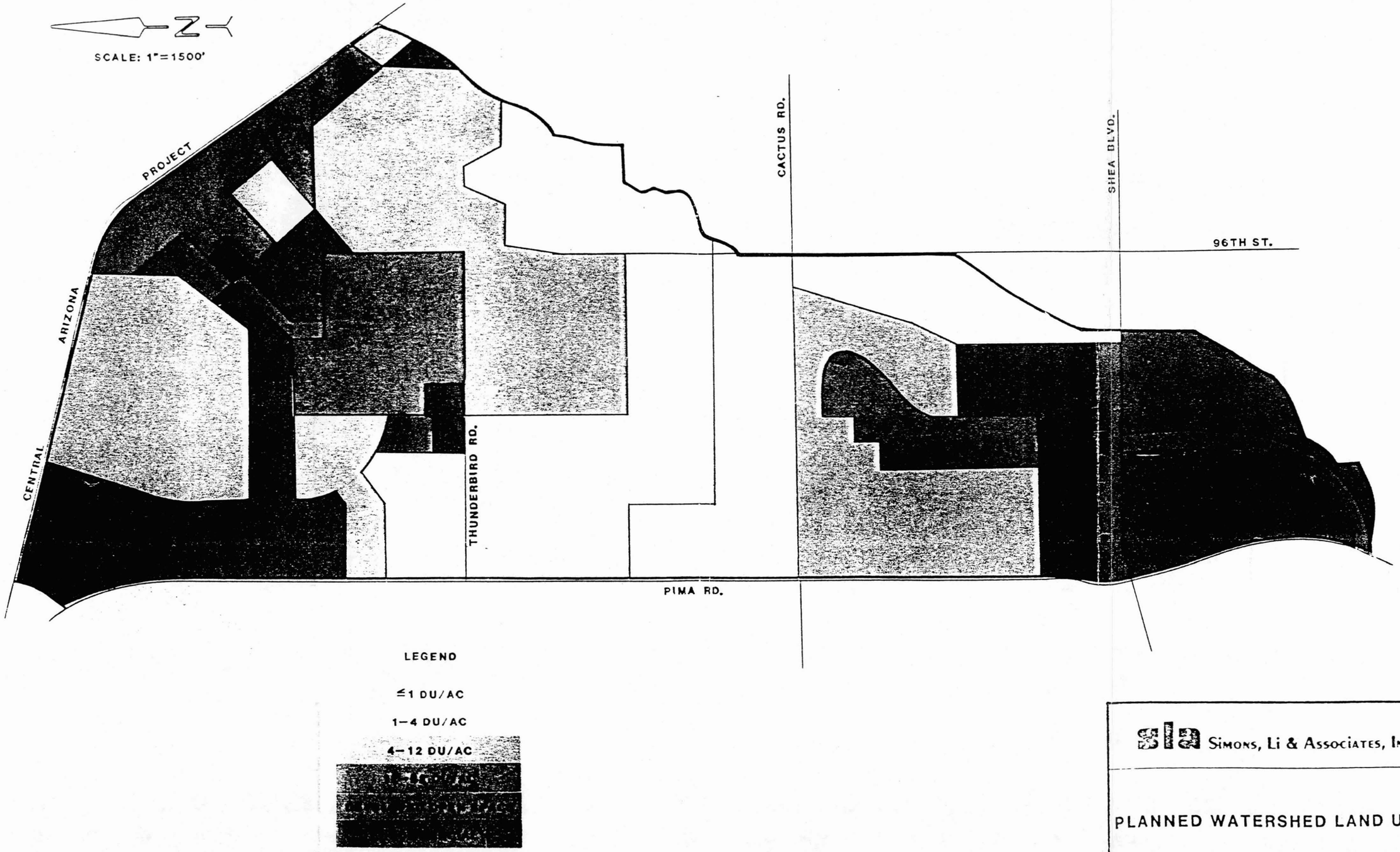
The primary guide used in selecting curve numbers was the City of Scottsdale's manual entitled Design Procedures and Criteria, Section 2, Drainage Report Preparation. Figure 2-16 of that report presents curve numbers for developed residential areas. The undeveloped portions of the basin were assumed to have desert brush with 15% cover density. For soil group B, and in accordance with SCS curves for desert brush vegetation, the curve number for undeveloped land is 83. All sub-basins were assumed to have soil group B as the type of soil cover. It is assumed that any variation of soil characteristics within this general classification will not have a significant effect on the infiltration characteristics.

Planned land use varies significantly throughout the basin and includes residential, commercial, and developed open space areas. Figure 4.2 shows the planned land use within the watershed and is based on the "General Plan" for land use prepared by the City of Scottsdale. Table 4.1 shows the curve numbers that correspond to land use categories. The land use is predominantly either residential or commercial. Large areas of developed or undeveloped open space are not planned, which means that for most areas of the basin composite curve numbers are in the range of 84 to 92.

Soil moisture conditions were assumed to correspond to an average moisture content prior to the time the rainstorm event occurs. This condition is designated as AMC-II by the Soil Conservation Service.

As previously discussed in Section 2.2, the City of Scottsdale requires that urban development be implemented in a manner that will not increase the peak rate of runoff beyond that existing under present-day conditions. This concept was approved by the City Council with the adoption of Ordinance No. 1644 on June 4, 1984.

Prior to adoption of this ordinance, most residential development had not provided a means to reducing peak runoff. This was observed during field



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PLANNED WATERSHED LAND USE

FIGURE 4.2

TABLE 4.1

CURVE NUMBERS FOR LAND USE CATEGORIES

Land Use Category	Curve Number
Developed Open Space	73
Undeveloped (desert brush)	83
1/10 - 1/5 DU/Ac.	84
1/5 - 1 DU/Ac.	85-87
1 - 2 DU/Ac.	87-88
2 - 4 DU/Ac.	88-90
4 - 8 DU/Ac.	90-91
8 - 12 DU/Ac.	92
Comercial	92
Paved Surfaces	98

inspections of the watershed. However, it was also observed that most commercial developments in the watershed do include basins for onsite detention/retention of runoff. The exception is commercial development adjacent to Camelback Walk between Shea Boulevard and Pima Road. Commercial development in this area has been allowed to discharge runoff directly to the channel without any provisions for temporary storage in detention basins. This practice has been allowed on the assumption that the majority of runoff from these commercial developments will be gone prior to the arrival of the peak discharge in the Camelback Walk channel.

Informal discussions with City of Scottsdale staff indicate a committment to enforce the provisions of Ordinance No. 1644. Accordingly, for the purpose of this hydrologic analysis, it was assumed that areas that are presently undeveloped, but forecast by Scottsdale to develop in the future, will provide detention/retention storage so that the peak rate of runoff will be the same for both pre- and post-development conditions. Such basins were modeled with a curve number of 84. If some development had taken place prior to 1984, but the basin was largely undeveloped, a curve number of 86 was used. The City staff has informally concurred in this approach.

For residential land use areas approved for construction prior to June 1984, it was assumed that no provisions exist for onsite detention/retention of storm water runoff. Accordingly, these areas were modeled with curve numbers representative of the increase in runoff potential.

Residential development that has occurred after June 1984 was evaluated through a review of available grading and drainage plans and by site inspections. It was found that runoff from the eastern portion of the Scottsdale Vista North development is controlled by a large detention pond. No other developments with significant detention were identified.

Table 4.2 summarizes soil classification, planned land use, existing land use status, runoff detention conditions, and curve number selection for all sub-basins in the watershed. The residential housing density listed in Table 4.2 is expressed in dwelling units per acre (DU/Ac), which is the average of all residential land use in a sub-basin. The status of development indicates whether significant development had begun in the sub-basin as of June 1985.

TABLE 4.2

SUB-BASIN CURVE NUMBERS

Sub-Basin	Soil Class	Planned Land Use	Status	Detention	Curve No.
1	B	100% Comm.	Undev.	Yes	84
2	B	70% Res 8 DU/AC; 30% Comm.	Undev.	Yes	84
3	B	50% Res 8 DU/AC; 50% Comm.	Undev.	Yes	84
4	B	75% Res 6 DU/AC; 25% Comm.	Undev.	No	91
5r*	B	70% Res 8 DU/AC; 30% Dev. Open	Dev.	Yes	84
1	B	90% Res 6 DU/AC; 10% Comm.	Dev.	No	91
6	B	100% Res 2 DU/AC	Undev.	Yes	84
7	B	100% Res 2 DU/AC	Undev.	Yes	84
8	B	100% Res 1 DU/AC	Dev.	No	88
9	B	100% Res 0.2 DU/AC	Dev.	No	84
10	B	100% Res 8 DU/AC	Undev.	Yes	84
11	B	100% Res 4 DU/AC	Dev.	No	90
12	B	50% Res 8 DU/AC; 50% Comm.	Part Dev.	Some	90
13	B	100% Comm.	Undev.	Yes	84
14r	B	90% Res 8 DU/AC; 10% Comm.	Undev.	Yes	84
1	B	90% Res 8 DU/AC; 10% Comm.	Undev.	Yes	84
15r	B	40% Res 10 DU/AC; 30% Comm.	Undev.	Yes	84
1	B	and 30% Dev. Open	Undev.	Yes	84
16r	B	90% Res 16 DU/AC; 10% Comm.	Undev.	Yes	84
1	B	90% Res 16 DU/AC; 10% Comm.	Undev.	Yes	84

TABLE 4.2, continued

SUB-BASIN CURVE NUMBERS

Sub-Basin	Soil Class	Planned Land Use	Status	Detention	Curve No.
17r	B	100% Res 2 DU/AC	Undev.	Yes	84
1	B	100% Res 2 DU/AC	Undev.	Yes	84
18r	B	100% Res 5 DU/AC	Undev.	Yes	84
1	B	100% Res 5 DU/AC	Undev.	Yes	84
19r	B	100% Res 4 DU/AC	Dev.	Yes	90
1	B	100% Res 4 DU/AC	Dev.	Yes	90
20r	B	100% Comm.	Undev.	Some	90
1	B	100% Comm.	Undev.	Some	90
21r	B	100% Res 8 DU/AC	Undev.	Yes	84
1	B	100% Res 8 DU/AC	Undev.	Yes	84
22r	B	100% Res 2 DU/AC	Undev.	Yes	84
1	B	100% Res 2 DU/AC	Undev.	Yes	84
23r	B	100% Res 10 DU/AC	Undev.	Yes	86
1	B	100% Res 10 DU/AC	Undev.	Yes	86
24r	B	90% Res 3 DU/AC; 10% Comm.	Dev.	No	90
1	B	90% Res 3 DU/AC; 10% Comm.	Dev.	No	90
25r	B	100% Res 1/2 DU/AC	Dev.	No	86
1	B	100% Res 4 DU/AC	Dev.	No	90
26r	B	60% Res 1/2 DU/AC; 40% Comm.	Undev.	Yes	84
1	B	100% Comm.	Undev.	Yes	84

TABLE 4.2, continued

SUB-BASIN CURVE NUMBERS

Sub-Basin	Soil Class	Planned Land Use	Status	Detention	Curve No.
27r	B	100% Res 10 DU/AC	Dev.	No	92
1	B	100% Res 4 DU/AC	Dev.	No	90
28r	B	60% Res 16 DU/AC; 40% Comm.	Undev.	Yes	86
1	B	60% Res 8 DU/AC; 40% Comm.	Undev.	Yes	86
29r	B	100% Comm.	Dev.	No	92
1	B	100% Comm.	Dev.	No	92

* r, 1 - denote right and left planes of the sub-basin (looking upstream), respectively.

4.3 Configuration of the Hydrologic Model

The HEC-1 model developed by the Corps of Engineers Hydrologic Engineering Center, was used to simulate runoff conditions in the study area. The kinematic wave option was used to determine the hydrologic response of the sub-basin areas and for routing the resulting hydrographs through the tributary channels of the basin. This option was selected because runoff processes can be simulated using measurable geographic features such as overland flow elements and the shape, boundary roughness, length, and slope of channel elements. Unlike unit hydrograph techniques, the kinematic wave approach also provides for a non-linear response of runoff characteristics, i.e., peak discharge does not necessarily increase linearly with direct runoff when using the kinematic wave methodology.

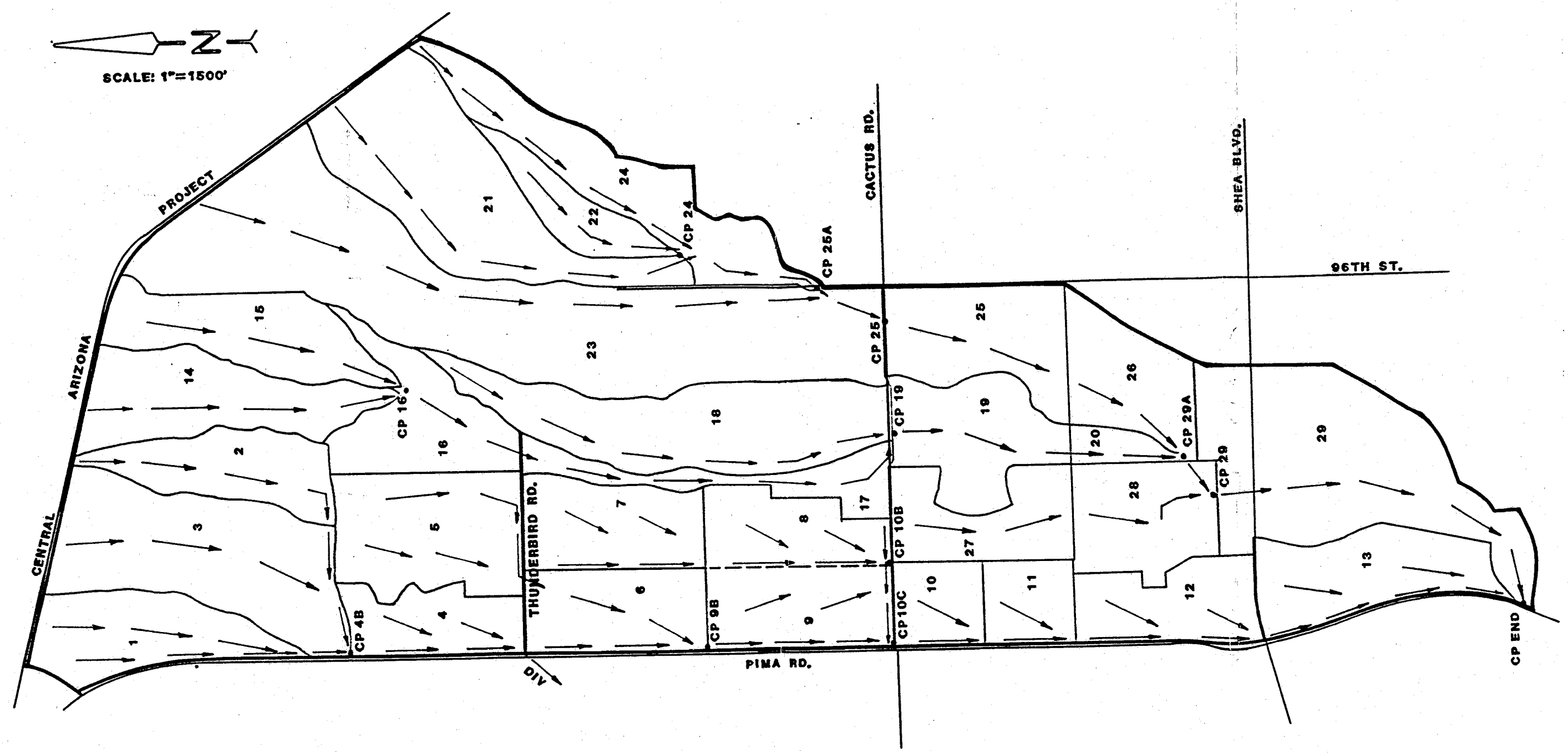
A network of sub-basins and connecting channels was configured that simulated the natural drainage pattern in the basin. Figure 4.3 presents an illustration of the drainage patterns, sub-basin boundaries, and concentration points used in the model, while Figure 4.4 is a schematic diagram of the model.

The kinematic wave option allows for three stream network elements: 1) sub-basin areas contributing runoff to a collector channel; 2) sub-basin areas, as in Element #1, but with an upstream hydrograph routed through the collector channel; and 3) channel routing reaches. Collection or concentration points are used in the model to arithmetically sum hydrographs that combine at confluences.

4.3.1 Overland Flow and Channel Routing Parameters

The kinematic wave calculations used in HEC-1 are based on the hydraulic properties of simple geometric elements such as overland flow planes and prismatic channel cross-sections. These elements are selected and dimensioned so as to simulate the physical drainage characteristics of a specific watershed sub-basin.

For this project, overland flow planes were used to model the wide, flat shallow-flow areas across the desert and urbanized areas of the watershed. These planes are described in terms of an average overland flow length, slope, and roughness coefficient. Lengths and slopes were measured from aerial photographs and the 7.5-minute quadrangle maps, while roughness values were based



LEGEND

———	DRAINAGE AREA PERIMETER
———	SUB–BASIN BOUNDARY
——→	FLOW PATH
•CP 25	CONCENTRATION POINT

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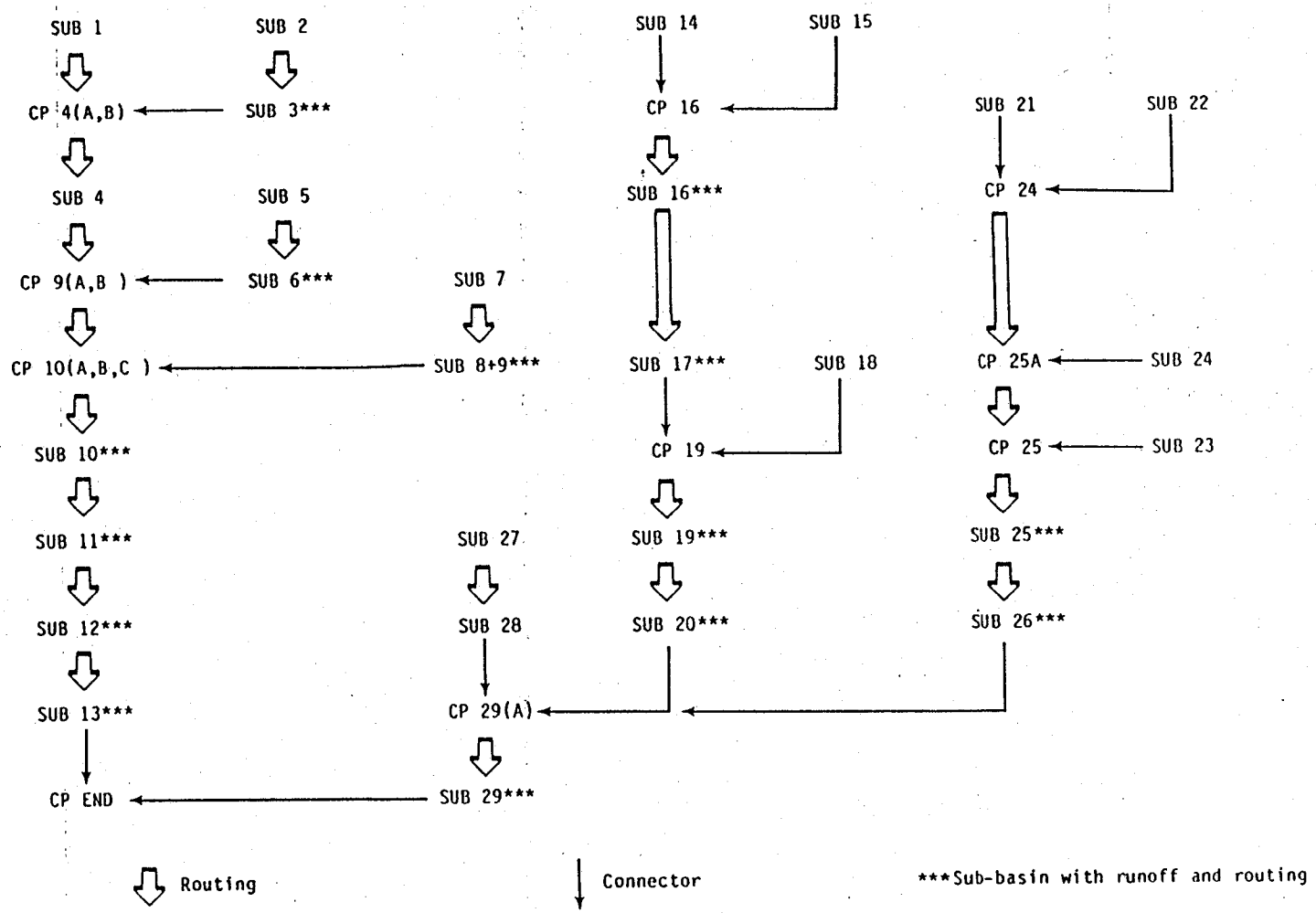
DRAINAGE PATTERNS, SUB–BASIN BOUNDARIES AND CONCENTRATION POINTS

FIGURE 4.3

SCHEMATIC DIAGRAM OF STREAM NETWORK



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ROUTING SCHEMATIC FOR HEC—1 MODEL

FIGURE 4.4

on recommendations presented in the HEC-1 Users Manual. Typical roughness values for desert areas were 0.1, while those used in urban sub-basins ranged from 0.05 to 0.1, depending upon degree of urbanization.

Sub-basins can be described in terms of one or two planes discharging to the collector channel. Table 4.3 summarizes overland flow kinematic wave parameters used for the sub-basins in the study area.

The well-defined washes that collect runoff from the overland flow planes were modeled as either triangular or trapezoidal cross-sections. Data requirements for the channel routing of hydrographs using the kinematic wave option include reach length, channel slope, channel shape, and roughness coefficient. The dimensions and roughness values for these collector channels were determined from a comparison of the hydraulic conveyance of actual surveyed cross-sections to the conveyance of an equivalent prismatic section. This was accomplished by developing a rating curve of Depth versus Conveyance for a wide range of depths in the natural cross-section. Depending on the cross-sectional geometry, these rating curves were plotted for a maximum flow depth of approximately 1.0 to 1.5-feet above the bank of the main channel portion of the cross-section. Again, depending on site specific conditions, the maximum lateral exent of overbank flow varied from approximately 30- to 150-feet. Any water beyond these lateral limits was assumed to be in a noneffective flow area.

Once the baseline conveyance curve was established, a trial and error procedure was employed whereby different prismatic sections were evaluated over the same range of flow depths used for the natural section. The geometry and "n" value of the prismatic sections were adjusted until a cross-section was found that exhibited a similar conveyance curve to that generated for the natural baseline section. The prismatic section that most nearly duplicated the conveyance characteristics of the natural section was used for the kinematic routing of flow through the sub-basin traversed by the natural channel cross-section. Table 4.4 summarizes channel routing kinematic wave parameters for all collectors and main channel reaches in the study area.

TABLE 4.3

SUB-BASIN OVERLAND FLOW KINEMATIC WAVE PARAMETERS

Sub-Basin	Percent in each Plane	Overland Flow Length (ft)	Slope (ft/ft)	Rougness Coefficient
1	100	1965	.0102	0.10
2	100	2885	.0099	0.10
3	100	2920	.0099	0.10
4	100	1154	.0052	0.06
5	46	450	.0050	0.025
	54	3020	.0050	0.025
6	100	1730	.0092	0.08
7	100	1254	.0043	0.07
8+9	40	1025	.0047	0.08
	60	1635	.0063	0.10
10	100	1105	.0094	0.07
11	100	1745	.0080	0.07
12	100	1440	.0083	0.06
13	100	1460	.0061	0.06
14	64	1075	.0140	0.10
	36	661	.0136	0.10
15	33	365	.0133	0.10
	67	885	.0129	0.10
16	25	830	.0102	0.10
	75	1170	.0098	0.10
17	54	240	.0085	0.09
	46	210	.0143	0.09
18	26	235	.0128	0.09
	74	1020	.0098	0.09
19	55	1175	.0042	0.07
	45	1040	.0030	0.07
20	17	120	.0083	0.06
	83	715	.0098	0.06
21	26	410	.0098	0.09
	74	1755	.0134	0.09
22	51	370	.0176	0.09
	49	490	.0179	0.09
23	74	1605	.0125	0.10
	26	610	.0172	0.10
24	20	175	.0171	0.09
	80	955	.0168	0.09
25	48	1400	.0030	0.10
	52	885	.0030	0.07
26	34	790	.0076	0.06
	66	885	.0068	0.08
27	40	335	.0030	0.07
	60	500	.0030	0.07
28	31	755	.0079	0.06
	69	985	.0081	0.06
29	33	745	.0054	0.06
	67	1710	.0064	0.06

TABLE 4.4

CHANNEL ROUTING KINEMATIC WAVE PARAMETERS

Reach	Length (ft)	Slope (ft/ft)	Roughness Coefficient	Bottom Width (ft)	Side Slope
SUB-1 Collector	4220	0.0101	0.016	10	1
SUB-1 to CP 4[1]	500	0.0100	0.016	10	1
SUB-2 Collector	1200	0.0021	0.025	25	1
SUB-3 Collector	1580	0.0027	0.025	25	1
SUB-4 Collector	2785	0.0083	0.016	12	1
SUB-4 to CP 9	2285	0.0088	0.016	12	1
SUB-5 Collector	2530	0.0040	0.025	25	1
SUB-6 Collector	2800	0.0075	0.040	0	100
CP 9 to CP 10[2]	2665	0.0067	0.016	15	1
SUB-7 Collector	2565	0.0082	0.040	0	100
SUB-8+9 Collector	2665	0.0071	0.025	25	1
SUB-8+9 to CP 10	1335	0.0015	0.025	25	1
SUB-10 Collector	1325	0.0072	0.016	15	1
SUB-11 Collector	1325	0.0072	0.016	16	1
SUB-12 Collector	2665	0.0071	0.016	17	1
SUB-13 Collector	4000	0.0053	0.016	17	1
SUB-14 Collector	5360	0.0080	0.025	5	8
SUB-15 Collector	5310	0.0075	0.037	6	5
SUB-16 Collector	1895	0.0095	0.037	6	5
SUB-17 Collector	5970	0.0069	0.025	5	6
SUB-18 Collector	7590	0.0074	0.065	0	9
SUB-19 Collector	2850	0.0053	0.030	6	6
SUB-20 Collector	1510	0.0079	0.032	10	6
SUB-21 Collector	6560	0.0120	0.035	1	7
SUB-22 Collector	3630	0.0152	0.030	1	13
CP 24 to CP 25A	1992	0.0080	0.025	3	7
SUB-24 Collector	4221	0.0120	0.025	3	7
CP 25A to CP 25	1023	0.0049	0.035	8	4
SUB-23 Collector	11,130	0.0079	0.035	8	4
SUB-25 Collector	2655	0.0068	0.036	12	3
SUB-26 Collector	2585	0.0046	0.038	2	6
SUB-27 Collector	2695	0.0074	0.025	25	1
SUB-28 Collector	2510	0.0056	0.036	10	3
SUB-29 Collector	5730	0.0051	0.025	50	3.9

[1] Same location as CP 4B

[2] Same location as CP 9B and CP 10C, respectively

4.3.2 Model Components Subject to Revision as Part of the Cross-Drainage System Design Process

Depending on the design concept that is ultimately selected for the cross-drainage system for this reach of the freeway, some revisions may be required to the HEC-1 model that is presented herein. Such model changes would be associated with the "channel" that routes hydrographs from north to south along the east side of Pima Road. Two factors, which will affect this channel, are discussed as follows:

1. Upstream Diversion - Under existing conditions, a small wash crosses Pima Road immediately south of Thunderbird Road. If the freeway cross-drainage concept maintains this crossing as part of the freeway drainage system, flows above this location will not be routed south along the east side of Pima Road. The drainage that would be diverted from the system at this location includes runoff from Sub-basins 1, 2, 3, and 4. The locations of this diversion is shown as "DIV" on Figure 4.3. Excluding this runoff will obviously have an impact on any drainage channel that might be designed along the east side of Pima Road.

Preliminary indications are that this reach of the freeway will be a depressed section. Under such conditions, it would not be feasible to maintain this drainage crossing at Thunderbird Road; the alternative would be to route the flows south along the east side of Pima Road. However, to provide flexibility during the concept drainage design phase, the HEC-1 model has been configured both with and without a "DIVERT" element at Thunderbird Road. As a result, hydrologic design data is available for either condition.

2. Channel Slope Along Pima Road - It appears that a drainage channel along the east side of Pima Road will be a major component of the drainage system for this reach of the freeway. The bed-slope and cross-sectional geometry for such a channel will not be known until the concept drainage design is completed. The selection of these channel characteristics will influence the hydrograph routing through the channel. Depending on the final channel configuration, the arrival of the hydrograph at the intersection with the Camelback Walk channel (CP END) can be either delayed or advanced. The timing and combining of hydrographs at this location is critical to the deter-

mination of the peak discharge that will be used for the Camelback Walk crossing of the freeway. Accordingly, during the concept drainage plan analysis and final design for the drainage system, it is recommended that the appropriate channel characteristics be input to the HEC-1 model and the model rerun to determine the final design discharge at points along the Pima Road channel and at the Camelback Walk crossing of the proposed freeway.

The HEC-1 model presented in this report uses the channel dimensions presented in Table 4.4.

4.4 Hydrologic Modeling Results

4.4.1 Verification of HEC-1 Model and Selection of Design Rainfall Distribution

As discussed in Section III, seven rainfall distributions were evaluated in order to determine watershed sensitivity to the duration and distribution of rainfall. Table 4.5 presents a summary of the peak discharge obtained from each of these distributions at concentration point "CP END". Since the SCS Type I distribution is not very representative of rainfall characteristics in the southwestern United States, it was discarded from further consideration. Of the remaining six distributions, it is apparent that a 24-hour event will produce the most severe runoff conditions for this specific watershed.

In order to provide verification of the HEC-1 model and obtain guidance as to which of the remaining 24-hour storms is most realistic for this drainage area, two independent hydrologic calculations were performed. These procedures, which both provide estimates of peak discharge, are listed as follows:

1. Peak Discharge equation from the Hydrology Manual For Engineering Design and Floodplain Management Within Pima County, Arizona, September 1979.

2. Flood Characteristics of Urban Watersheds in the United States, USGS Water Supply Paper 2207, 1983-1984.

Method No. 1 is a procedure that was developed for predicting peak discharge rates for surface runoff from small semi-arid watersheds. The pro-

TABLE 4.5

COMPARISON OF PEAK FLOWS BASED ON STORM DURATION AND DISTRIBUTION

Storm Duration (hours)	Storm Distribution	Peak Flow (cfs) at CP END	
		100-Year	50-Year
1	Hypothetical	2187	1722
3	Hypothetical	2785	2209
6	Hypothetical	3040	2429
24	Hypothetical	3913	3099
24	SCS Type 1	1680	1357
24	SCS Type II	3035	2347
24	SCS Type IIA	3373	2548

cedure has been field checked against measured runoff data from drainage basins in southern Arizona and has consistently provided excellent comparisons. This method uses a basin factor, which represents a composite roughness coefficient of all principal water courses within a watershed, and other data (rainfall, curve numbers, slopes, etc.) that physically describe the hydrologic features of the specific basin being evaluated. For this study, a basin factor of 0.022 was used to represent light to moderate urbanization that includes some commercial development (see page 74 of the manual) at a density of 3 to 5 houses per acre.

Method No. 2 was developed from a nationwide sample of 199 urban basins with drainage areas between 0.2 and 100 square miles. The method is based on a regression analysis of drainage data collected from these basins and also utilizes a basin development factor (BDF) which provides a measure of the efficiency of the watershed's drainage system. A BDF of 9 was used for the analysis presented in this report.

Table 4.6 presents the results of this comparative analysis for the 100-year event. These peak discharge values show very close correlation with results obtained from HEC-1 using the SCS Type IIA distribution. Discussions with SCS indicate that the Type IIA distribution was developed from rainfall data in New Mexico and is frequently applied to small drainage areas of approximately 5 square miles or less.

TABLE 4.6

SUMMARY OF PEAK DISCHARGE RATES

DEVELOPED FROM INDEPENDENT METHODS

100-YEAR EVENT

Method	Peak Discharge, cfs
Pima County	3260
USGS	3440

It should be noted that all 24-hour duration storms evaluated as part of this study utilized SCS curve numbers that were not adjusted for storm duration. Research conducted by Woodward (Runoff Curve Numbers for Semiarid Range and Forest Conditions, 1973) shows a definite reduction in curve number as storm durations increase beyond 1-hour. Since the curve numbers used in this study were based on 1-hour storm durations, with no reduction in accordance with data published by Woodward, the peak discharge rates listed for the 24-hour storms in this report should be conservative.

Subsequent to a review of the hydrologic output from HEC-1, DeLeuw, Cather & Company (Outer Loop Management Consultant) and the Arizona Department of Transportation requested that the HEC-1 hypothetical rainfall distribution be used for the concept drainage plan for this reach of the Outer Loop. Accordingly, the 24-hour, HEC-1 hypothetical storm will be used as the design event.

4.4.2 Hydrologic Response

The hydrologic response of the study area can be characterized by peak discharge, time to peak and the lag time between peak rainfall intensity and peak discharge. In general, the hydrologic response of the basin is rapid, meaning that runoff takes place quickly following rainfall and that runoff will not persist very long past the end of the storm event.

The peak rainfall intensity occurs during hour twelve of the HEC-1 hypothetical storm. Runoff from the sub-basins lags this period by about 15 to 30 minutes, while the peak flow at the basin outlet at Pima Road lags by 30 minutes. Peak flow rates, times to peak and runoff volume are summarized on Figure 4.5 (100-year event) and Figure 4.6 (50-year event). Both of these figures list data for the HEC-1 hypothetical distribution. Hydrographs at selected locations along Pima Road and at the basin outlet are presented in the Appendix.

As indicated by the hydrologic response, the channel routing times are very brief. This means that channel velocities will be high for most channels in the study area. Normal depth calculations for these channels indicate estimated channel velocities of 15-18 ft/sec at peak discharge. These velocities are consistent with the computed channel routing times of 15 minutes in the HEC-1 simulation.

Note:

The USGS quadrangle map presented in Figures 4.5 and 4.6 was prepared in the 1964-1965 era and was last photo-revised in 1982. As a result, it shows very little of the development that has taken place in the watershed in recent years. Some of this development has altered natural drainage paths to the extent that some of the washes shown on Figures 4.5 and 4.6 no longer exist. In some cases this creates what may appear as an illogical sub-basin delineation, i.e., washes passing through the side of a sub-basin boundary. However, such sub-basin delineations are based on drainage patterns that exist as of June 1986.

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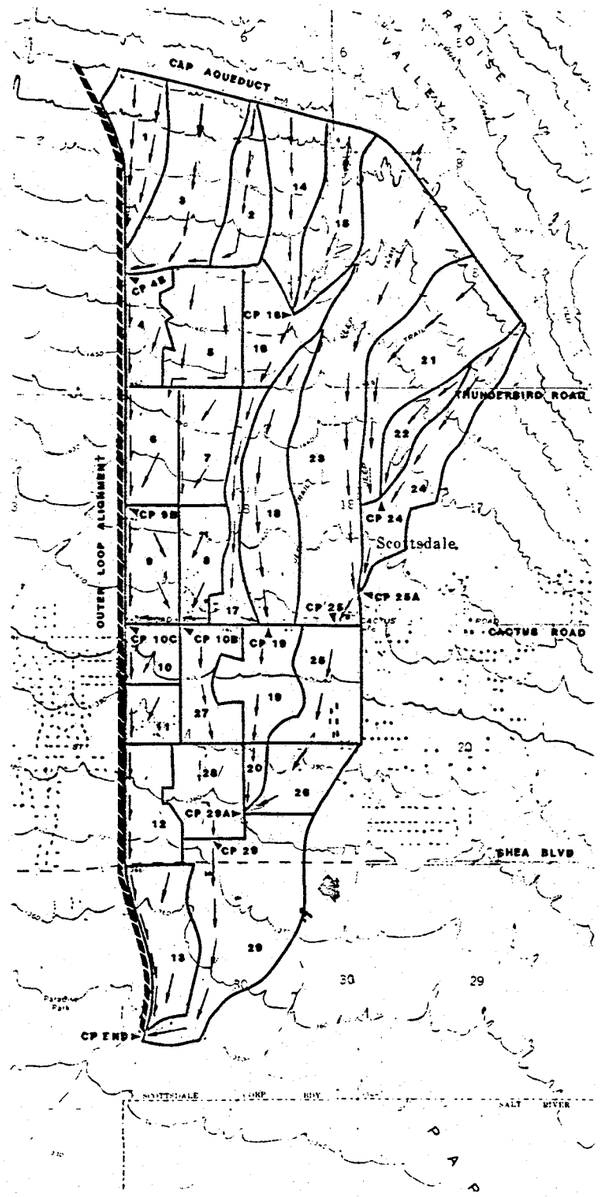

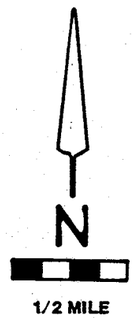

Registered Professional Engineer (Civil)
CERTIFICATE NO. 13505
ROBERT L. WARD
Date Signed 5/29/86
ARIZONA, U.S.A.

HYDROLOGY SUMMARY

100-Year Event

Operation	Station	Curve Numbers	Sub-Basin Area (sq. mi.)	Contributing Basin Area (sq. mi.)	No Diversion @ Thunderbird Road			Diversion @ Thunderbird Road		
					Peak Flow (cfs)	Time of Peak (hrs)	Volume (ac-ft)	Peak Flow (cfs)	Time of Peak (hrs)	Volume (ac-ft)
Hydrograph At	Sub 1	84	0.12	0.12	104	12.75	16	104	12.75	16
Routed to	CP 4A			0.12	103	12.75	16	103	12.75	16
Hydrograph At	Sub 2	84	0.11	0.11	69	13.00	14	69	13.00	14
Hydrograph At	Sub 3	84	0.22	0.33	203	13.00	42	203	13.00	42
2 Combined At	CP 4B			0.45	290	13.00	58	290	13.00	58
Hydrograph At	Sub 4	91	0.09	0.54	445	12.75	74	445	12.75	74
Diversion At	Sub 4				N/A	N/A	N/A	445	12.75	74
Hydrograph At	CP 9A			0.54	426	12.75	74	0	N/A	0
Hydrograph At	Sub 5	91, 84	0.16	0.16	305	12.50	24	305	12.50	24
Hydrograph At	Sub 6	84	0.12	0.28	354	12.75	40	354	12.75	40
2 Combined At	CP 9B			0.82	780	12.75	114	354	12.75	40
Routed to	CP 10A			0.82	734	12.75	114	325	12.75	40
Hydrograph At	Sub 7	84	0.11	0.11	120	12.75	14	120	12.75	14
Hydrograph At	Sub 8&9	88, 84	0.21	0.32	312	12.75	44	303	12.75	44
Routed to	CP 10B			0.32	297	12.75	44	287	12.75	44
2 Combined At	CP 10C			1.14	1031	12.75	156	611	12.75	84
Hydrograph At	Sub 10	84	0.06	1.20	1104	12.75	164	694	12.75	92
Hydrograph At	Sub 11	90	0.06	1.26	1168	12.75	174	767	12.75	102
Hydrograph At	Sub 12	90	0.10	1.36	1301	12.75	190	921	12.75	116
Hydrograph At	Sub 13	84	0.14	1.50	1363	12.75	208	1016	12.75	136
Hydrograph At	Sub 14	84, 84	0.16	0.16	214	12.75	22	214	12.75	22
Hydrograph At	Sub 15	84, 84	0.14	0.14	230	12.50	18	230	12.50	18
2 Combined At	CP 16			0.30	435	12.50	40	435	12.50	40
Hydrograph At	Sub 16	84, 84	0.11	0.41	520	12.50	56	520	12.50	56
Hydrograph At	Sub 17	84, 84	0.07	0.49	528	12.75	64	528	12.75	64
Hydrograph At	Sub 18	84, 84	0.24	0.24	255	12.50	32	255	12.50	32
2 Combined At	CP 19			0.73	779	12.50	962	779	12.75	96
Hydrograph At	Sub 19	90, 90	0.13	0.85	862	12.75	116	904	12.75	116
Hydrograph At	Sub 20	90, 90	0.02	0.88	856	12.75	120	887	12.75	120
Hydrograph At	Sub 21	84, 84	0.28	0.28	345	12.50	36	345	12.50	36
Hydrograph At	Sub 22	84, 84	0.06	0.06	100	12.50	8	100	12.50	8
2 Combined At	CP 24			0.34	445	12.50		445	12.50	44
Routed To	CP 25A			0.34	392	12.50		392	12.50	44
Hydrograph At	Sub 24	90, 90	0.17	0.17	334	12.50	28	[illegible]	12.50	28
2 Combined At	CP 25A			0.51	726	12.50	74	726	12.50	74
Routed To	CP 25			0.51	684	12.50	74	684	12.50	74
Hydrograph At	Sub 25	86, 96	[illegible]	0.57	622	12.75	80	622	12.75	80
2 Combined At	CP 25			1.08	1235	12.50	154	1235	12.50	154
Hydrograph At	Sub 25	86, 90	0.14	1.21	1282	12.75	174	1282	12.75	174
Hydrograph At	Sub 26	84, 84	0.10	1.31	1309	12.75	186	1309	12.75	186
2 Combined At	CP 29A			2.19	2165	12.75	306	2196	12.75	306
Hydrograph At	Sub 27	92, 90	0.09	0.09	188	12.50	16	188	12.50	16
Hydrograph At	Sub 28	86, 86	0.16	0.21	360	12.50	32	360	12.50	32
2 Combined At	CP 29			2.89	2409	12.75	338	2440	12.75	338
Hydrograph At	Sub 29	92, 92	0.32	2.72	2550	12.75	392	2597	12.75	394
2 Combined At	CP End			4.22	3913	12.75	602	3614	12.75	518

Note: Lag time is not listed in the table because the kinematic wave option in HEC-1 was used to generate runoff values. Lag time is not an input parameter for kinematic wave calculations.

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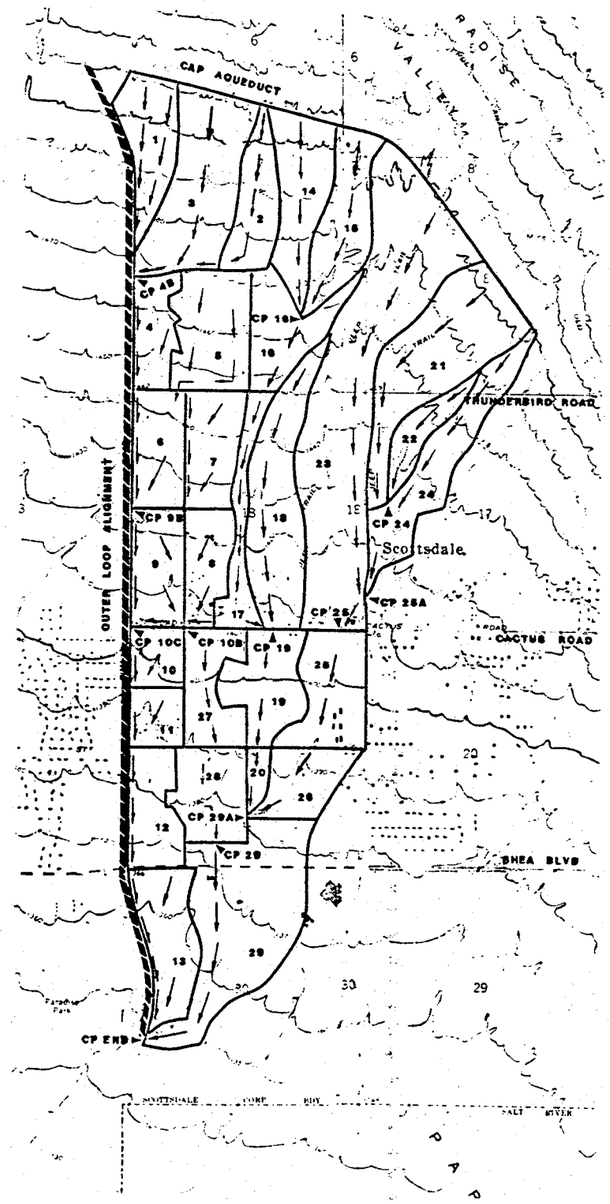
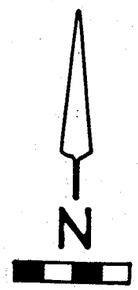
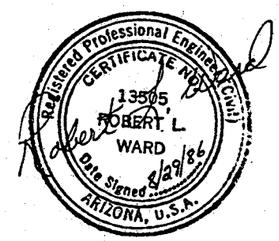
FIGURE 4.5

in 50-yr table, it shows 2.39. why?







HYDROLOGY SUMMARY

50-Year Event

Operation	Station	Curve Numbers	Sub-Basin Area (sq. mi.)	Contributing Basin Area (sq. mi.)	No Diversion @ Thunderbird Road			Diversion @ Thunderbird Road		
					Peak Flow (cfs)	Time of Peak (hrs)	Volume (ac-ft)	Peak Flow (cfs)	Time of Peak (hrs)	Volume (ac-ft)
Hydrograph At	Sub 1	84	0.12	0.12	79	12.75	14	79	12.75	14
Routed to	CP 4A			0.12	78	12.75	14	78	12.75	14
Hydrograph At	Sub 2	84	0.11	0.11	53	13.00	12	53	13.00	12
Hydrograph At	Sub 3	84	0.22	0.33	154	13.00	36	154	13.00	36
2 Combined At	CP 4B			0.45	224	13.00	50	224	13.00	50
Hydrograph At	Sub 4	91	0.09	0.54	358	12.75	62	358	12.75	62
Diversion At	Sub 4				N/A	N/A	N/A	358	12.75	62
Hydrograph At	CP 9A			0.54	339	12.75	62	0	N/A	0
Hydrograph At	Sub 5	91, 84	0.16	0.16	225	12.50	20	255	12.50	20
Hydrograph At	Sub 6	84	0.12	0.28	285	12.75	34	285	12.75	34
2 Combined At	CP 9B			0.82	624	12.75	96	285	12.75	34
Routed to	CP 10A			0.82	579	12.75	96	256	13.00	34
Hydrograph At	Sub 7	84	0.11	0.11	92	12.75	12	92	12.75	12
Hydrograph At	Sub 8&9	88, 84	0.21	0.32	257	12.75	36	249	12.75	36
Routed to	CP 10B			0.32	239	12.75	36	229	12.75	36
2 Combined At	CP 10C			1.14	818	12.75	122	485	12.75	70
Hydrograph At	Sub 10	84	0.06	1.20	880	12.75	140	556	12.75	78
Hydrograph At	Sub 11	90	0.06	1.26	928	12.75	148	612	12.75	86
Hydrograph At	Sub 12	90	0.10	1.36	1044	12.75	162	746	12.75	100
Hydrograph At	Sub 13	84	0.14	1.50	1069	12.75	178	800	12.75	116
Hydrograph At	Sub 14	84, 84	0.16	0.16	185	12.75	18	185	12.75	18
Hydrograph At	Sub 15	84, 84	0.14	0.14	195	12.50	16	195	12.50	16
2 Combined At	CP 16			0.30	359	12.50	34	359	12.50	34
Hydrograph At	Sub 16	84, 84	0.11	0.41	414	12.50	48	414	12.50	48
Hydrograph At	Sub 17	84, 84	0.07	0.49	434	12.75	54	434	12.75	54
Hydrograph At	Sub 18	84, 84	0.24	0.24	209	12.75	26	209	12.75	26
2 Combined At	CP 19			0.73	644	12.75	82	644	12.75	82
Hydrograph At	Sub 19	90, 90	0.13	0.85	712	12.75	100	[illegible]	12.75	100
Hydrograph At	Sub 20	90, 90	0.02	0.88	681	12.75	[illegible]	[illegible]	12.75	102
Hydrograph At	Sub 21	84, 84	0.28	0.28	270	12.50	[illegible]	270	12.50	30
Hydrograph At	Sub 22	84, 84	0.06	0.06	85	12.50	6	85	12.50	6
2 Combined At	CP 24			0.34	355	12.50	38	355	12.50	38
Routed To	CP 25A			0.34	306	12.50	38	306	12.50	38
Hydrograph At	Sub 24	90, 90	0.17	0.17	295	12.50	24	295	12.50	24
2 Combined At	CP 25A			0.51	601	12.50	62	601	12.50	62
Routed To	CP 25			0.51	564	12.50	62	564	12.50	62
Hydrograph At	Sub 23	86, 86	0.57	0.57	501	12.75	68	501	12.75	68
2 Combined At	CP 25			1.08	967	12.75	130	967	12.75	130
Hydrograph At	Sub 25	86, 90	0.14	1.21	1038	12.75	146	1038	12.75	146
Hydrograph At	Sub 26	84, 84	0.10	1.31	1043	12.75	156	1043	12.75	156
2 Combined At	CP 29A			2.19	1724	12.75	260	1758	12.75	260
Hydrograph At	Sub 27	92, 90	0.09	0.09	166	12.50	14	166	12.50	14
Hydrograph At	Sub 28	86, 86	0.16	0.21	308	12.50	28	308	12.50	28
2 Combined At	CP 29			2.39	1924	12.75	286	1958	12.75	288
Hydrograph At	Sub 29	92, 92	0.32	2.72	2030	12.75	334	2075	12.75	334
2 Combined At	CP End			4.22	3099	12.75	510	2875	12.75	490

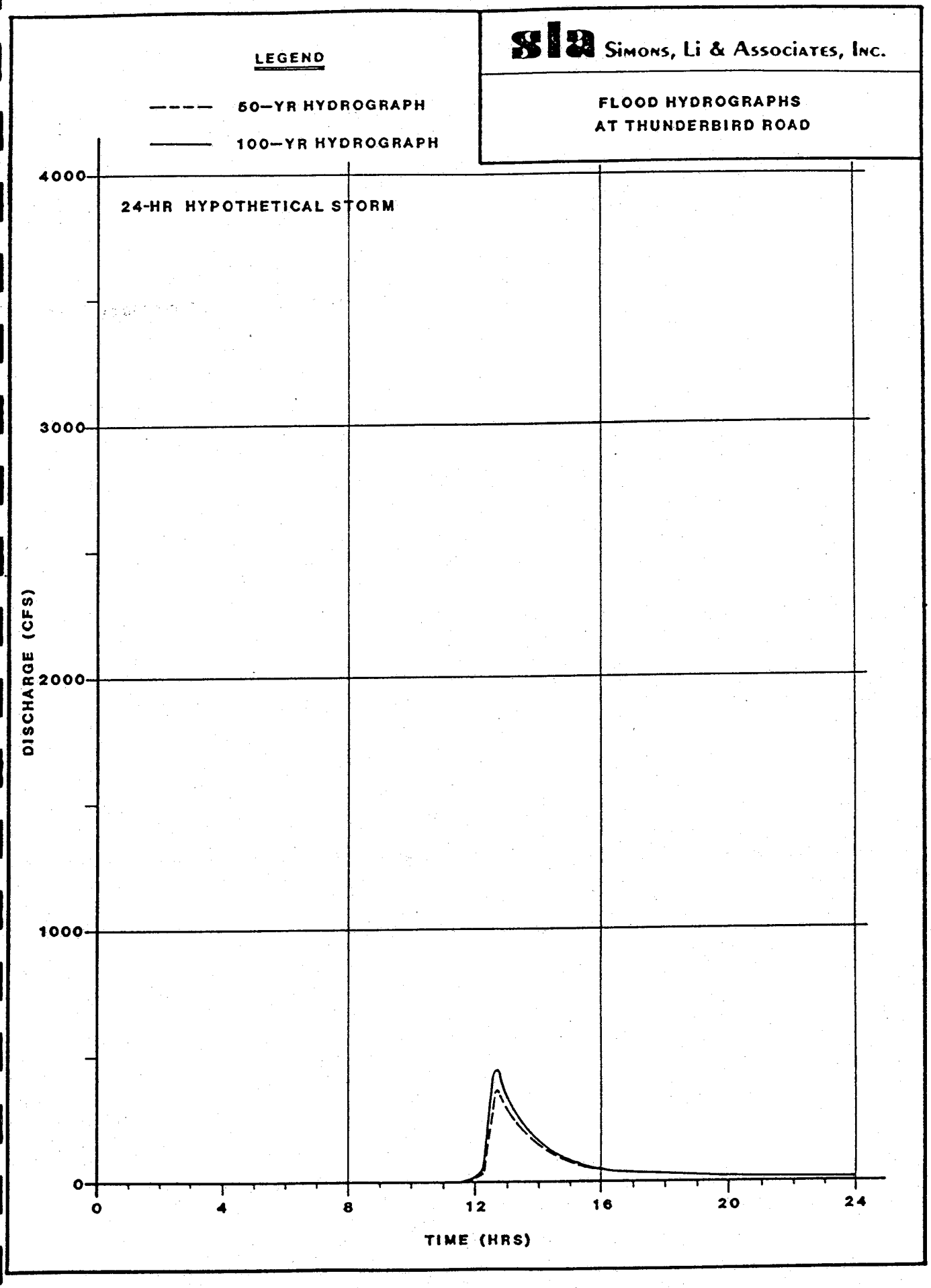
Note: Lag time is not listed in the table because the kinematic wave option in HEC-1 was used to generate runoff values. Lag time is not an input parameter for kinematic wave calculations.

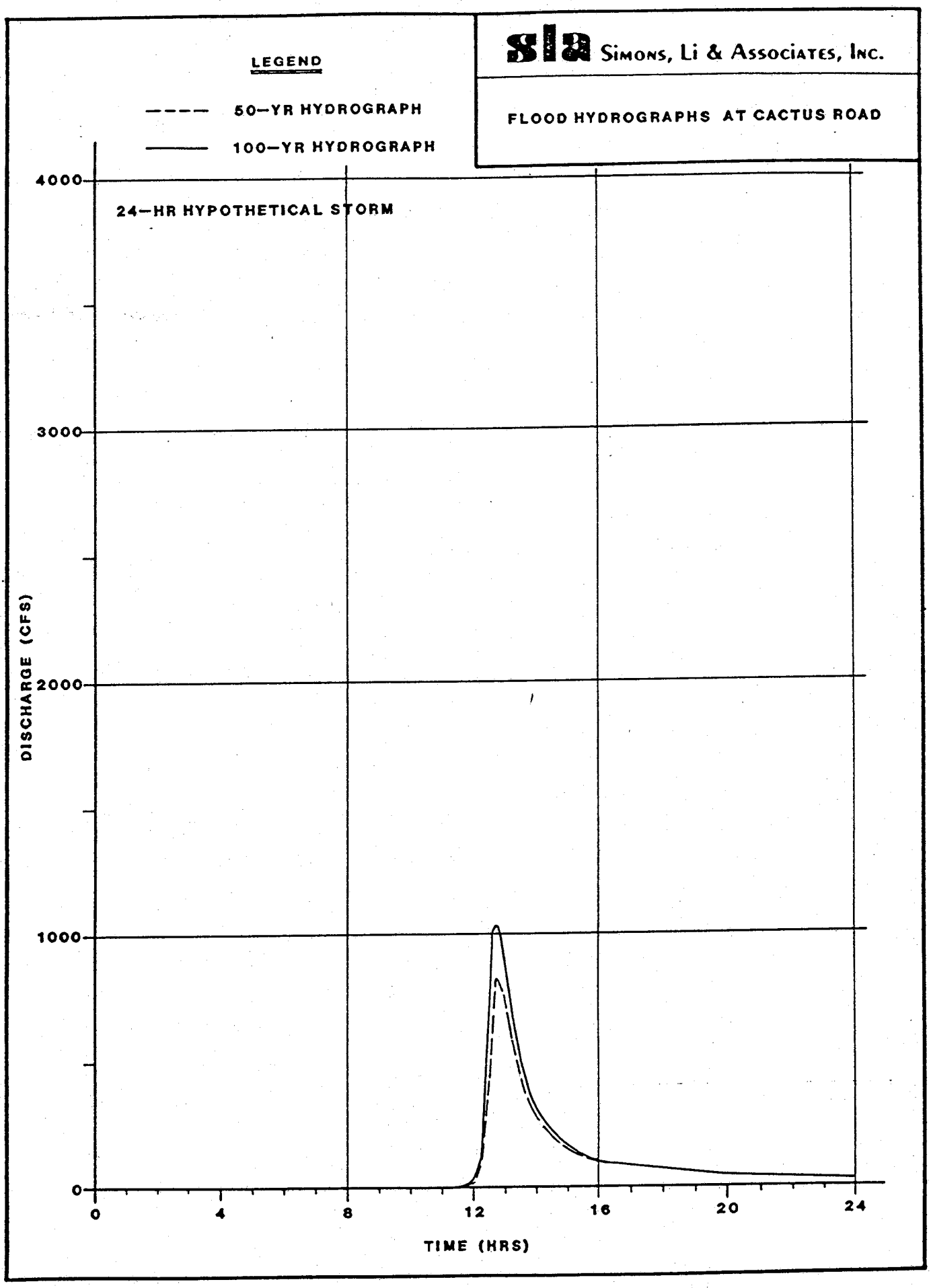
SIA SIMONS, LI & ASSOCIATES, INC.

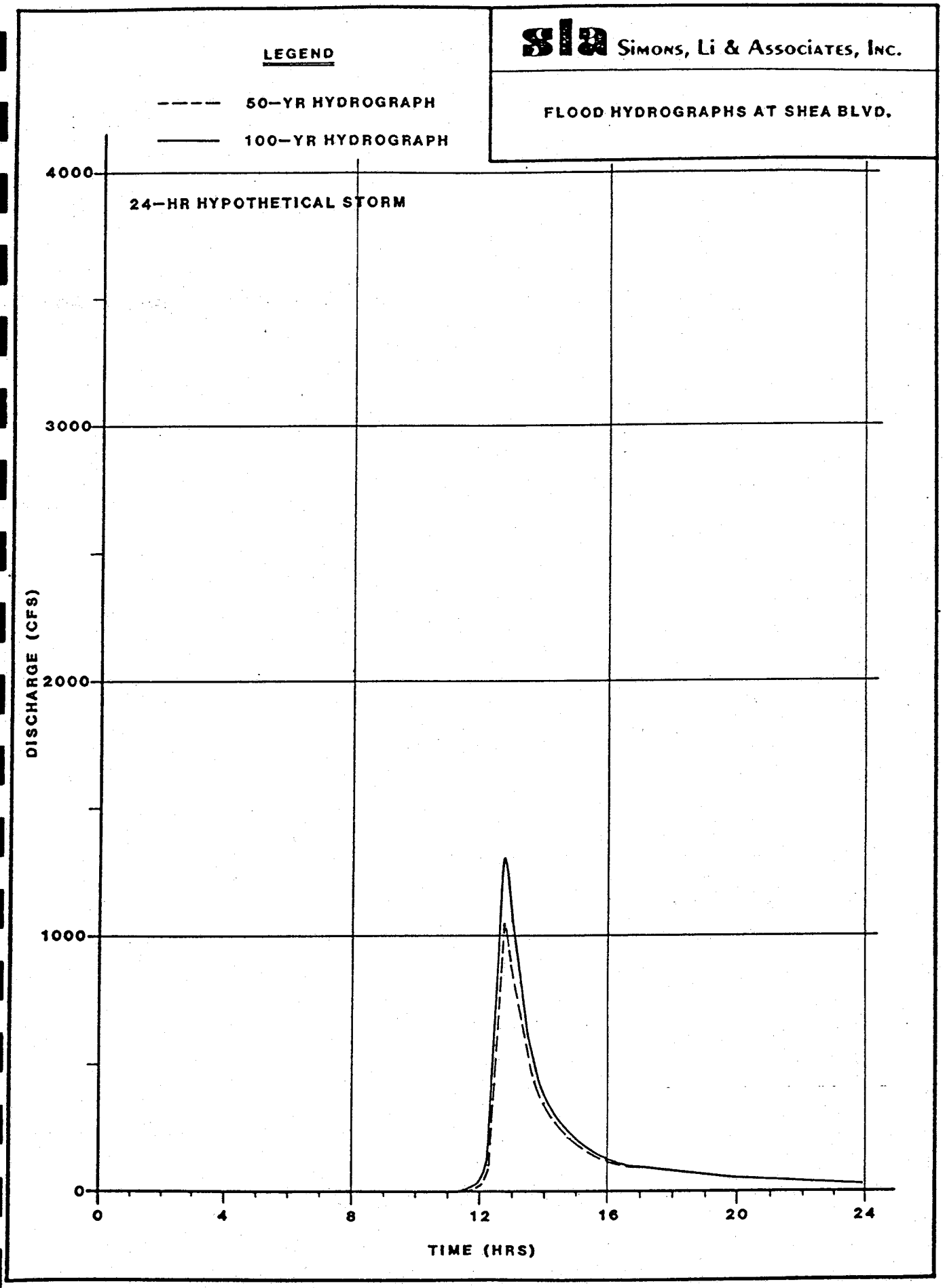
FIGURE 4.6

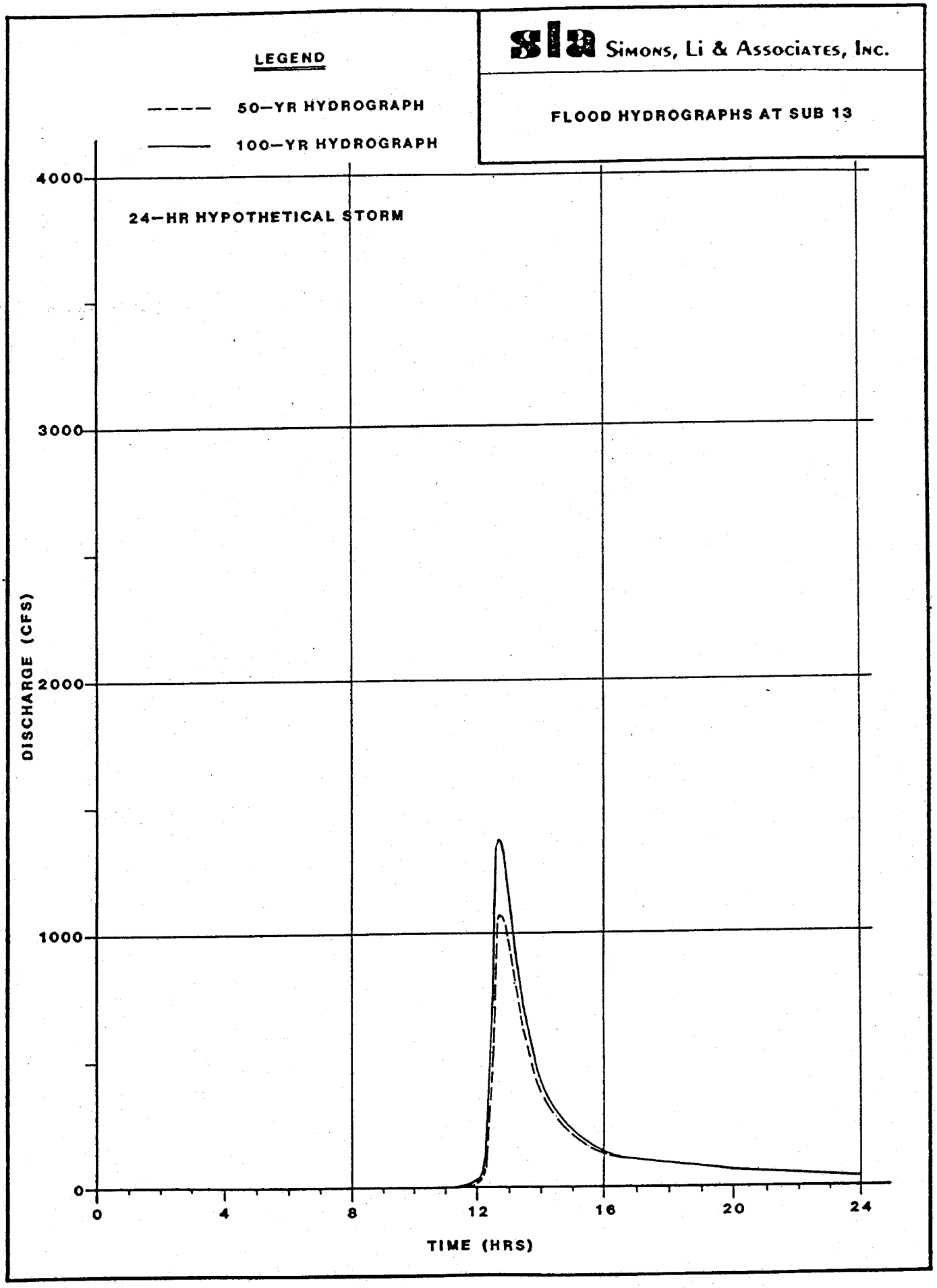
APPENDIX A

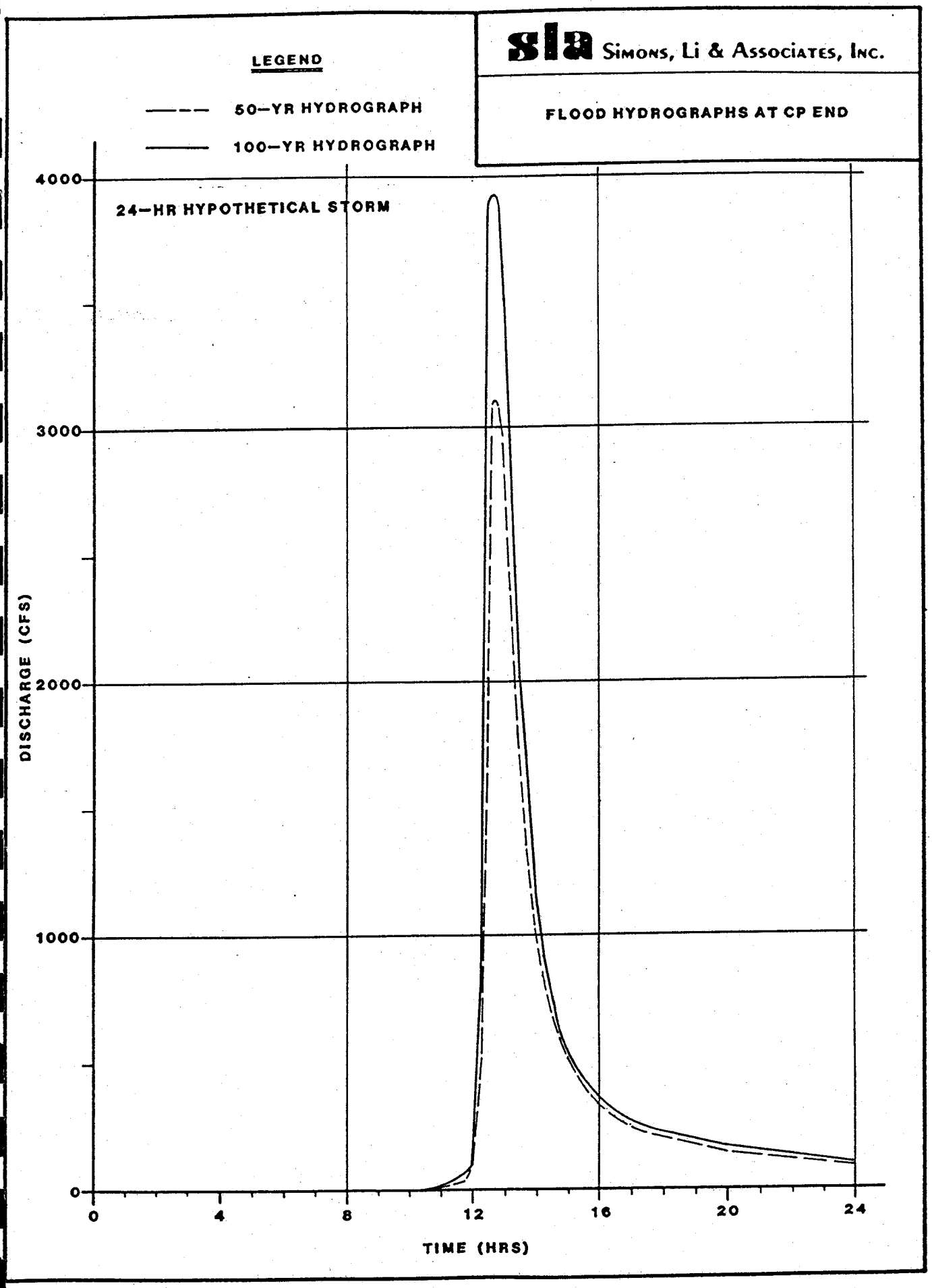
Hydrographs


sla Simons, Li & Associates, Inc.
FLOOD HYDROGRAPHS
AT THUNDERBIRD ROAD
LEGEND
50-YR HYDROGRAPH
100-YR HYDROGRAPH
24-HR HYPOTHETICAL STORM
DISCHARGE (CFS)
4000
3000
2000
1000
0
0
4
8
12
16
20
24
TIME (HRS)


sla Simons, Li & Associates, Inc.
FLOOD HYDROGRAPHS AT CACTUS ROAD
LEGEND
50-YR HYDROGRAPH
100-YR HYDROGRAPH
24-HR HYPOTHETICAL STORM
DISCHARGE (CFS)
4000
3000
2000
1000
0
0
4
8
12
16
20
24
TIME (HRS)


SIA Simons, Li & Associates, Inc.
FLOOD HYDROGRAPHS AT SHEA BLVD.
LEGEND
50-YR HYDROGRAPH
100-YR HYDROGRAPH
24-HR HYPOTHETICAL STORM
DISCHARGE (CFS)
4000
3000
2000
1000
0
0
4
8
12
16
20
24
TIME (HRS)


sla Simons, Li & Associates, Inc.
FLOOD HYDROGRAPHS AT SUB 13
LEGEND
50-YR HYDROGRAPH
100-YR HYDROGRAPH
24-HR HYPOTHETICAL STORM
DISCHARGE (CFS)
4000
3000
2000
1000
0
0
4
8
12
16
20
24
TIME (HRS)


sla Simons, Li & Associates, Inc.
FLOOD HYDROGRAPHS AT CP END
LEGEND
50-YR HYDROGRAPH
100-YR HYDROGRAPH
24-HR HYPOTHETICAL STORM
DISCHARGE (CFS)
4000
3000
2000
1000
0
0
4
8
12
16
20
24
TIME (HRS)

APPENDIX B

HEC-1 Printout, 100-Year Event, No Diversion at Thunderbird Road

```
T OUTER11B24.DAT
*DIAGRAM
*NO LIST
ID          ------------ SIMONS, LI & ASSOCIATES, INC.  PAZ-DC-01 ------------
ID      DELEUW, CATHER & CO. - OUTER LOOP HIGHWAY PROJECT CONCEPT DRAINAGE PLAN
ID         ALL SUBBASINS TO PIMA RD CHANNEL, EXISTING RUNOFF CHARACTERISTICS
ID           100-YR, 24-HR RAINFALL USING HYPOTHETICAL STORM DISTRIBUTION
IT  15. 25JUN86      0.     100.
IO   5.      0.
KK  SUB1
KM      RUNOFF FROM SUB-BASIN 1
BA0.1242
*       HYPOTHETICAL STORM DISTRIBUTION
PH                0.72   1.41   2.47   2.77   2.97   3.35   3.81   4.28
LS   0.      84
UK 1965.  0.0102    0.10    100.
RK 4220.  0.0101   0.016  0.1242   TRAP    10.     1.
KK  CP4A
KM      ROUTE SUB1 TO CP4
RK  500.  0.0100   0.016  0.1242   TRAP    10.     1.
KK  SUB2
KM      RUNOFF FROM SUB-BASIN 2
BA0.1106
LS   0.      84
UK 2885.  0.0099    0.10    100.
RK 1200.  0.0021   0.025  0.1106   TRAP    25.     1.
KK  SUB3
KM      RUNOFF FROM SUB-BASIN 3
BA0.2192
LS   0.      84
UK 2920.  0.0099    0.10    100.
RK 1580.  0.0027   0.025  0.3298   TRAP    25.     1.     YES
KK  CP4B
KM      COMBINE HYDROGRAPHS CP4A & SUB3
KO   1.
HC   2.
KK  SUB4
KM      RUNOFF FROM SUB-BASIN 4
KO   1.
BA0.0887
LS   0.      91
UK 1154.  0.0052    0.06    100.
RK 2785.  0.0083   0.016  0.4540   TRAP    12.     1.     YES
KK  CP9A
KM      ROUTE SUB-BASIN 4 TO CP9
RK 2285.  0.0088   0.016  0.5740   TRAP    12.     1.
KK  SUB5
KM      RUNOFF FROM SUB-BASIN 5
BA0.1555
LS   0.      91      0.     84.
UK  450.  0.0050   0.025   45.92
UK 3020.  0.0050   0.025   54.08
RK 2530.  0.0040   0.025  0.1555   TRAP    25.     1.
KK  SUB6
KM      RUNOFF FROM SUB-BASIN 6
BA0.1200
LS   0.      84
UK 1730.  0.0092    0.08    100.
RK 2800.  0.0075   0.040  0.2280   TRAP     0.   100.     YES
KK  CP9B
```

```
KM      COMBINE HYDROGRAPHS CP9A & SUB6
KO    1.
HC    2.
KK CP10A
KM      ROUTE CP9 TO CP10
RK 2665.  0.0067   0.016  0.8182    TRAP     15.      1.
KK  SUB7
KM      RUNOFF FROM SUB-BASIN 7
BA0.1080
LS    0.      84
UK 1254.  0.0043   0.07    100.
RK 2565.  0.0082   0.040  0.1080    TRAP      0.    100.
KKSUB8+9
KM      RUNOFF FROM SUB-BASINS 8 AND 9
BA0.2118
LS    0.      88              0.     84.
UK 1025.  0.0047   0.08   39.90
UK 1635.  0.0063   0.10   60.10
RK 2665.  0.0071   0.025  0.3198    TRAP     25.      1.     YES
KK CP10B
KM      ROUTE SUB8+9 TO CP10
RK 1335.  0.0015   0.025  0.3198    TRAP     25.      1.
KK CP10C
KM      COMBINE HYDROGRAPHS CP10A & CP10B
KO    1.
HC    2.
KK SUB10
KM      RUNOFF FROM SUB-BASIN 10
BA0.0626
LS    0.      84
UK 1105.  0.0094   0.07    100.
RK 1325.  0.0072   0.016  1.1380    TRAP     15.      1.     YES
KK SUB11
KM      RUNOFF FROM SUB-BASIN 11
KO    1.
BA0.0626
LS    0.      90
UK 1745.  0.0080   0.07    100.
RK 1325.  0.0072   0.016  1.2014    TRAP     16.      1.     YES
KK SUB12
KM      RUNOFF FROM SUB-BASIN 12
KO    1.
BA0.1012
LS    0.      90
UK 1440.  0.0083   0.06    100.
RK 2665.  0.0071   0.016  1.2632    TRAP     17.      1.     YES
KK SUB13
KM      RUNOFF FROM SUB-BASIN 13
KO    1.
BA0.1374
LS    0.     84.
UK 1460.  0.0061   0.06    100.
RK 4000.  0.0053   0.016  1.4006    TRAP     17.      1.     YES
KK SUB14
KM      RUNOFF FROM SUB-BASIN 14
BA0.1611
LS    0.      84              0.     84
UK 1075.  0.0140   0.10   64.31
UK  661.  0.0136   0.10   35.69
RK 5360.  0.0080   0.025  0.1611    TRAP      5.      8.
```

```
KK SUB15
KM      RUNOFF FROM SUB-BASIN 15
BA0.1402
LS    0.      84              0.      84
UK  365.  0.0133    0.10   33.31
UK  855.  0.0129    0.10   66.69
RK 5310.  0.0075   0.037  0.1402    TRAP      6.      5.
KK CP16
KM      COMBINE HYDROGRAPHS SUB14 & SUB15
HC    2.
KK SUB16
KM      RUNOFF FROM SUB-BASIN 16
BA0.1133
LS    0.      84              0.      84
UK  830.  0.0102    0.10   24.54
UK 1170.  0.0098    0.10   75.46
RK 1895.  0.0095   0.037  0.1133    TRAP      6.      5.     YES
KK SUB17
KM      RUNOFF FROM SUB-BASIN 17
BA0.0712
LS    0.      84.             0.      84.
UK  240.  0.0085    0.09   53.79
UK  210.  0.0143    0.09   46.21
RK 5970.  0.0069   0.025  0.0712    TRAP      5.      6.     YES
KK SUB18
KM      RUNOFF FROM SUB-BASIN 18
BA0.2398
LS    0.      84.             0.      84.
UK  235.  0.0128    0.09   26.31
UK 1020.  0.0098    0.09   73.69
RK 7590.  0.0074   0.065  0.2398    TRAP      0.      9.
KK CP19
KM      COMBINE HYDROGRAPHS SUB17 & SUB18
HC    2.
KK SUB19
KM      RUNOFF FROM SUB-BASIN 19
BA0.1288
LS    0.      90.             0.      90.
UK 1175.  0.0042    0.07   54.81
UK 1040.  0.0030    0.07   45.19
RK 2850.  0.0053   0.030  0.1288    TRAP      6.      6.     YES
KK SUB20
KM      RUNOFF FROM SUB-BASIN 20
BA0.0218
LS    0.      90.             0.      90.
UK  120.  0.0083    0.06   16.97
UK  715.  0.0098    0.06   83.03
RK 1510.  0.0079   0.032  0.0218    TRAP     10.      6.     YES
KK SUB21
KM      RUNOFF FROM SUB-BASIN 21
BA0.2765
LS    0.      84.             0.      84.
UK  410.  0.0098    0.09   26.15
UK 1755.  0.0134    0.09   73.85
RK 6560.  0.0120   0.035  0.2765    TRAP      1.      7.
KK SUB22
KM      RUNOFF FROM SUB-BASIN 22
BA0.0595
LS    0.      84.             0.      84.
UK  370.  0.0176    0.09   50.76
```

```
UK  490.  0.0179    0.09   49.24
RK 3630.  0.0152    0.03  0.0595    TRAP      1.      13.
KK  CP24
KM      COMBINE HYDROGRAPHS SUB21 & SUB22
HC    2.
KK CP25A
KM      ROUTE CP24 TO CP25A
RK 1992.  0.0080   0.025  0.3360    TRAP      3.       7.
KK SUB24
KM      RUNOFF FROM SUB-BASIN 24
BA0.1711
LS    0.     90.              0.     90.
UK  175.  0.0171    0.09   19.70
UK  955.  0.0168    0.09   80.30
RK 7505.  0.0120   0.025  0.1711    TRAP      3.       7.
KK CP25A
KM      COMBINE CP24 & SUB24
HC    2.
KK  CP25
KM      ROUTE CP25A TO CP25
RK 1023.  0.0049   0.035  0.5071    TRAP      8.       4.
KK SUB23
KM      RUNOFF FROM SUB-BASIN 23
BA0.5706
LS    0.     86.              0.     86.
UK 1605.  0.0125    0.10   74.26
UK  610.  0.0172    0.10   25.74
RK11130.  0.0079   0.035  0.5706    TRAP      8.       4.
KK  CP25
KM      COMBINE HYDROGRAPHS CP25A & SUB23
HC    2.
KK SUB25
KM      RUNOFF FROM SUB-BASIN 25
BA0.1364
LS    0.     86.              0.     90.
UK 1400.  0.0030    0.10   47.87
UK  885.  0.0030    0.07   52.13
RK 2655.  0.0068   0.036  0.1364    TRAP     12.       3.      YES
KK SUB26
KM      RUNOFF FROM SUB-BASIN 26
BA0.0963
LS    0.     84.              0.     84.
UK  790.  0.0076    0.06   33.75
UK  885.  0.0068    0.08   66.25
RK 2585.  0.0046   0.038  0.0963    TRAP      2.       6.      YES
KK CP29A
KM      COMBINE HYDROGRAPHS SUB20 & SUB 26
HC    2.
KK SUB27
KM      RUNOFF FROM SUB-BASIN 27
BA0.0925
LS    0.     92.              0.     90.
UK  355.  0.0030    0.07   40.22
UK  500.  0.0030    0.07   59.78
RK 2695.  0.0074   0.025  0.0925    TRAP     25.       1.
KK SUB28
KM      RUNOFF FROM SUB-BASIN 28
BA0.1155
LS    0.     86.              0.     86.
UK  755.  0.0079    0.06   30.74
```

```
UK  985.  0.0081    0.06   69.26
RK 2510.  0.0056   0.036  0.1155    TRAP     10.      3.      YES
KK  CP29
KM      COMBINE HYDROGRAPHS CP29A & SUB28
HC    2.
KK SUB29
KM      RUNOFF FROM SUB-BASIN 29
KO    1.
BA0.3230
LS    0.     92.              0.     92.
UK  745.  0.0054    0.06   32.54
UK 1710.  0.0064    0.06   67.46
RK 5730.  0.0051   0.025  0.3230    TRAP     50.     3.9     YES
KK CPEND
KM      COMBINE HYDROGRAPHS CP13 & SUB29
KO    1.
HC    2.
ZZ
$ SET TERMINAL/WIDTH = 132
$ T OUTER11B24.OUT
$ SET NOVERIFY

THOUGHT OF THE DAY FROM ' V A X '

A lost ounce of gold may be found, a lost moment of time never.

        *** NOTE TO MASS 11 USERS ***

   **PLEASE KEEP SASI INFORMED OF ANY PROBLEMS**


 $ ASSIGN DUMMY SYS$PRINT
 $ ASSIGN OUTER11B24.DAT INPUT
 $! OUTPUT OF HEC1 GOES TO THE LOG FILE
 $ RUN [USERS.SIMONS.SIMONS1]HEC1
```

****

*

*

****

*

```
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            FEBRUARY 1981              *
*          REVISED 30 OCT 81            *
*                                       *
* RUN DATE      25-J     TIME      13:4 *
*                                       *
*****************************************
```


```
*    U.S. ARMY CORPS OF ENGINEERS
*  THE HYDROLOGIC ENGINEERING CENTE
*         609 SECOND STREET
*       DAVIS, CALIFORNIA 95616
*  (916) 440-3285 OR (FTS) 448-3285
*
*********************************
```


```
X     X  XXXXXXX   XXXXX          X
X     X  X       X    X        XX
X     X  X       X              X
XXXXXXX  XXXX    X       XXXXX  X
X     X  X       X              X
X     X  X       X    X         X
X     X  XXXXXXX   XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. SEE SEPTEMBER 1981 INPUT DESCRIPTION FOR NEW DEFINITIONS.

HEC-1 INPUT


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

                      *DIAGRAM
*** NOLIST ***
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
LINE      (V) ROUTING          (--->) DIVERSION
 NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED FLOW

  7       SUB1
            V
            V
 14       CP4A
            .
            .
 17         .        SUB2
            .          V
            .          V
 23         .        SUB3 ***
            .          .
            .          .
 29       CP4B............
            V
            V
 33       SUB4 ***
            V
            V
 40       CP9A
            .
            .
 43         .        SUB5
            .          V
            .          V
 50         .        SUB6 ***
            .          .
            .          .
 56       CP9B............
            V
            V
 60       CP10A
            .
            .
 63         .        SUB7
            .          V
            .          V
 69         .      SUB8+9 ***
            .          V
            .          V
 76         .      CP10B
            .          .
            .          .
 79       CP10C............
            V
```

```
                V
 83        SUB10 ***
                V
                V
 89        SUB11 ***
                V
                V
 96        SUB12 ***
                V
                V
103        SUB13 ***
                .
                .
110             .      SUB14
                .        .
                .        .
117             .        .        SUB15
                .        .          .
                .        .          .
124             .      CP16............
                .        V
                .        V
127             .      SUB16 ***
                .        V
                .        V
134             .      SUB17 ***
                .        .
                .        .
141             .        .        SUB18
                .        .          .
                .        .          .
148             .      CP19............
                .        V
                .        V
151             .      SUB19 ***
                .        V
                .        V
158             .      SUB20 ***
                .        .
                .        .
165             .        .        SUB21
                .        .          .
                .        .          .
172             .        .          .        SUB22
                .        .          .          .
                .        .          .          .
179             .        .        CP24............
                .        .          V
                .        .          V
182             .        .        CP25A
                .        .          .
                .        .          .
185             .        .          .        SUB24
                .        .          .          .
                .        .          .          .
192             .        .        CP25A............
                .        .          V
                .        .          V
195             .        .        CP25
                .        .          .
```

```
                .         .         .
198             .         .         .        SUB23
                .         .         .          .
                .         .         .          .
205             .         .       CP25.........
                .         .         V
                .         .         V
208             .         .       SUB25 ***
                .         .         V
                .         .         V
215             .         .       SUB26 ***
                .         .         .
                .         .         .
222             .      CP29A........
                .         .
                .         .
225             .         .      SUB27
                .         .         V
                .         .         V
232             .         .      SUB28 ***
                .         .         .
                .         .         .
239             .      CP29.........
                .         V
                .         V
242             .      SUB29 ***
                .         .
                .         .
250          CPEND........
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*            FEBRUARY 1981              *
*          REVISED 30 OCT 81            *
*                                       *
*  RUN DATE     25-J    TIME     13:4   *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*   U.S. ARMY CORPS OF ENGINEERS    *
*  THE HYDROLOGIC ENGINEERING CENTER *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*  (916) 440-3285 OR (FTS) 448-3285 *
*                                   *
*************************************
```

---------- SIMONS, LI & ASSOCIATES, INC. PAZ-DC-01 ----------
DELEUW, CATHER & CO.-- OUTER LOOP HIGHWAY PROJECT CONCEPT DRAINAGE PLAN
ALL SUBBASINS TO PIMA RD CHANNEL, EXISTING RUNOFF CHARACTERISTICS
100-YR, 24-HR RAINFALL USING HYPOTHETICAL STORM DISTRIBUTION

```
  6 IO        OUTPUT CONTROL VARIABLES
                  IPRNT          5  PRINT CONTROL
                  IPLOT          0  PLOT CONTROL
                  QSCAL         0.  HYDROGRAPH PLOT SCALE

 IT           HYDROGRAPH TIME DATA
                  NMIN          15  MINUTES IN COMPUTATION INTERVAL
```

```
                IDATE     25JUN86  STARTING DATE
                ITIME        0000  STARTING TIME
                   NQ         100  NUMBER OF HYDROGRAPH ORDINATES
              NDDATE     26JUN86  ENDING DATE
              NDTIME        0045  ENDING TIME

          COMPUTATION INTERVAL    0.25 HOURS
               TOTAL TIME BASE   24.75 HOURS

     ENGLISH UNITS
          DRAINAGE AREA          SQUARE MILES
          PRECIPITATION DEPTH    INCHES
          LENGTH, ELEVATION      FEET
          FLOW                   CUBIC FEET PER SECOND
          STORAGE VOLUME         ACRE-FEET
          SURFACE AREA           ACRES
          TEMPERATURE            DEGREES FAHRENHEIT

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 29 KK    *     CP4B   *
          *            *
          **************

 31 KO        OUTPUT CONTROL VARIABLES
                IPRNT          1  PRINT CONTROL
                IPLOT          0  PLOT CONTROL
                QSCAL         0.  HYDROGRAPH PLOT SCALE

 32 HC        HYDROGRAPH COMBINATION
                ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                    ***

**********************************************************************************************************************

                          HYDROGRAPH AT STATION     CP4B
                            SUM OF  2 HYDROGRAPHS

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

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
25 JUN 0000	1	0.	25 JUN 0615	26	0.	25 JUN 1230	51	191.	25 JUN 1845	76	23.
25 JUN 0015	2	0.	25 JUN 0630	27	0.	25 JUN 1245	52	288.	25 JUN 1900	77	21.
25 JUN 0030	3	0.	25 JUN 0645	28	0.	25 JUN 1300	53	290.	25 JUN 1915	78	20.
25 JUN 0045	4	0.	25 JUN 0700	29	0.	25 JUN 1315	54	250.	25 JUN 1930	79	20.
25 JUN 0100	5	0.	25 JUN 0715	30	0.	25 JUN 1330	55	204.	25 JUN 1945	80	19.
25 JUN 0115	6	0.	25 JUN 0730	31	0.	25 JUN 1345	56	165.	25 JUN 2000	81	18.
25 JUN 0130	7	0.	25 JUN 0745	32	0.	25 JUN 1400	57	136.	25 JUN 2015	82	17.
25 JUN 0145	8	0.	25 JUN 0800	33	0.	25 JUN 1415	58	113.	25 JUN 2030	83	17.
25 JUN 0200	9	0.	25 JUN 0815	34	0.	25 JUN 1430	59	96.	25 JUN 2045	84	16.
25 JUN 0215	10	0.	25 JUN 0830	35	0.	25 JUN 1445	60	83.	25 JUN 2100	85	15.
25 JUN 0230	11	0.	25 JUN 0845	36	0.	25 JUN 1500	61	72.	25 JUN 2115	86	15.
25 JUN 0245	12	0.	25 JUN 0900	37	0.	25 JUN 1515	62	63.	25 JUN 2130	87	14.

25 JUN 0300	13	0.	*	25 JUN 0915	38	0.	*	25 JUN 1530	63	57.	*	25 JUN 2145	88	14.
25 JUN 0315	14	0.	*	25 JUN 0930	39	0.	*	25 JUN 1545	64	51.	*	25 JUN 2200	89	13.
25 JUN 0330	15	0.	*	25 JUN 0945	40	0.	*	25 JUN 1600	65	47.	*	25 JUN 2215	90	13.
25 JUN 0345	16	0.	*	25 JUN 1000	41	0.	*	25 JUN 1615	66	43.	*	25 JUN 2230	91	13.
25 JUN 0400	17	0.	*	25 JUN 1015	42	0.	*	25 JUN 1630	67	39.	*	25 JUN 2245	92	12.
25 JUN 0415	18	0.	*	25 JUN 1030	43	0.	*	25 JUN 1645	68	36.	*	25 JUN 2300	93	12.
25 JUN 0430	19	0.	*	25 JUN 1045	44	0.	*	25 JUN 1700	69	34.	*	25 JUN 2315	94	12.
25 JUN 0445	20	0.	*	25 JUN 1100	45	0.	*	25 JUN 1715	70	32.	*	25 JUN 2330	95	11.
25 JUN 0500	21	0.	*	25 JUN 1115	46	0.	*	25 JUN 1730	71	30.	*	25 JUN 2345	96	11.
25 JUN 0515	22	0.	*	25 JUN 1130	47	1.	*	25 JUN 1745	72	28.	*	26 JUN 0000	97	11.
25 JUN 0530	23	0.	*	25 JUN 1145	48	2.	*	25 JUN 1800	73	27.	*	26 JUN 0015	98	11.
25 JUN 0545	24	0.	*	25 JUN 1200	49	5.	*	25 JUN 1815	74	25.	*	26 JUN 0030	99	10.
25 JUN 0600	25	0.	*	25 JUN 1215	50	24.	*	25 JUN 1830	75	24.	*	26 JUN 0045	100	9.
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PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
290.	13.00	(CFS)	100.	29.	28.	28.
		(INCHES)	2.047	2.403	2.404	2.404
		(AC-FT)	50.	58.	58.	58.

CUMULATIVE AREA = 0.45 SQ MI

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          *            *
33 KK     *    SUB4    *
          *            *
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35 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

SUBBASIN RUNOFF DATA

36 BA SUBBASIN CHARACTERISTICS

TAREA	0.09	SUBBASIN AREA

PRECIPITATION DATA

10 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

HYDRO-35			TP-40					TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.72	1.41	2.47	2.77	2.97	3.35	3.81	4.28	0.00	0.00	0.00	0.00

STORM AREA = 0.09

37 LS SCS LOSS RATE

STRTL	0.20	INITIAL ABSTRACTION
CRVNBR	91.00	CURVE NUMBER
RTIMP	0.00	PERCENT IMPERVIOUS AREA

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                KINEMATIC WAVE
38 UK            OVERLAND-FLOW ELEMENT NO. 1
                       L      1154.  OVERLAND FLOW LENGTH
                       S     0.0052  SLOPE
                       N      0.060  ROUGHNESS COEFFICIENT
                      PA      100.0  PERCENT OF SUBBASIN
39 RK            MAIN CHANNEL
                       L      2785.  CHANNEL LENGTH
                       S     0.0083  SLOPE
                       N      0.016  CHANNEL ROUGHNESS COEFFICIENT
                      CA       0.09  CONTRIBUTING AREA
                   SHAPE       TRAP  CHANNEL SHAPE
                      WD      12.00  BOTTOM WIDTH OR DIAMETER
                       Z       1.00  SIDE SLOPE
                  RUPSTQ        YES  ROUTE UPSTREAM HYDROGRAPH

                                                        ***

        COMPUTED KINEMATIC PARAMETERS
          ELEMENT    ALPHA      M      DT (MIN)   DX (FT)
              1      1.7908   1.667      15.00     577.00
              3      2.0537   1.496      15.00    1392.50

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                                    HYDROGRAPH AT STATION    SUB4

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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	0.	25 JUN 1230	51	0.30	0.02	0.28	309.
25 JUN 0015	2	0.01	0.01	0.00	0.	25 JUN 1245	52	0.09	0.01	0.09	445.
25 JUN 0030	3	0.01	0.01	0.00	0.	25 JUN 1300	53	0.07	0.00	0.06	330.
25 JUN 0045	4	0.01	0.01	0.00	0.	25 JUN 1315	54	0.06	0.00	0.05	286.
25 JUN 0100	5	0.01	0.01	0.00	0.	25 JUN 1330	55	0.05	0.00	0.05	236.
25 JUN 0115	6	0.01	0.01	0.00	0.	25 JUN 1345	56	0.04	0.00	0.04	192.
25 JUN 0130	7	0.01	0.01	0.00	0.	25 JUN 1400	57	0.04	0.00	0.03	158.
25 JUN 0145	8	0.01	0.01	0.00	0.	25 JUN 1415	58	0.03	0.00	0.03	132.
25 JUN 0200	9	0.01	0.01	0.00	0.	25 JUN 1430	59	0.03	0.00	0.03	112.
25 JUN 0215	10	0.01	0.01	0.00	0.	25 JUN 1445	60	0.03	0.00	0.03	96.
25 JUN 0230	11	0.01	0.01	0.00	0.	25 JUN 1500	61	0.03	0.00	0.02	84.
25 JUN 0245	12	0.01	0.01	0.00	0.	25 JUN 1515	62	0.03	0.00	0.02	74.
25 JUN 0300	13	0.01	0.01	0.00	0.	25 JUN 1530	63	0.02	0.00	0.02	66.
25 JUN 0315	14	0.01	0.01	0.00	0.	25 JUN 1545	64	0.02	0.00	0.02	60.
25 JUN 0330	15	0.01	0.01	0.00	0.	25 JUN 1600	65	0.02	0.00	0.02	54.
25 JUN 0345	16	0.01	0.01	0.00	0.	25 JUN 1615	66	0.02	0.00	0.02	50.
25 JUN 0400	17	0.01	0.01	0.00	0.	25 JUN 1630	67	0.02	0.00	0.02	46.
25 JUN 0415	18	0.01	0.01	0.00	0.	25 JUN 1645	68	0.02	0.00	0.02	43.
25 JUN 0430	19	0.01	0.01	0.00	0.	25 JUN 1700	69	0.02	0.00	0.02	40.
25 JUN 0445	20	0.01	0.01	0.00	0.	25 JUN 1715	70	0.02	0.00	0.02	37.
25 JUN 0500	21	0.01	0.01	0.00	0.	25 JUN 1730	71	0.02	0.00	0.02	35.
25 JUN 0515	22	0.01	0.01	0.00	0.	25 JUN 1745	72	0.02	0.00	0.02	33.
25 JUN 0530	23	0.01	0.01	0.00	0.	25 JUN 1800	73	0.02	0.00	0.01	31.
25 JUN 0545	24	0.01	0.01	0.00	0.	25 JUN 1815	74	0.01	0.00	0.01	30.
25 JUN 0600	25	0.01	0.01	0.00	0.	25 JUN 1830	75	0.01	0.00	0.01	28.
25 JUN 0615	26	0.01	0.01	0.00	0.	25 JUN 1845	76	0.01	0.00	0.01	27.
25 JUN 0630	27	0.02	0.01	0.00	0.	25 JUN 1900	77	0.01	0.00	0.01	25.
25 JUN 0645	28	0.02	0.01	0.00	0.	25 JUN 1915	78	0.01	0.00	0.01	24.
25 JUN 0700	29	0.02	0.01	0.00	0.	25 JUN 1930	79	0.01	0.00	0.01	23.

25 JUN 0715	30	0.02	0.01	0.00	0.	*	25 JUN 1945	80	0.01	0.00	0.01	22.
25 JUN 0730	31	0.02	0.01	0.00	0.	*	25 JUN 2000	81	0.01	0.00	0.01	21.
25 JUN 0745	32	0.02	0.01	0.00	0.	*	25 JUN 2015	82	0.01	0.00	0.01	20.
25 JUN 0800	33	0.02	0.01	0.01	0.	*	25 JUN 2030	83	0.01	0.00	0.01	20.
25 JUN 0815	34	0.02	0.01	0.01	0.	*	25 JUN 2045	84	0.01	0.00	0.01	19.
25 JUN 0830	35	0.02	0.02	0.01	0.	*	25 JUN 2100	85	0.01	0.00	0.01	18.
25 JUN 0845	36	0.02	0.02	0.01	0.	*	25 JUN 2115	86	0.01	0.00	0.01	18.
25 JUN 0900	37	0.02	0.02	0.01	0.	*	25 JUN 2130	87	0.01	0.00	0.01	17.
25 JUN 0915	38	0.02	0.02	0.01	0.	*	25 JUN 2145	88	0.01	0.00	0.01	16.
25 JUN 0930	39	0.03	0.02	0.01	1.	*	25 JUN 2200	89	0.01	0.00	0.01	16.
25 JUN 0945	40	0.03	0.02	0.01	1.	*	25 JUN 2215	90	0.01	0.00	0.01	15.
25 JUN 1000	41	0.03	0.02	0.01	1.	*	25 JUN 2230	91	0.01	0.00	0.01	15.
25 JUN 1015	42	0.03	0.02	0.02	1.	*	25 JUN 2245	92	0.01	0.00	0.01	15.
25 JUN 1030	43	0.04	0.02	0.02	1.	*	25 JUN 2300	93	0.01	0.00	0.01	14.
25 JUN 1045	44	0.04	0.02	0.02	2.	*	25 JUN 2315	94	0.01	0.00	0.01	14.
25 JUN 1100	45	0.05	0.02	0.03	2.	*	25 JUN 2330	95	0.01	0.00	0.01	13.
25 JUN 1115	46	0.06	0.02	0.04	3.	*	25 JUN 2345	96	0.01	0.00	0.01	13.
25 JUN 1130	47	0.08	0.03	0.05	4.	*	26 JUN 0000	97	0.01	0.00	0.01	13.
25 JUN 1145	48	0.24	0.07	0.17	6.	*	26 JUN 0015	98	0.00	0.00	0.00	13.
25 JUN 1200	49	0.52	0.11	0.41	13.	*	26 JUN 0030	99	0.00	0.00	0.00	12.
25 JUN 1215	50	1.41	0.15	1.26	50.	*	26 JUN 0045	100	0.00	0.00	0.00	11.
						*						

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TOTAL RAINFALL = 4.28, TOTAL LOSS = 0.99, TOTAL EXCESS = 3.29

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
445.	12.75	(CFS)	125.	37.	36.	36.
		(INCHES)	2.134	2.514	2.514	2.514
		(AC-FT)	62.	73.	73.	73.

CUMULATIVE AREA = 0.54 SQ MI

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 56 KK    *     CP9B   *
          *            *
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58 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

59 HC HYDROGRAPH COMBINATION

ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION CP9B
SUM OF 2 HYDROGRAPHS

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
25 JUN 0000	1	1.	25 JUN 0615	26	0.	25 JUN 1230	51	474.	25 JUN 1845	76	38.
25 JUN 0015	2	0.	25 JUN 0630	27	0.	25 JUN 1245	52	780.	25 JUN 1900	77	36.
25 JUN 0030	3	0.	25 JUN 0645	28	0.	25 JUN 1300	53	631.	25 JUN 1915	78	35.
25 JUN 0045	4	0.	25 JUN 0700	29	0.	25 JUN 1315	54	460.	25 JUN 1930	79	33.
25 JUN 0100	5	0.	25 JUN 0715	30	0.	25 JUN 1330	55	347.	25 JUN 1945	80	32.
25 JUN 0115	6	0.	25 JUN 0730	31	0.	25 JUN 1345	56	272.	25 JUN 2000	81	30.
25 JUN 0130	7	0.	25 JUN 0745	32	0.	25 JUN 1400	57	221.	25 JUN 2015	82	29.
25 JUN 0145	8	0.	25 JUN 0800	33	0.	25 JUN 1415	58	184.	25 JUN 2030	83	28.
25 JUN 0200	9	0.	25 JUN 0815	34	0.	25 JUN 1430	59	156.	25 JUN 2045	84	27.
25 JUN 0215	10	0.	25 JUN 0830	35	0.	25 JUN 1445	60	134.	25 JUN 2100	85	26.
25 JUN 0230	11	0.	25 JUN 0845	36	0.	25 JUN 1500	61	117.	25 JUN 2115	86	25.
25 JUN 0245	12	0.	25 JUN 0900	37	0.	25 JUN 1515	62	103.	25 JUN 2130	87	24.
25 JUN 0300	13	0.	25 JUN 0915	38	0.	25 JUN 1530	63	93.	25 JUN 2145	88	24.
25 JUN 0315	14	0.	25 JUN 0930	39	1.	25 JUN 1545	64	84.	25 JUN 2200	89	23.
25 JUN 0330	15	0.	25 JUN 0945	40	1.	25 JUN 1600	65	76.	25 JUN 2215	90	22.
25 JUN 0345	16	0.	25 JUN 1000	41	1.	25 JUN 1615	66	70.	25 JUN 2230	91	22.
25 JUN 0400	17	0.	25 JUN 1015	42	2.	25 JUN 1630	67	65.	25 JUN 2245	92	21.
25 JUN 0415	18	0.	25 JUN 1030	43	3.	25 JUN 1645	68	60.	25 JUN 2300	93	21.
25 JUN 0430	19	0.	25 JUN 1045	44	3.	25 JUN 1700	69	56.	25 JUN 2315	94	20.
25 JUN 0445	20	0.	25 JUN 1100	45	4.	25 JUN 1715	70	53.	25 JUN 2330	95	20.
25 JUN 0500	21	0.	25 JUN 1115	46	6.	25 JUN 1730	71	50.	25 JUN 2345	96	19.
25 JUN 0515	22	0.	25 JUN 1130	47	8.	25 JUN 1745	72	47.	26 JUN 0000	97	19.
25 JUN 0530	23	0.	25 JUN 1145	48	11.	25 JUN 1800	73	45.	26 JUN 0015	98	18.
25 JUN 0545	24	0.	25 JUN 1200	49	21.	25 JUN 1815	74	42.	26 JUN 0030	99	18.
25 JUN 0600	25	0.	25 JUN 1215	50	88.	25 JUN 1830	75	40.	26 JUN 0045	100	17.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
780.	12.75	(CFS)	194.	57.	55.	55.
		(INCHES)	2.203	2.569	2.570	2.570
		(AC-FT)	96.	112.	112.	112.

CUMULATIVE AREA = 0.82 SQ MI

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79 KK     *    CP10C   *
          *            *
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81 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

82 HC HYDROGRAPH COMBINATION

ICOMP	2	NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION CP10C
SUM OF 2 HYDROGRAPHS

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
25 JUN 0000	1	1.	25 JUN 0615	26	0.	25 JUN 1230	51	610.	25 JUN 1845	76	53.
25 JUN 0015	2	1.	25 JUN 0630	27	0.	25 JUN 1245	52	1031.	25 JUN 1900	77	50.
25 JUN 0030	3	1.	25 JUN 0645	28	0.	25 JUN 1300	53	903.	25 JUN 1915	78	48.
25 JUN 0045	4	0.	25 JUN 0700	29	0.	25 JUN 1315	54	670.	25 JUN 1930	79	46.
25 JUN 0100	5	0.	25 JUN 0715	30	0.	25 JUN 1330	55	500.	25 JUN 1945	80	44.
25 JUN 0115	6	0.	25 JUN 0730	31	0.	25 JUN 1345	56	388.	25 JUN 2000	81	42.
25 JUN 0130	7	0.	25 JUN 0745	32	0.	25 JUN 1400	57	312.	25 JUN 2015	82	40.
25 JUN 0145	8	0.	25 JUN 0800	33	0.	25 JUN 1415	58	258.	25 JUN 2030	83	39.
25 JUN 0200	9	0.	25 JUN 0815	34	0.	25 JUN 1430	59	218.	25 JUN 2045	84	37.
25 JUN 0215	10	0.	25 JUN 0830	35	0.	25 JUN 1445	60	187.	25 JUN 2100	85	36.
25 JUN 0230	11	0.	25 JUN 0845	36	0.	25 JUN 1500	61	163.	25 JUN 2115	86	35.
25 JUN 0245	12	0.	25 JUN 0900	37	0.	25 JUN 1515	62	143.	25 JUN 2130	87	34.
25 JUN 0300	13	0.	25 JUN 0915	38	0.	25 JUN 1530	63	128.	25 JUN 2145	88	33.
25 JUN 0315	14	0.	25 JUN 0930	39	0.	25 JUN 1545	64	116.	25 JUN 2200	89	32.
25 JUN 0330	15	0.	25 JUN 0945	40	1.	25 JUN 1600	65	106.	25 JUN 2215	90	31.
25 JUN 0345	16	0.	25 JUN 1000	41	1.	25 JUN 1615	66	97.	25 JUN 2230	91	30.
25 JUN 0400	17	0.	25 JUN 1015	42	1.	25 JUN 1630	67	89.	25 JUN 2245	92	29.
25 JUN 0415	18	0.	25 JUN 1030	43	2.	25 JUN 1645	68	83.	25 JUN 2300	93	29.
25 JUN 0430	19	0.	25 JUN 1045	44	3.	25 JUN 1700	69	77.	25 JUN 2315	94	28.
25 JUN 0445	20	0.	25 JUN 1100	45	4.	25 JUN 1715	70	73.	25 JUN 2330	95	27.
25 JUN 0500	21	0.	25 JUN 1115	46	5.	25 JUN 1730	71	69.	25 JUN 2345	96	27.
25 JUN 0515	22	0.	25 JUN 1130	47	8.	25 JUN 1745	72	65.	26 JUN 0000	97	26.
25 JUN 0530	23	0.	25 JUN 1145	48	11.	25 JUN 1800	73	62.	26 JUN 0015	98	25.
25 JUN 0545	24	0.	25 JUN 1200	49	25.	25 JUN 1815	74	59.	26 JUN 0030	99	24.
25 JUN 0600	25	0.	25 JUN 1215	50	138.	25 JUN 1830	75	56.	26 JUN 0045	100	23.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
1031.	12.75	(CFS)	269.	78.	76.	76.
		(INCHES)	2.200	2.558	2.559	2.559
		(AC-FT)	134.	155.	155.	155.

CUMULATIVE AREA = 1.14 SQ MI

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89 KK SUB11

91 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

SUBBASIN RUNOFF DATA

92 BA SUBBASIN CHARACTERISTICS

TAREA	0.06	SUBBASIN AREA

PRECIPITATION DATA

10 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

HYDRO-35			TP-40					TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.72	1.41	2.47	2.77	2.97	3.35	3.81	4.28	0.00	0.00	0.00	0.00

STORM AREA = 0.06

93 LS SCS LOSS RATE

STRTL	0.22	INITIAL ABSTRACTION
CRVNBR	90.00	CURVE NUMBER
RTIMP	0.00	PERCENT IMPERVIOUS AREA

KINEMATIC WAVE

94 UK OVERLAND-FLOW ELEMENT NO. 1

L	1745.	OVERLAND FLOW LENGTH
S	0.0080	SLOPE
N	0.070	ROUGHNESS COEFFICIENT
PA	100.0	PERCENT OF SUBBASIN

95 RK MAIN CHANNEL

L	1325.	CHANNEL LENGTH
S	0.0072	SLOPE
N	0.016	CHANNEL ROUGHNESS COEFFICIENT
CA	0.06	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	16.00	BOTTOM WIDTH OR DIAMETER
Z	1.00	SIDE SLOPE
RUPSTQ	YES	ROUTE UPSTREAM HYDROGRAPH

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COMPUTED KINEMATIC PARAMETERS

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)
1	1.9039	1.667	15.00	872.50
3	1.5931	1.523	15.00	662.50

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HYDROGRAPH AT STATION SUB11

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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	1.	*	25 JUN 1230	51	0.30	0.02	0.28	701.
25 JUN 0015	2	0.01	0.01	0.00	1.	*	25 JUN 1245	52	0.09	0.01	0.09	1168.
25 JUN 0030	3	0.01	0.01	0.00	1.	*	25 JUN 1300	53	0.07	0.00	0.06	989.
25 JUN 0045	4	0.01	0.01	0.00	1.	*	25 JUN 1315	54	0.06	0.00	0.05	749.
25 JUN 0100	5	0.01	0.01	0.00	1.	*	25 JUN 1330	55	0.05	0.00	0.04	562.

25 JUN 0115	6	0.01	0.01	0.00	0.	*	25 JUN 1345	56	0.04	0.00	0.04	435.
25 JUN 0130	7	0.01	0.01	0.00	0.	*	25 JUN 1400	57	0.04	0.00	0.03	348.
25 JUN 0145	8	0.01	0.01	0.00	0.	*	25 JUN 1415	58	0.03	0.00	0.03	288.
25 JUN 0200	9	0.01	0.01	0.00	0.	*	25 JUN 1430	59	0.03	0.00	0.03	243.
25 JUN 0215	10	0.01	0.01	0.00	0.	*	25 JUN 1445	60	0.03	0.00	0.03	208.
25 JUN 0230	11	0.01	0.01	0.00	0.	*	25 JUN 1500	61	0.03	0.00	0.02	182.
25 JUN 0245	12	0.01	0.01	0.00	0.	*	25 JUN 1515	62	0.03	0.00	0.02	159.
25 JUN 0300	13	0.01	0.01	0.00	0.	*	25 JUN 1530	63	0.02	0.00	0.02	142.
25 JUN 0315	14	0.01	0.01	0.00	0.	*	25 JUN 1545	64	0.02	0.00	0.02	129.
25 JUN 0330	15	0.01	0.01	0.00	0.	*	25 JUN 1600	65	0.02	0.00	0.02	117.
25 JUN 0345	16	0.01	0.01	0.00	0.	*	25 JUN 1615	66	0.02	0.00	0.02	108.
25 JUN 0400	17	0.01	0.01	0.00	0.	*	25 JUN 1630	67	0.02	0.00	0.02	99.
25 JUN 0415	18	0.01	0.01	0.00	0.	*	25 JUN 1645	68	0.02	0.00	0.02	92.
25 JUN 0430	19	0.01	0.01	0.00	0.	*	25 JUN 1700	69	0.02	0.00	0.02	86.
25 JUN 0445	20	0.01	0.01	0.00	0.	*	25 JUN 1715	70	0.02	0.00	0.02	81.
25 JUN 0500	21	0.01	0.01	0.00	0.	*	25 JUN 1730	71	0.02	0.00	0.02	76.
25 JUN 0515	22	0.01	0.01	0.00	0.	*	25 JUN 1745	72	0.02	0.00	0.01	72.
25 JUN 0530	23	0.01	0.01	0.00	0.	*	25 JUN 1800	73	0.02	0.00	0.01	68.
25 JUN 0545	24	0.01	0.01	0.00	0.	*	25 JUN 1815	74	0.01	0.00	0.01	65.
25 JUN 0600	25	0.01	0.01	0.00	0.	*	25 JUN 1830	75	0.01	0.00	0.01	62.
25 JUN 0615	26	0.01	0.01	0.00	0.	*	25 JUN 1845	76	0.01	0.00	0.01	59.
25 JUN 0630	27	0.02	0.01	0.00	0.	*	25 JUN 1900	77	0.01	0.00	0.01	56.
25 JUN 0645	28	0.02	0.01	0.00	0.	*	25 JUN 1915	78	0.01	0.00	0.01	53.
25 JUN 0700	29	0.02	0.01	0.00	0.	*	25 JUN 1930	79	0.01	0.00	0.01	51.
25 JUN 0715	30	0.02	0.01	0.00	0.	*	25 JUN 1945	80	0.01	0.00	0.01	49.
25 JUN 0730	31	0.02	0.02	0.00	0.	*	25 JUN 2000	81	0.01	0.00	0.01	47.
25 JUN 0745	32	0.02	0.02	0.00	0.	*	25 JUN 2015	82	0.01	0.00	0.01	45.
25 JUN 0800	33	0.02	0.02	0.00	0.	*	25 JUN 2030	83	0.01	0.00	0.01	43.
25 JUN 0815	34	0.02	0.02	0.00	0.	*	25 JUN 2045	84	0.01	0.00	0.01	42.
25 JUN 0830	35	0.02	0.02	0.01	0.	*	25 JUN 2100	85	0.01	0.00	0.01	40.
25 JUN 0845	36	0.02	0.02	0.01	0.	*	25 JUN 2115	86	0.01	0.00	0.01	39.
25 JUN 0900	37	0.02	0.02	0.01	0.	*	25 JUN 2130	87	0.01	0.00	0.01	38.
25 JUN 0915	38	0.02	0.02	0.01	0.	*	25 JUN 2145	88	0.01	0.00	0.01	37.
25 JUN 0930	39	0.03	0.02	0.01	0.	*	25 JUN 2200	89	0.01	0.00	0.01	35.
25 JUN 0945	40	0.03	0.02	0.01	0.	*	25 JUN 2215	90	0.01	0.00	0.01	34.
25 JUN 1000	41	0.03	0.02	0.01	1.	*	25 JUN 2230	91	0.01	0.00	0.01	34.
25 JUN 1015	42	0.03	0.02	0.02	1.	*	25 JUN 2245	92	0.01	0.00	0.01	33.
25 JUN 1030	43	0.04	0.02	0.02	2.	*	25 JUN 2300	93	0.01	0.00	0.01	32.
25 JUN 1045	44	0.04	0.02	0.02	3.	*	25 JUN 2315	94	0.01	0.00	0.01	31.
25 JUN 1100	45	0.05	0.02	0.03	4.	*	25 JUN 2330	95	0.01	0.00	0.01	30.
25 JUN 1115	46	0.06	0.03	0.03	6.	*	25 JUN 2345	96	0.01	0.00	0.01	30.
25 JUN 1130	47	0.08	0.03	0.05	8.	*	26 JUN 0000	97	0.01	0.00	0.01	29.
25 JUN 1145	48	0.24	0.08	0.16	12.	*	26 JUN 0015	98	0.00	0.00	0.00	28.
25 JUN 1200	49	0.52	0.13	0.39	27.	*	26 JUN 0030	99	0.00	0.00	0.00	27.
25 JUN 1215	50	1.41	0.17	1.23	136.	*	26 JUN 0045	100	0.00	0.00	0.00	26.
						*						

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TOTAL RAINFALL = 4.28, TOTAL LOSS = 1.09, TOTAL EXCESS = 3.19

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
1168.	12.75	(CFS)	301.	87.	85.	85.
		(INCHES)	2.213	2.571	2.572	2.572
		(AC-FT)	149.	173.	173.	173.

CUMULATIVE AREA = 1.26 SQ MI

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          *            *
 96 KK    *    SUB12   *
          *            *
          **************

 98 KO        OUTPUT CONTROL VARIABLES
                   IPRNT          1  PRINT CONTROL
                   IPLOT          0  PLOT CONTROL
                   QSCAL         0.  HYDROGRAPH PLOT SCALE

            SUBBASIN RUNOFF DATA

 99 BA        SUBBASIN CHARACTERISTICS
                   TAREA       0.10  SUBBASIN AREA

              PRECIPITATION DATA

 10 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 ......  ............... TP-40 ...............  ........... TP-49 ...........
              5-MIN  15-MIN  60-MIN   2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
               0.72   1.41   2.47    2.77    2.97    3.35    3.81    4.28    0.00    0.00    0.00    0.00

                                                STORM AREA =    0.10

 100 LS       SCS LOSS RATE
                   STRTL       0.22  INITIAL ABSTRACTION
                  CRVNBR      90.00  CURVE NUMBER
                   RTIMP       0.00  PERCENT IMPERVIOUS AREA

              KINEMATIC WAVE
 101 UK         OVERLAND-FLOW ELEMENT NO. 1
                       L      1440.  OVERLAND FLOW LENGTH
                       S     0.0083  SLOPE
                       N      0.060  ROUGHNESS COEFFICIENT
                      PA      100.0  PERCENT OF SUBBASIN
 102 RK         MAIN CHANNEL
                       L      2665.  CHANNEL LENGTH
                       S     0.0071  SLOPE
                       N      0.016  CHANNEL ROUGHNESS COEFFICIENT
                      CA       0.10  CONTRIBUTING AREA
                   SHAPE       TRAP  CHANNEL SHAPE
                      WD      17.00  BOTTOM WIDTH OR DIAMETER
                       Z       1.00  SIDE SLOPE
                  RUPSTQ        YES  ROUTE UPSTREAM HYDROGRAPH

                                                   ***

          COMPUTED KINEMATIC PARAMETERS
             ELEMENT    ALPHA       M      DT (MIN)   DX (FT)
                   1   2.2624   1.667       15.00     720.00
                   3   1.5192   1.528       15.00    1332.50

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                                    HYDROGRAPH AT STATION    SUB12
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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	1.	25 JUN 1230	51	0.30	0.02	0.28	778.
25 JUN 0015	2	0.01	0.01	0.00	1.	25 JUN 1245	52	0.09	0.01	0.09	1301.
25 JUN 0030	3	0.01	0.01	0.00	1.	25 JUN 1300	53	0.07	0.00	0.06	1053.
25 JUN 0045	4	0.01	0.01	0.00	1.	25 JUN 1315	54	0.06	0.00	0.05	814.
25 JUN 0100	5	0.01	0.01	0.00	1.	25 JUN 1330	55	0.05	0.00	0.04	616.
25 JUN 0115	6	0.01	0.01	0.00	1.	25 JUN 1345	56	0.04	0.00	0.04	477.
25 JUN 0130	7	0.01	0.01	0.00	1.	25 JUN 1400	57	0.04	0.00	0.03	381.
25 JUN 0145	8	0.01	0.01	0.00	0.	25 JUN 1415	58	0.03	0.00	0.03	314.
25 JUN 0200	9	0.01	0.01	0.00	0.	25 JUN 1430	59	0.03	0.00	0.03	265.
25 JUN 0215	10	0.01	0.01	0.00	0.	25 JUN 1445	60	0.03	0.00	0.03	227.
25 JUN 0230	11	0.01	0.01	0.00	0.	25 JUN 1500	61	0.03	0.00	0.02	198.
25 JUN 0245	12	0.01	0.01	0.00	0.	25 JUN 1515	62	0.03	0.00	0.02	174.
25 JUN 0300	13	0.01	0.01	0.00	0.	25 JUN 1530	63	0.02	0.00	0.02	155.
25 JUN 0315	14	0.01	0.01	0.00	0.	25 JUN 1545	64	0.02	0.00	0.02	140.
25 JUN 0330	15	0.01	0.01	0.00	0.	25 JUN 1600	65	0.02	0.00	0.02	128.
25 JUN 0345	16	0.01	0.01	0.00	0.	25 JUN 1615	66	0.02	0.00	0.02	117.
25 JUN 0400	17	0.01	0.01	0.00	0.	25 JUN 1630	67	0.02	0.00	0.02	108.
25 JUN 0415	18	0.01	0.01	0.00	0.	25 JUN 1645	68	0.02	0.00	0.02	100.
25 JUN 0430	19	0.01	0.01	0.00	0.	25 JUN 1700	69	0.02	0.00	0.02	93.
25 JUN 0445	20	0.01	0.01	0.00	0.	25 JUN 1715	70	0.02	0.00	0.02	88.
25 JUN 0500	21	0.01	0.01	0.00	0.	25 JUN 1730	71	0.02	0.00	0.02	83.
25 JUN 0515	22	0.01	0.01	0.00	0.	25 JUN 1745	72	0.02	0.00	0.01	78.
25 JUN 0530	23	0.01	0.01	0.00	0.	25 JUN 1800	73	0.02	0.00	0.01	74.
25 JUN 0545	24	0.01	0.01	0.00	0.	25 JUN 1815	74	0.01	0.00	0.01	71.
25 JUN 0600	25	0.01	0.01	0.00	0.	25 JUN 1830	75	0.01	0.00	0.01	67.
25 JUN 0615	26	0.01	0.01	0.00	0.	25 JUN 1845	76	0.01	0.00	0.01	64.
25 JUN 0630	27	0.02	0.01	0.00	0.	25 JUN 1900	77	0.01	0.00	0.01	61.
25 JUN 0645	28	0.02	0.01	0.00	0.	25 JUN 1915	78	0.01	0.00	0.01	58.
25 JUN 0700	29	0.02	0.01	0.00	0.	25 JUN 1930	79	0.01	0.00	0.01	55.
25 JUN 0715	30	0.02	0.01	0.00	0.	25 JUN 1945	80	0.01	0.00	0.01	53.
25 JUN 0730	31	0.02	0.02	0.00	0.	25 JUN 2000	81	0.01	0.00	0.01	51.
25 JUN 0745	32	0.02	0.02	0.00	0.	25 JUN 2015	82	0.01	0.00	0.01	49.
25 JUN 0800	33	0.02	0.02	0.00	0.	25 JUN 2030	83	0.01	0.00	0.01	47.
25 JUN 0815	34	0.02	0.02	0.00	0.	25 JUN 2045	84	0.01	0.00	0.01	45.
25 JUN 0830	35	0.02	0.02	0.01	0.	25 JUN 2100	85	0.01	0.00	0.01	44.
25 JUN 0845	36	0.02	0.02	0.01	0.	25 JUN 2115	86	0.01	0.00	0.01	42.
25 JUN 0900	37	0.02	0.02	0.01	0.	25 JUN 2130	87	0.01	0.00	0.01	41.
25 JUN 0915	38	0.02	0.02	0.01	0.	25 JUN 2145	88	0.01	0.00	0.01	40.
25 JUN 0930	39	0.03	0.02	0.01	1.	25 JUN 2200	89	0.01	0.00	0.01	38.
25 JUN 0945	40	0.03	0.02	0.01	1.	25 JUN 2215	90	0.01	0.00	0.01	37.
25 JUN 1000	41	0.03	0.02	0.01	1.	25 JUN 2230	91	0.01	0.00	0.01	36.
25 JUN 1015	42	0.03	0.02	0.02	1.	25 JUN 2245	92	0.01	0.00	0.01	35.
25 JUN 1030	43	0.04	0.02	0.02	2.	25 JUN 2300	93	0.01	0.00	0.01	34.
25 JUN 1045	44	0.04	0.02	0.02	4.	25 JUN 2315	94	0.01	0.00	0.01	34.
25 JUN 1100	45	0.05	0.02	0.03	5.	25 JUN 2330	95	0.01	0.00	0.01	33.
25 JUN 1115	46	0.06	0.03	0.03	7.	25 JUN 2345	96	0.01	0.00	0.01	32.
25 JUN 1130	47	0.08	0.03	0.05	10.	26 JUN 0000	97	0.01	0.00	0.01	31.
25 JUN 1145	48	0.24	0.08	0.16	15.	26 JUN 0015	98	0.00	0.00	0.00	31.
25 JUN 1200	49	0.52	0.13	0.39	31.	26 JUN 0030	99	0.00	0.00	0.00	30.
25 JUN 1215	50	1.41	0.17	1.23	140.	26 JUN 0045	100	0.00	0.00	0.00	28.

TOTAL RAINFALL = 4.28, TOTAL LOSS = 1.09, TOTAL EXCESS = 3.18

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PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
  (CFS)       (HR)                  6-HR       24-HR       72-HR     24.75-HR
  1301.      12.75        (CFS)     328.         95.         93.         93.
                        (INCHES)   2.237       2.600       2.601       2.601
                         (AC-FT)    163.        189.        189.        189.

                      CUMULATIVE AREA =    1.36 SQ MI


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103 KK    *    SUB13   *
          *            *
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105 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          1  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

              SUBBASIN RUNOFF DATA

106 BA          SUBBASIN CHARACTERISTICS
                     TAREA       0.14  SUBBASIN AREA

                PRECIPITATION DATA

 10 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....  ............... TP-40 ...............  ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN   2-HR   3-HR   6-HR  12-HR  24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 0.72   1.41   2.47    2.77   2.97   3.35   3.81   4.28    0.00    0.00    0.00    0.00

                                                STORM AREA =    0.14

107 LS          SCS LOSS RATE
                     STRTL       0.38  INITIAL ABSTRACTION
                    CRVNBR      84.00  CURVE NUMBER
                     RTIMP       0.00  PERCENT IMPERVIOUS AREA

                KINEMATIC WAVE
108 UK           OVERLAND-FLOW ELEMENT NO. 1
                         L       1460.  OVERLAND FLOW LENGTH
                         S      0.0061  SLOPE
                         N       0.060  ROUGHNESS COEFFICIENT
                        PA       100.0  PERCENT OF SUBBASIN
109 RK           MAIN CHANNEL
                         L       4000.  CHANNEL LENGTH
                         S      0.0053  SLOPE
                         N       0.016  CHANNEL ROUGHNESS COEFFICIENT
                        CA        0.14  CONTRIBUTING AREA
                     SHAPE        TRAP  CHANNEL SHAPE
                        WD       17.00  BOTTOM WIDTH OR DIAMETER
                         Z        1.00  SIDE SLOPE
                    RUPSTO         YES  ROUTE UPSTREAM HYDROGRAPH
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COMPUTED KINEMATIC PARAMETERS

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)
1	1.9395	1.667	15.00	730.00
3	1.3126	1.528	15.00	2000.00

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HYDROGRAPH AT STATION SUB13

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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	1.	*	25 JUN 1230	51	0.30	0.05	0.25	744.
25 JUN 0015	2	0.01	0.01	0.00	1.	*	25 JUN 1245	52	0.09	0.01	0.08	1363.
25 JUN 0030	3	0.01	0.01	0.00	1.	*	25 JUN 1300	53	0.07	0.01	0.06	1182.
25 JUN 0045	4	0.01	0.01	0.00	1.	*	25 JUN 1315	54	0.06	0.01	0.05	922.
25 JUN 0100	5	0.01	0.01	0.00	1.	*	25 JUN 1330	55	0.05	0.01	0.04	704.
25 JUN 0115	6	0.01	0.01	0.00	1.	*	25 JUN 1345	56	0.04	0.01	0.04	546.
25 JUN 0130	7	0.01	0.01	0.00	1.	*	25 JUN 1400	57	0.04	0.00	0.03	435.
25 JUN 0145	8	0.01	0.01	0.00	1.	*	25 JUN 1415	58	0.03	0.00	0.03	356.
25 JUN 0200	9	0.01	0.01	0.00	1.	*	25 JUN 1430	59	0.03	0.00	0.03	299.
25 JUN 0215	10	0.01	0.01	0.00	0.	*	25 JUN 1445	60	0.03	0.00	0.02	256.
25 JUN 0230	11	0.01	0.01	0.00	0.	*	25 JUN 1500	61	0.03	0.00	0.02	223.
25 JUN 0245	12	0.01	0.01	0.00	0.	*	25 JUN 1515	62	0.03	0.00	0.02	196.
25 JUN 0300	13	0.01	0.01	0.00	0.	*	25 JUN 1530	63	0.02	0.00	0.02	174.
25 JUN 0315	14	0.01	0.01	0.00	0.	*	25 JUN 1545	64	0.02	0.00	0.02	157.
25 JUN 0330	15	0.01	0.01	0.00	0.	*	25 JUN 1600	65	0.02	0.00	0.02	143.
25 JUN 0345	16	0.01	0.01	0.00	0.	*	25 JUN 1615	66	0.02	0.00	0.02	131.
25 JUN 0400	17	0.01	0.01	0.00	0.	*	25 JUN 1630	67	0.02	0.00	0.02	121.
25 JUN 0415	18	0.01	0.01	0.00	0.	*	25 JUN 1645	68	0.02	0.00	0.02	112.
25 JUN 0430	19	0.01	0.01	0.00	0.	*	25 JUN 1700	69	0.02	0.00	0.02	104.
25 JUN 0445	20	0.01	0.01	0.00	0.	*	25 JUN 1715	70	0.02	0.00	0.01	98.
25 JUN 0500	21	0.01	0.01	0.00	0.	*	25 JUN 1730	71	0.02	0.00	0.01	92.
25 JUN 0515	22	0.01	0.01	0.00	0.	*	25 JUN 1745	72	0.02	0.00	0.01	87.
25 JUN 0530	23	0.01	0.01	0.00	0.	*	25 JUN 1800	73	0.02	0.00	0.01	83.
25 JUN 0545	24	0.01	0.01	0.00	0.	*	25 JUN 1815	74	0.01	0.00	0.01	79.
25 JUN 0600	25	0.01	0.01	0.00	0.	*	25 JUN 1830	75	0.01	0.00	0.01	75.
25 JUN 0615	26	0.01	0.01	0.00	0.	*	25 JUN 1845	76	0.01	0.00	0.01	71.
25 JUN 0630	27	0.02	0.02	0.00	0.	*	25 JUN 1900	77	0.01	0.00	0.01	68.
25 JUN 0645	28	0.02	0.02	0.00	0.	*	25 JUN 1915	78	0.01	0.00	0.01	64.
25 JUN 0700	29	0.02	0.02	0.00	0.	*	25 JUN 1930	79	0.01	0.00	0.01	62.
25 JUN 0715	30	0.02	0.02	0.00	0.	*	25 JUN 1945	80	0.01	0.00	0.01	59.
25 JUN 0730	31	0.02	0.02	0.00	0.	*	25 JUN 2000	81	0.01	0.00	0.01	56.
25 JUN 0745	32	0.02	0.02	0.00	0.	*	25 JUN 2015	82	0.01	0.00	0.01	54.
25 JUN 0800	33	0.02	0.02	0.00	0.	*	25 JUN 2030	83	0.01	0.00	0.01	52.
25 JUN 0815	34	0.02	0.02	0.00	0.	*	25 JUN 2045	84	0.01	0.00	0.01	50.
25 JUN 0830	35	0.02	0.02	0.00	0.	*	25 JUN 2100	85	0.01	0.00	0.01	49.
25 JUN 0845	36	0.02	0.02	0.00	0.	*	25 JUN 2115	86	0.01	0.00	0.01	47.
25 JUN 0900	37	0.02	0.02	0.00	0.	*	25 JUN 2130	87	0.01	0.00	0.01	45.
25 JUN 0915	38	0.02	0.02	0.00	0.	*	25 JUN 2145	88	0.01	0.00	0.01	44.
25 JUN 0930	39	0.03	0.02	0.00	0.	*	25 JUN 2200	89	0.01	0.00	0.01	43.
25 JUN 0945	40	0.03	0.02	0.00	0.	*	25 JUN 2215	90	0.01	0.00	0.01	41.
25 JUN 1000	41	0.03	0.03	0.01	0.	*	25 JUN 2230	91	0.01	0.00	0.01	40.
25 JUN 1015	42	0.03	0.03	0.01	1.	*	25 JUN 2245	92	0.01	0.00	0.01	39.
25 JUN 1030	43	0.04	0.03	0.01	1.	*	25 JUN 2300	93	0.01	0.00	0.01	38.
25 JUN 1045	44	0.04	0.03	0.01	3.	*	25 JUN 2315	94	0.01	0.00	0.01	37.
25 JUN 1100	45	0.05	0.04	0.01	3.	*	25 JUN 2330	95	0.01	0.00	0.01	36.

25 JUN 1115	46	0.06	0.04	0.02	5.	*	25 JUN 2345	96	0.01	0.00	0.01	35.
25 JUN 1130	47	0.08	0.05	0.03	8.	*	26 JUN 0000	97	0.01	0.00	0.01	35.
25 JUN 1145	48	0.24	0.14	0.10	12.	*	26 JUN 0015	98	0.00	0.00	0.00	34.
25 JUN 1200	49	0.52	0.22	0.29	24.	*	26 JUN 0030	99	0.00	0.00	0.00	33.
25 JUN 1215	50	1.41	0.35	1.06	108.	*	26 JUN 0045	100	0.00	0.00	0.00	31.

****

TOTAL RAINFALL = 4.28, TOTAL LOSS = 1.66, TOTAL EXCESS = 2.62

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
1363.	12.75	(CFS)	359.	104.	101.	101.
		(INCHES)	2.224	2.580	2.581	2.581
		(AC-FT)	178.	207.	207.	207.

CUMULATIVE AREA = 1.50 SQ MI

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          **************
          *            *
242 KK    *   SUB29    *
          *            *
          **************
```

244 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

SUBBASIN RUNOFF DATA

245 BA SUBBASIN CHARACTERISTICS

TAREA	0.32	SUBBASIN AREA

PRECIPITATION DATA

10 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

HYDRO-35			TP-40					TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.72	1.41	2.47	2.77	2.97	3.35	3.81	4.28	0.00	0.00	0.00	0.00

STORM AREA = 0.32

246 LS SCS LOSS RATE

STRTL	0.17	INITIAL ABSTRACTION
CRVNBR	92.00	CURVE NUMBER
RTIMP	0.00	PERCENT IMPERVIOUS AREA

LOSS RATE VARIABLES FOR SECOND OVERLAND FLOW ELEMENT

STRTL	0.17	INITIAL ABSTRACTION
CRVNBR	92.00	CURVE NUMBER
RTIMP	0.00	PERCENT IMPERVIOUS AREA

KINEMATIC WAVE

```
247 UK          OVERLAND-FLOW ELEMENT NO. 1
                        L       745.  OVERLAND FLOW LENGTH
                        S     0.0054  SLOPE
                        N      0.060  ROUGHNESS COEFFICIENT
                       PA       32.5  PERCENT OF SUBBASIN
248 UK          OVERLAND-FLOW ELEMENT NO. 2
                        L      1710.  OVERLAND FLOW LENGTH
                        S     0.0064  SLOPE
                        N      0.060  ROUGHNESS COEFFICIENT
                       PA       67.5  PERCENT OF SUBBASIN
249 RK          MAIN CHANNEL
                        L      5730.  CHANNEL LENGTH
                        S     0.0051  SLOPE
                        N      0.025  CHANNEL ROUGHNESS COEFFICIENT
                       CA       0.32  CONTRIBUTING AREA
                    SHAPE       TRAP  CHANNEL SHAPE
                       WD      50.00  BOTTOM WIDTH OR DIAMETER
                        Z       3.90  SIDE SLOPE
                   RUPSTQ        YES  ROUTE UPSTREAM HYDROGRAPH

                                                    ***

        COMPUTED KINEMATIC PARAMETERS
          ELEMENT     ALPHA        M      DT (MIN)   DX (FT)
                1    1.8249    1.667        15.00     372.50
                2    1.9867    1.667        15.00     855.00
                3    0.4577    1.535        15.00    2865.00

**********************************************************************************************************************

                                    HYDROGRAPH AT STATION    SUB29

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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	1.	25 JUN 1230	51	0.30	0.01	0.29	1981.
25 JUN 0015	2	0.01	0.01	0.00	1.	25 JUN 1245	52	0.09	0.00	0.09	2550.
25 JUN 0030	3	0.01	0.01	0.00	1.	25 JUN 1300	53	0.07	0.00	0.07	2323.
25 JUN 0045	4	0.01	0.01	0.00	1.	25 JUN 1315	54	0.06	0.00	0.05	1797.
25 JUN 0100	5	0.01	0.01	0.00	1.	25 JUN 1330	55	0.05	0.00	0.05	1304.
25 JUN 0115	6	0.01	0.01	0.00	0.	25 JUN 1345	56	0.04	0.00	0.04	943.
25 JUN 0130	7	0.01	0.01	0.00	0.	25 JUN 1400	57	0.04	0.00	0.04	704.
25 JUN 0145	8	0.01	0.01	0.00	0.	25 JUN 1415	58	0.03	0.00	0.03	553.
25 JUN 0200	9	0.01	0.01	0.00	0.	25 JUN 1430	59	0.03	0.00	0.03	455.
25 JUN 0215	10	0.01	0.01	0.00	0.	25 JUN 1445	60	0.03	0.00	0.03	387.
25 JUN 0230	11	0.01	0.01	0.00	0.	25 JUN 1500	61	0.03	0.00	0.02	337.
25 JUN 0245	12	0.01	0.01	0.00	0.	25 JUN 1515	62	0.03	0.00	0.02	299.
25 JUN 0300	13	0.01	0.01	0.00	0.	25 JUN 1530	63	0.02	0.00	0.02	268.
25 JUN 0315	14	0.01	0.01	0.00	0.	25 JUN 1545	64	0.02	0.00	0.02	244.
25 JUN 0330	15	0.01	0.01	0.00	0.	25 JUN 1600	65	0.02	0.00	0.02	223.
25 JUN 0345	16	0.01	0.01	0.00	0.	25 JUN 1615	66	0.02	0.00	0.02	206.
25 JUN 0400	17	0.01	0.01	0.00	0.	25 JUN 1630	67	0.02	0.00	0.02	192.
25 JUN 0415	18	0.01	0.01	0.00	0.	25 JUN 1645	68	0.02	0.00	0.02	180.
25 JUN 0430	19	0.01	0.01	0.00	0.	25 JUN 1700	69	0.02	0.00	0.02	169.
25 JUN 0445	20	0.01	0.01	0.00	0.	25 JUN 1715	70	0.02	0.00	0.02	159.
25 JUN 0500	21	0.01	0.01	0.00	0.	25 JUN 1730	71	0.02	0.00	0.02	151.
25 JUN 0515	22	0.01	0.01	0.00	0.	25 JUN 1745	72	0.02	0.00	0.02	143.
25 JUN 0530	23	0.01	0.01	0.00	0.	25 JUN 1800	73	0.02	0.00	0.01	136.
25 JUN 0545	24	0.01	0.01	0.00	0.	25 JUN 1815	74	0.01	0.00	0.01	130.

25 JUN 0600	25	0.01	0.01	0.00	0.	*	25 JUN 1830	75	0.01	0.00	0.01	124.
25 JUN 0615	26	0.01	0.01	0.00	0.	*	25 JUN 1845	76	0.01	0.00	0.01	119.
25 JUN 0630	27	0.02	0.01	0.00	0.	*	25 JUN 1900	77	0.01	0.00	0.01	114.
25 JUN 0645	28	0.02	0.01	0.00	0.	*	25 JUN 1915	78	0.01	0.00	0.01	109.
25 JUN 0700	29	0.02	0.01	0.00	0.	*	25 JUN 1930	79	0.01	0.00	0.01	104.
25 JUN 0715	30	0.02	0.01	0.00	0.	*	25 JUN 1945	80	0.01	0.00	0.01	99.
25 JUN 0730	31	0.02	0.01	0.00	0.	*	25 JUN 2000	81	0.01	0.00	0.01	95.
25 JUN 0745	32	0.02	0.01	0.01	0.	*	25 JUN 2015	82	0.01	0.00	0.01	92.
25 JUN 0800	33	0.02	0.01	0.01	0.	*	25 JUN 2030	83	0.01	0.00	0.01	88.
25 JUN 0815	34	0.02	0.01	0.01	0.	*	25 JUN 2045	84	0.01	0.00	0.01	85.
25 JUN 0830	35	0.02	0.01	0.01	0.	*	25 JUN 2100	85	0.01	0.00	0.01	82.
25 JUN 0845	36	0.02	0.01	0.01	1.	*	25 JUN 2115	86	0.01	0.00	0.01	79.
25 JUN 0900	37	0.02	0.01	0.01	1.	*	25 JUN 2130	87	0.01	0.00	0.01	77.
25 JUN 0915	38	0.02	0.01	0.01	1.	*	25 JUN 2145	88	0.01	0.00	0.01	75.
25 JUN 0930	39	0.03	0.01	0.01	2.	*	25 JUN 2200	89	0.01	0.00	0.01	73.
25 JUN 0945	40	0.03	0.01	0.01	3.	*	25 JUN 2215	90	0.01	0.00	0.01	71.
25 JUN 1000	41	0.03	0.02	0.02	4.	*	25 JUN 2230	91	0.01	0.00	0.01	69.
25 JUN 1015	42	0.03	0.02	0.02	5.	*	25 JUN 2245	92	0.01	0.00	0.01	67.
25 JUN 1030	43	0.04	0.02	0.02	8.	*	25 JUN 2300	93	0.01	0.00	0.01	65.
25 JUN 1045	44	0.04	0.02	0.03	11.	*	25 JUN 2315	94	0.01	0.00	0.01	64.
25 JUN 1100	45	0.05	0.02	0.03	15.	*	25 JUN 2330	95	0.01	0.00	0.01	62.
25 JUN 1115	46	0.06	0.02	0.04	21.	*	25 JUN 2345	96	0.01	0.00	0.01	61.
25 JUN 1130	47	0.08	0.03	0.05	29.	*	26 JUN 0000	97	0.01	0.00	0.01	59.
25 JUN 1145	48	0.24	0.06	0.18	48.	*	26 JUN 0015	98	0.00	0.00	0.00	58.
25 JUN 1200	49	0.52	0.09	0.43	108.	*	26 JUN 0030	99	0.00	0.00	0.00	56.
25 JUN 1215	50	1.41	0.12	1.29	685.	*	26 JUN 0045	100	0.00	0.00	0.00	54.
						*						

****

TOTAL RAINFALL = 4.28, TOTAL LOSS = 0.89, TOTAL EXCESS = 3.39

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
2550.	12.75	(CFS)	682.	196.	190.	190.
		(INCHES)	2.334	2.688	2.688	2.688
		(AC-FT)	338.	390.	390.	390.

CUMULATIVE AREA = 2.72 SQ MI

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          **************
          *            *
250 KK    *    CPEND   *
          *            *
          **************
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252 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

253 HC HYDROGRAPH COMBINATION

ICOMP	2	NUMBER OF HYDROGRAPHS TO COMBINE

***

HYDROGRAPH AT STATION CPEND

SUM OF 2 HYDROGRAPHS

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
25 JUN 0000	1	2.	25 JUN 0615	26	0.	25 JUN 1230	51	2725.	25 JUN 1845	76	190.
25 JUN 0015	2	2.	25 JUN 0630	27	0.	25 JUN 1245	52	3913.	25 JUN 1900	77	181.
25 JUN 0030	3	2.	25 JUN 0645	28	0.	25 JUN 1300	53	3505.	25 JUN 1915	78	173.
25 JUN 0045	4	2.	25 JUN 0700	29	0.	25 JUN 1315	54	2718.	25 JUN 1930	79	165.
25 JUN 0100	5	2.	25 JUN 0715	30	0.	25 JUN 1330	55	2009.	25 JUN 1945	80	158.
25 JUN 0115	6	1.	25 JUN 0730	31	0.	25 JUN 1345	56	1488.	25 JUN 2000	81	152.
25 JUN 0130	7	1.	25 JUN 0745	32	0.	25 JUN 1400	57	1139.	25 JUN 2015	82	146.
25 JUN 0145	8	1.	25 JUN 0800	33	0.	25 JUN 1415	58	910.	25 JUN 2030	83	140.
25 JUN 0200	9	1.	25 JUN 0815	34	0.	25 JUN 1430	59	754.	25 JUN 2045	84	135.
25 JUN 0215	10	1.	25 JUN 0830	35	0.	25 JUN 1445	60	643.	25 JUN 2100	85	131.
25 JUN 0230	11	1.	25 JUN 0845	36	1.	25 JUN 1500	61	560.	25 JUN 2115	86	126.
25 JUN 0245	12	1.	25 JUN 0900	37	1.	25 JUN 1515	62	494.	25 JUN 2130	87	122.
25 JUN 0300	13	1.	25 JUN 0915	38	1.	25 JUN 1530	63	442.	25 JUN 2145	88	119.
25 JUN 0315	14	1.	25 JUN 0930	39	2.	25 JUN 1545	64	400.	25 JUN 2200	89	115.
25 JUN 0330	15	0.	25 JUN 0945	40	3.	25 JUN 1600	65	366.	25 JUN 2215	90	112.
25 JUN 0345	16	0.	25 JUN 1000	41	4.	25 JUN 1615	66	337.	25 JUN 2230	91	109.
25 JUN 0400	17	0.	25 JUN 1015	42	6.	25 JUN 1630	67	313.	25 JUN 2245	92	106.
25 JUN 0415	18	0.	25 JUN 1030	43	9.	25 JUN 1645	68	291.	25 JUN 2300	93	103.
25 JUN 0430	19	0.	25 JUN 1045	44	14.	25 JUN 1700	69	273.	25 JUN 2315	94	101.
25 JUN 0445	20	0.	25 JUN 1100	45	18.	25 JUN 1715	70	257.	25 JUN 2330	95	99.
25 JUN 0500	21	0.	25 JUN 1115	46	26.	25 JUN 1730	71	243.	25 JUN 2345	96	96.
25 JUN 0515	22	0.	25 JUN 1130	47	37.	25 JUN 1745	72	230.	26 JUN 0000	97	94.
25 JUN 0530	23	0.	25 JUN 1145	48	60.	25 JUN 1800	73	219.	26 JUN 0015	98	92.
25 JUN 0545	24	0.	25 JUN 1200	49	132.	25 JUN 1815	74	209.	26 JUN 0030	99	89.
25 JUN 0600	25	0.	25 JUN 1215	50	793.	25 JUN 1830	75	199.	26 JUN 0045	100	85.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
3913.	12.75	(CFS)	1041.	301.	292.	292.
		(INCHES)	2.294	2.650	2.650	2.650
		(AC-FT)	516.	596.	596.	596.

CUMULATIVE AREA = 4.22 SQ MI

RUNOFF SUMMARY

FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	SUB1	104.	12.75	28.	8.	8.	0.12		
ROUTED TO	CP4A	103.	12.75	28.	8.	8.	0.12		
HYDROGRAPH AT	SUB2	69.	13.00	24.	7.	7.	0.11		
HYDROGRAPH AT	SUB3	203.	13.00	72.	21.	21.	0.33		
2 COMBINED AT	CP4B	290.	13.00	100.	29.	28.	0.45		
HYDROGRAPH AT	SUB4	445.	12.75	125.	37.	36.	0.54		
ROUTED TO	CP9A	426.	12.75	125.	37.	36.	0.54		
HYDROGRAPH AT	SUB5	305.	12.50	41.	12.	11.	0.16		
HYDROGRAPH AT	SUB6	354.	12.75	69.	20.	19.	0.28		
2 COMBINED AT	CP9B	780.	12.75	194.	57.	55.	0.82		
ROUTED TO	CP10A	734.	12.75	195.	57.	55.	0.82		
HYDROGRAPH AT	SUB7	120.	12.75	24.	7.	7.	0.11		
HYDROGRAPH AT	SUB8+9	312.	12.75	75.	22.	21.	0.32		
ROUTED TO	CP10B	297.	12.75	75.	22.	21.	0.32		
2 COMBINED AT	CP10C	1031.	12.75	269.	78.	76.	1.14		
HYDROGRAPH AT	SUB10	1104.	12.75	284.	82.	80.	1.20		
HYDROGRAPH AT	SUB11	1168.	12.75	301.	87.	85.	1.26		
HYDROGRAPH AT	SUB12	1301.	12.75	328.	95.	93.	1.36		
HYDROGRAPH AT	SUB13	1363.	12.75	359.	104.	101.	1.50		
HYDROGRAPH AT	SUB14	214.	12.75	38.	11.	11.	0.16		
HYDROGRAPH AT	SUB15	230.	12.50	33.	9.	9.	0.14		
2 COMBINED AT	CP16	435.	12.50	71.	20.	20.	0.30		
HYDROGRAPH AT	SUB16	520.	12.50	97.	28.	27.	0.41		
HYDROGRAPH AT	SUB17	528.	12.75	114.	32.	31.	0.49		
HYDROGRAPH AT	SUB18	255.	12.50	55.	16.	15.	0.24		
2 COMBINED AT	CP19	779.	12.75	168.	48.	47.	0.73		
HYDROGRAPH AT	SUB19	882.	12.75	204.	58.	57.	0.85		

HYDROGRAPH AT	SUB20	856.	12.75	209.	60.	58.	0.88
HYDROGRAPH AT	SUB21	345.	12.50	64.	18.	18.	0.28
HYDROGRAPH AT	SUB22	100.	12.50	15.	4.	4.	0.06
2 COMBINED AT	CP24	445.	12.50	78.	22.	22.	0.34
ROUTED TO	CP25A	392.	12.50	78.	22.	22.	0.34
HYDROGRAPH AT	SUB24	334.	12.50	50.	14.	14.	0.17
2 COMBINED AT	CP25A	726.	12.50	128.	37.	35.	0.51
ROUTED TO	CP25	684.	12.50	128.	37.	36.	0.51
HYDROGRAPH AT	SUB23	622.	12.75	139.	40.	39.	0.57
2 COMBINED AT	CP25	1235.	12.50	268.	77.	74.	1.08
HYDROGRAPH AT	SUB25	1282.	12.75	303.	87.	84.	1.21
HYDROGRAPH AT	SUB26	1309.	12.75	325.	93.	90.	1.31
2 COMBINED AT	CP29A	2165.	12.75	534.	153.	148.	2.19
HYDROGRAPH AT	SUB27	188.	12.50	27.	8.	8.	0.09
HYDROGRAPH AT	SUB28	360.	12.50	57.	16.	16.	0.21
2 COMBINED AT	CP29	2409.	12.75	590.	169.	164.	2.39
HYDROGRAPH AT	SUB29	2550.	12.75	682.	196.	190.	2.72
2 COMBINED AT	CPEND	3913.	12.75	1041.	301.	292.	4.22

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*** NORMAL END OF HEC-1 ***
101
  SIMONS8      job terminated at 25-JUN-1986 13:48:01.63

  Accounting information:
  Buffered I/O count:          179     Peak working set size:    500
  Direct I/O count:            375     Peak page file size:     1843
  Page faults:                1994     Mounted volumes:            0
  Charged CPU time:     0 00:01:10.05  Elapsed time:     0 00:01:49.46
$
```

APPENDIX C

HEC-1 Printout, 100-Year Event, Diversion at Thunderbird Road

```
T OUTER12B24.DAT
*DIAGRAM
*NO LIST
ID        ------------ SIMONS, LI & ASSOCIATES, INC.  PAZ-DC-01 ------------
ID        DELEUW, CATHER & CO.  OUTER LOOP HIGHWAY PROJECT CONCEPT DRAINAGE PLAN
ID            DIVERSION AT THUNDERBIRD RD, EXISTING RUNOFF CHARACTERISTICS
ID            100-YR, 24-HR RAINFALL USING HYPOTHETICAL STORM DISTRIBUTION
IT   15. 25JUN86     0.     100.
IO    5.      0.
KK  SUB1
KM      RUNOFF FROM SUB-BASIN 1
BA0.1242
*       HYPOTHETICAL STORM DISTRIBUTION
PH                  0.72    1.41    2.47    2.77    2.97    3.35    3.81    4.28
LS    0.      84
UK 1965.  0.0102    0.10    100.
RK 4220.  0.0101   0.016  0.1242    TRAP     10.      1.
KK  CP4A
KM      ROUTE SUB1 TO CP4
RK  500.  0.0100   0.016  0.1242    TRAP     10.      1.
KK  SUB2
KM      RUNOFF FROM SUB-BASIN 2
BA0.1106
LS    0.      84
UK 2885.  0.0099    0.10    100.
RK 1200.  0.0021   0.025  0.1106    TRAP     25.      1.
KK  SUB3
KM      RUNOFF FROM SUB-BASIN 3
BA0.2192
LS    0.      84
UK 2920.  0.0099    0.10    100.
RK 1580.  0.0027   0.025  0.3298    TRAP     25.      1.     YES
KK  CP4B
KM      COMBINE HYDROGRAPHS CP4A & SUB3
KO    1.
HC    2.
KK  SUB4
KM      RUNOFF FROM SUB-BASIN 4
KO    1.
BA0.0887
LS    0.      91
UK 1154.  0.0052    0.06    100.
RK 2785.  0.0083   0.016  0.4540    TRAP     12.      1.     YES
KK  CP9A
KM      DIVERT FLOW TO WEST SIDE OF PIMA ROAD
DTDIVERT
DI    0.    100.    200.    300.    400.    500.
DQ    0.    100.    200.    300.    400.    500.
KK  SUB5
KM      RUNOFF FROM SUB-BASIN 5
BA0.1555
LS    0.      91              0.     84.
UK  450.  0.0050   0.025   45.92
UK 3020.  0.0050   0.025   54.08
RK 2530.  0.0040   0.025  0.1555    TRAP     25.      1.
KK  SUB6
KM      RUNOFF FROM SUB-BASIN 6
BA0.1200
LS    0.      84
UK 1730.  0.0092    0.08    100.
```

```
RK 2800.  0.0075   0.040  0.2280    TRAP      0.    100.     YES
KK CP9B
KM      COMBINE HYDROGRAPHS CP9A & SUB6
KO    1.
HC    2.
KK CP10A
KM      ROUTE CP9 TO CP10
RK 2665.  0.0067   0.016  0.8182    TRAP     15.      1.
KK  SUB7
KM      RUNOFF FROM SUB-BASIN 7
BA0.1080
LS    0.     84
UK 1254.  0.0043   0.07    100.
RK 2565.  0.0082   0.040  0.1080    TRAP      0.    100.
KKSUB8+9
KM      RUNOFF FROM SUB-BASINS 8 AND 9
BA0.2118
LS    0.     88              0.     84.
UK 1025.  0.0047    0.08   39.90
UK 1635.  0.0063    0.10   60.10
RK 2665.  0.0071   0.040  0.3198    TRAP     25.      1.     YES
KK CP10B
KM      ROUTE SUB8+9 TO CP10
RK 1335.  0.0015   0.025  0.3198    TRAP     25.      1.
KK CP10C
KM      COMBINE HYDROGRAPHS CP10A & CP10B
KO    1.
HC    2.
KK SUB10
KM      RUNOFF FROM SUB-BASIN 10
BA0.0626
LS    0.     84
UK 1105.  0.0094    0.07    100.
RK 1325.  0.0072   0.016  1.1380    TRAP     15.      1.     YES
KK SUB11
KM      RUNOFF FROM SUB-BASIN 11
KO    1.
BA0.0626
LS    0.     90
UK 1745.  0.0080    0.07    100.
RK 1325.  0.0072   0.016  1.2014    TRAP     16.      1.     YES
KK SUB12
KM      RUNOFF FROM SUB-BASIN 12
KO    1.
BA0.1012
LS    0.     90
UK 1440.  0.0083    0.06    100.
RK 2665.  0.0071   0.016  1.2632    TRAP     17.      1.     YES
KK SUB13
KM      RUNOFF FROM SUB-BASIN 13
KO    1.
BA0.1374
LS    0.     84.
UK 1460.  0.0061    0.06    100.
RK 4000.  0.0053   0.016  1.4006    TRAP     17.      1.     YES
KK SUB14
KM      RUNOFF FROM SUB-BASIN 14
BA0.1611
LS    0.     84              0.     84
UK 1075.  0.0140    0.10   64.31
```

```
UK  661.  0.0136    0.10   35.69
RK 5360.  0.0080   0.025  0.1611    TRAP      5.      8.
KK SUB15
KM      RUNOFF FROM SUB-BASIN 15
BA0.1402
LS    0.      84              0.      84
UK  365.  0.0133    0.10   33.31
UK  855.  0.0129    0.10   66.69
RK 5310.  0.0075   0.037  0.1402    TRAP      6.      5.
KK  CP16
KM      COMBINE HYDROGRAPHS SUB14 & SUB15
HC    2.
KK SUB16
KM      RUNOFF FROM SUB-BASIN 16
BA0.1133
LS    0.      84              0.      84
UK  830.  0.0102    0.10   24.54
UK 1170.  0.0098    0.10   75.46
RK 1895.  0.0095   0.037  0.1133    TRAP      6.      5.     YES
KK SUB17
KM      RUNOFF FROM SUB-BASIN 17
BA0.0712
LS    0.      84.             0.      84.
UK  240.  0.0085    0.09   53.79
UK  210.  0.0143    0.09   46.21
RK 5970.  0.0069   0.025  0.0712    TRAP      5.      6.     YES
KK SUB18
KM      RUNOFF FROM SUB-BASIN 18
BA0.2398
LS    0.      84.             0.      84.
UK  235.  0.0128    0.09   26.31
UK 1020.  0.0098    0.09   73.69
RK 7590.  0.0074   0.065  0.2398    TRAP      0.      9.
KK  CP19
KM      COMBINE HYDROGRAPHS SUB17 & SUB18
HC    2.
KK SUB19
KM      RUNOFF FROM SUB-BASIN 19
BA0.1288
LS    0.      90.             0.      90.
UK 1175.  0.0042    0.07   54.81
UK 1040.  0.0030    0.07   45.19
RK 2850.  0.0053   0.016  0.1288    TRAP      6.      6.     YES
KK SUB20
KM      RUNOFF FROM SUB-BASIN 20
BA0.0218
LS    0.      90.             0.      90.
UK  120.  0.0083    0.06   16.97
UK  715.  0.0098    0.06   83.03
RK 1510.  0.0079   0.032  0.0218    TRAP     10.      6.     YES
KK SUB21
KM      RUNOFF FROM SUB-BASIN 21
BA0.2765
LS    0.      84.             0.      84.
UK  410.  0.0098    0.09   26.15
UK 1755.  0.0134    0.09   73.85
RK 6560.  0.0120   0.035  0.2765    TRAP      1.      7.
KK SUB22
KM      RUNOFF FROM SUB-BASIN 22
BA0.0595
```

```
LS    0.     84.              0.     84.
UK  370.  0.0176    0.09   50.76
UK  490.  0.0179    0.09   49.24
RK 3630.  0.0152    0.03  0.0595    TRAP      1.      13.
KK  CP24
KM       COMBINE HYDROGRAPHS SUB21 & SUB22
HC    2.
KK CP25A
KM       ROUTE CP24 TO CP25A
RK 1992.  0.0080   0.025  0.3360    TRAP      3.       7.
KK SUB24
KM       RUNOFF FROM SUB-BASIN 24
BA0.1711
LS    0.     90.              0.     90.
UK  175.  0.0171    0.09   19.70
UK  955.  0.0168    0.09   80.30
RK 7505.  0.0120   0.025  0.1711    TRAP      3.       7.
KK CP25A
KM       COMBINE CP24 & SUB24
HC    2.
KK  CP25
KM       ROUTE CP25A TO CP25
RK 1023.  0.0049   0.035  0.5071    TRAP      8.       4.
KK SUB23
KM       RUNOFF FROM SUB-BASIN 23
BA0.5706
LS    0.     86.              0.     86.
UK 1605.  0.0125    0.10   74.26
UK  610.  0.0172    0.10   25.74
RK11130.  0.0079   0.035  0.5706    TRAP      8.       4.
KK  CP25
KM       COMBINE HYDROGRAPHS CP25A & SUB23
HC    2.
KK SUB25
KM       RUNOFF FROM SUB-BASIN 25
BA0.1364
LS    0.     86.              0.     90.
UK 1400.  0.0030    0.10   47.87
UK  885.  0.0030    0.07   52.13
RK 2655.  0.0068   0.036  0.1364    TRAP     12.       3.     YES
KK SUB26
KM       RUNOFF FROM SUB-BASIN 26
BA0.0963
LS    0.     84.              0.     84.
UK  790.  0.0076    0.06   33.75
UK  885.  0.0068    0.08   66.25
RK 2585.  0.0046   0.038  0.0963    TRAP      2.       6.     YES
KK CP29A
KM       COMBINE HYDROGRAPHS SUB20 & SUB 26
HC    2.
KK SUB27
KM       RUNOFF FROM SUB-BASIN 27
BA0.0925
LS    0.     92.              0.     90.
UK  355.  0.0030    0.07   40.22
UK  500.  0.0030    0.07   59.78
RK 2695.  0.0074   0.025  0.0925    TRAP     25.       1.
KK SUB28
KM       RUNOFF FROM SUB-BASIN 28
BA0.1155
```

```
LS    0.     86.              0.     86.
UK  755.  0.0079     0.06   30.74
UK  985.  0.0081     0.06   69.26
RK 2510.  0.0056    0.036  0.1155    TRAP      10.       3.      YES
KK  CP29
KM       COMBINE HYDROGRAPHS CP29A & SUB28
HC    2.
KK SUB29
KM       RUNOFF FROM SUB-BASIN 29
KO    1.
BA0.3230
LS    0.     92.              0.     92.
UK  745.  0.0054     0.06   32.54
UK 1710.  0.0064     0.06   67.46
RK 5730.  0.0051    0.025  0.3230    TRAP      50.      3.9      YES
KK CPEND
KM       COMBINE HYDROGRAPHS CP13 & SUB29
KO    1.
HC    2.
ZZ
$ T OUTER12B24.OUT
$ SET NOVERIFY
```

THOUGHT OF THE DAY FROM ' V A X '

You will be singled out for promotion in your work.

*** NOTE TO MASS 11 USERS ***

PLEASE KEEP SASI INFORMED OF ANY PROBLEMS

```
$ ASSIGN DUMMY SYS$PRINT
$ ASSIGN OUTER12B24.DAT INPUT
$! OUTPUT OF HEC1 GOES TO THE LOG FILE
$ RUN [USERS.SIMONS.SIMONS1]HEC1
```

****

```
*                                        *
*   FLOOD HYDROGRAPH PACKAGE (HEC-1)     *
*            FEBRUARY 1981               *
*          REVISED 30 OCT 81             *
*                                        *
*  RUN DATE      25-J    TIME      12:2  *
*                                        *
******************************************
```


```
*
*   U.S. ARMY CORPS OF ENGINEERS
*  THE HYDROLOGIC ENGINEERING CENTEI
*          609 SECOND STREET
*       DAVIS, CALIFORNIA 95616
*  (916) 440-3285 OR (FTS) 448-3285
*
*********************************
```


```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X              X
XXXXXXX  XXXX    X       XXXXX  X
X     X  X       X              X
X     X  X       X     X        X
X     X  XXXXXXX   XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. SEE SEPTEMBER 1981 INPUT DESCRIPTION FOR NEW DEFINITIONS.

HEC-1 INPUT


```
  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

                *DIAGRAM
*** NOLIST ***
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
LINE      (V) ROUTING          (--->) DIVERSION
 NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED FLOW

  7       SUB1
            V
            V
 14       CP4A
            .
            .
 17         .        SUB2
            .          V
            .          V
 23         .        SUB3 ***
            .          .
            .          .
 29       CP4B............
            V
            V
 33       SUB4 ***
            .
            .
 42         .-------> DIVERT
 40       CP9A
            .
            .
 45         .        SUB5
            .          V
            .          V
 52         .        SUB6 ***
            .          .
            .          .
 58       CP9B............
            V
            V
 62       CP10A
            .
            .
 65         .        SUB7
            .          V
            .          V
 71         .      SUB8+9 ***
            .          V
            .          V
 78         .      CP10B
            .          .
            .          .
```

```
81      CP10C............
           V
           V
85      SUB10 ***
           V
           V
91      SUB11 ***
           V
           V
98      SUB12 ***
           V
           V
105     SUB13 ***
           .
           .
112        .        SUB14
           .          .
           .          .
119        .          .        SUR15
           .          .          .
           .          .          .
126        .        CP16............
           .          V
           .          V
129        .      SUB16 ***
           .          V
           .          V
136        .      SUB17 ***
           .          .
           .          .
143        .          .        SUB18
           .          .          .
           .          .          .
150        .      CP19............
           .          V
           .          V
153        .      SUB19 ***
           .          V
           .          V
160        .      SUB20 ***
           .          .
           .          .
167        .          .        SUB21
           .          .          .
           .          .          .
174        .          .          .        SUB22
           .          .          .          .
           .          .          .          .
181        .          .        CP24............
           .          .          V
           .          .          V
184        .          .        CP25A
           .          .          .
           .          .          .
187        .          .          .        SUB24
           .          .          .          .
           .          .          .          .
194        .          .        CP25A............
           .          .          V
           .          .          V
```

```
197                 .           .        CP25
                    .           .          .
                    .           .          .
200                 .           .          .        SUB23
                    .           .          .          .
                    .           .          .          .
207                 .           .        CP25.............
                    .           .          V
                    .           .          V
210                 .           .       SUB25 ***
                    .           .          V
                    .           .          V
217                 .           .       SUB26 ***
                    .           .          .
                    .           .          .
224                 .       CP29A.............
                    .           .
                    .           .
227                 .           .       SUB27
                    .           .          V
                    .           .          V
234                 .           .       SUB28 ***
                    .           .          .
                    .           .          .
241                 .        CP29.............
                    .           .          V
                    .           .          V
244                 .       SUB29 ***
                    .           .
                    .           .
252            CPEND.............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*****************************************
*                                       *
*   FLOOD-HYDROGRAPH PACKAGE  (HEC-1)   *
*             FEBRUARY 1981             *
*           REVISED 30 OCT 81           *
*                                       *
*  RUN DATE      25-J    TIME      12:2 *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*      U.S. ARMY CORPS OF ENGINEERS
*  THE HYDROLOGIC ENGINEERING CENTEI
*          609 SECOND STREET
*        DAVIS, CALIFORNIA 95616
*  (916) 440-3285 OR (FTS) 448-3285
*                                   *
*************************************
```

---------- SIMONS, LI & ASSOCIATES, INC. PAZ-DC-01 ----------
DELEUW, CATHER & CO. - OUTER LOOP HIGHWAY PROJECT CONCEPT DRAINAGE PLAN
DIVERSION AT THUNDERBIRD RD, EXISTING RUNOFF CHARACTERISTICS
100-YR, 24-HR RAINFALL USING HYPOTHETICAL STORM DISTRIBUTION

```
  6 IO        OUTPUT CONTROL VARIABLES
                   IPRNT          5  PRINT CONTROL
                   IPLOT          0  PLOT CONTROL
                   QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT         HYDROGRAPH TIME DATA
```

```
                NMIN        15  MINUTES IN COMPUTATION INTERVAL
               IDATE  25JUN86  STARTING DATE
               ITIME      0000  STARTING TIME
                  NQ       100  NUMBER OF HYDROGRAPH ORDINATES
              NDDATE  26JUN86  ENDING DATE
              NDTIME      0045  ENDING TIME

        COMPUTATION INTERVAL    0.25 HOURS
             TOTAL TIME BASE   24.75 HOURS

    ENGLISH UNITS
        DRAINAGE AREA          SQUARE MILES
        PRECIPITATION DEPTH    INCHES
        LENGTH, ELEVATION      FEET
        FLOW                   CUBIC FEET PER SECOND
        STORAGE VOLUME         ACRE-FEET
        SURFACE AREA           ACRES
        TEMPERATURE            DEGREES FAHRENHEIT

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 29 KK    *    CP4B    *
          *            *
          **************

 31 KO        OUTPUT CONTROL VARIABLES
                  IPRNT          1  PRINT CONTROL
                  IPLOT          0  PLOT CONTROL
                  QSCAL         0.  HYDROGRAPH PLOT SCALE

 32 HC        HYDROGRAPH COMBINATION
                  ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                    ***

*****************************************************************************************************************

                                HYDROGRAPH AT STATION     CP4B
                                  SUM OF  2 HYDROGRAPHS

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

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
25 JUN 0000	1	0.	25 JUN 0615	26	0.	25 JUN 1230	51	191.	25 JUN 1845	76	23.
25 JUN 0015	2	0.	25 JUN 0630	27	0.	25 JUN 1245	52	288.	25 JUN 1900	77	21.
25 JUN 0030	3	0.	25 JUN 0645	28	0.	25 JUN 1300	53	290.	25 JUN 1915	78	20.
25 JUN 0045	4	0.	25 JUN 0700	29	0.	25 JUN 1315	54	250.	25 JUN 1930	79	20.
25 JUN 0100	5	0.	25 JUN 0715	30	0.	25 JUN 1330	55	204.	25 JUN 1945	80	19.
25 JUN 0115	6	0.	25 JUN 0730	31	0.	25 JUN 1345	56	165.	25 JUN 2000	81	18.
25 JUN 0130	7	0.	25 JUN 0745	32	0.	25 JUN 1400	57	136.	25 JUN 2015	82	17.
25 JUN 0145	8	0.	25 JUN 0800	33	0.	25 JUN 1415	58	113.	25 JUN 2030	83	17.
25 JUN 0200	9	0.	25 JUN 0815	34	0.	25 JUN 1430	59	96.	25 JUN 2045	84	16.
25 JUN 0215	10	0.	25 JUN 0830	35	0.	25 JUN 1445	60	83.	25 JUN 2100	85	15.
25 JUN 0230	11	0.	25 JUN 0845	36	0.	25 JUN 1500	61	72.	25 JUN 2115	86	15.

25 JUN 0245	12	0.	*	25 JUN 0900	37	0.	*	25 JUN 1515	62	63.	*	25 JUN 2130	87	14
25 JUN 0300	13	0.	*	25 JUN 0915	38	0.	*	25 JUN 1530	63	57.	*	25 JUN 2145	88	14
25 JUN 0315	14	0.	*	25 JUN 0930	39	0.	*	25 JUN 1545	64	51.	*	25 JUN 2200	89	13
25 JUN 0330	15	0.	*	25 JUN 0945	40	0.	*	25 JUN 1600	65	47.	*	25 JUN 2215	90	13
25 JUN 0345	16	0.	*	25 JUN 1000	41	0.	*	25 JUN 1615	66	43.	*	25 JUN 2230	91	13
25 JUN 0400	17	0.	*	25 JUN 1015	42	0.	*	25 JUN 1630	67	39.	*	25 JUN 2245	92	12
25 JUN 0415	18	0.	*	25 JUN 1030	43	0.	*	25 JUN 1645	68	36.	*	25 JUN 2300	93	12
25 JUN 0430	19	0.	*	25 JUN 1045	44	0.	*	25 JUN 1700	69	34.	*	25 JUN 2315	94	12
25 JUN 0445	20	0.	*	25 JUN 1100	45	0.	*	25 JUN 1715	70	32.	*	25 JUN 2330	95	11
25 JUN 0500	21	0.	*	25 JUN 1115	46	0.	*	25 JUN 1730	71	30.	*	25 JUN 2345	96	11
25 JUN 0515	22	0.	*	25 JUN 1130	47	1.	*	25 JUN 1745	72	28.	*	26 JUN 0000	97	11
25 JUN 0530	23	0.	*	25 JUN 1145	48	2.	*	25 JUN 1800	73	27.	*	26 JUN 0015	98	11
25 JUN 0545	24	0.	*	25 JUN 1200	49	5.	*	25 JUN 1815	74	25.	*	26 JUN 0030	99	10
25 JUN 0600	25	0.	*	25 JUN 1215	50	24.	*	25 JUN 1830	75	24.	*	26 JUN 0045	100	9
			*				*				*			

****

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
290.	13.00	(CFS)	100.	29.	28.	28.
		(INCHES)	2.047	2.403	2.404	2.404
		(AC-FT)	50.	58.	58.	58.

CUMULATIVE AREA = 0.45 SQ MI

*** ***

```
          **************
          *            *
33 KK     *    SUB4    *
          *            *
          **************
```

35 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

SUBBASIN RUNOFF DATA

36 BA SUBBASIN CHARACTERISTICS

TAREA	0.09	SUBBASIN AREA

PRECIPITATION DATA

10 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.72	1.41	2.47	2.77	2.97	3.35	3.81	4.28	0.00	0.00	0.00	0.00

STORM AREA = 0.09

37 LS SCS LOSS RATE

STRTL	0.20	INITIAL ABSTRACTION
CRVNBR	91.00	CURVE NUMBER
RTIMP	0.00	PERCENT IMPERVIOUS AREA

```
                 KINEMATIC WAVE
38 UK             OVERLAND-FLOW ELEMENT NO. 1
                        L      1154.  OVERLAND FLOW LENGTH
                        S     0.0052  SLOPE
                        N      0.060  ROUGHNESS COEFFICIENT
                       PA      100.0  PERCENT OF SUBBASIN
39 RK            MAIN CHANNEL
                        L      2785.  CHANNEL LENGTH
                        S     0.0083  SLOPE
                        N      0.016  CHANNEL ROUGHNESS COEFFICIENT
                       CA       0.09  CONTRIBUTING AREA
                    SHAPE       TRAP  CHANNEL SHAPE
                       WD      12.00  BOTTOM WIDTH OR DIAMETER
                        Z       1.00  SIDE SLOPE
                   RUPSTQ        YES  ROUTE UPSTREAM HYDROGRAPH
                                                        ***

          COMPUTED KINEMATIC PARAMETERS
             ELEMENT     ALPHA        M      DT (MIN)   DX (FT)
                   1    1.7908    1.667       15.00     577.00
                   3    2.0537    1.496       15.00    1392.50
```

****

HYDROGRAPH AT STATION SUB4

****

DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	0.	25 JUN 1230	51	0.30	0.02	0.28	309.
25 JUN 0015	2	0.01	0.01	0.00	0.	25 JUN 1245	52	0.09	0.01	0.09	445.
25 JUN 0030	3	0.01	0.01	0.00	0.	25 JUN 1300	53	0.07	0.00	0.06	330.
25 JUN 0045	4	0.01	0.01	0.00	0.	25 JUN 1315	54	0.06	0.00	0.05	286.
25 JUN 0100	5	0.01	0.01	0.00	0.	25 JUN 1330	55	0.05	0.00	0.05	236.
25 JUN 0115	6	0.01	0.01	0.00	0.	25 JUN 1345	56	0.04	0.00	0.04	192.
25 JUN 0130	7	0.01	0.01	0.00	0.	25 JUN 1400	57	0.04	0.00	0.03	158.
25 JUN 0145	8	0.01	0.01	0.00	0.	25 JUN 1415	58	0.03	0.00	0.03	132.
25 JUN 0200	9	0.01	0.01	0.00	0.	25 JUN 1430	59	0.03	0.00	0.03	112.
25 JUN 0215	10	0.01	0.01	0.00	0.	25 JUN 1445	60	0.03	0.00	0.03	96.
25 JUN 0230	11	0.01	0.01	0.00	0.	25 JUN 1500	61	0.03	0.00	0.02	84.
25 JUN 0245	12	0.01	0.01	0.00	0.	25 JUN 1515	62	0.03	0.00	0.02	74.
25 JUN 0300	13	0.01	0.01	0.00	0.	25 JUN 1530	63	0.02	0.00	0.02	66.
25 JUN 0315	14	0.01	0.01	0.00	0.	25 JUN 1545	64	0.02	0.00	0.02	60.
25 JUN 0330	15	0.01	0.01	0.00	0.	25 JUN 1600	65	0.02	0.00	0.02	54.
25 JUN 0345	16	0.01	0.01	0.00	0.	25 JUN 1615	66	0.02	0.00	0.02	50.
25 JUN 0400	17	0.01	0.01	0.00	0.	25 JUN 1630	67	0.02	0.00	0.02	46.
25 JUN 0415	18	0.01	0.01	0.00	0.	25 JUN 1645	68	0.02	0.00	0.02	43.
25 JUN 0430	19	0.01	0.01	0.00	0.	25 JUN 1700	69	0.02	0.00	0.02	40.
25 JUN 0445	20	0.01	0.01	0.00	0.	25 JUN 1715	70	0.02	0.00	0.02	37.
25 JUN 0500	21	0.01	0.01	0.00	0.	25 JUN 1730	71	0.02	0.00	0.02	35.
25 JUN 0515	22	0.01	0.01	0.00	0.	25 JUN 1745	72	0.02	0.00	0.02	33.
25 JUN 0530	23	0.01	0.01	0.00	0.	25 JUN 1800	73	0.02	0.00	0.01	31.
25 JUN 0545	24	0.01	0.01	0.00	0.	25 JUN 1815	74	0.01	0.00	0.01	30.
25 JUN 0600	25	0.01	0.01	0.00	0.	25 JUN 1830	75	0.01	0.00	0.01	28.
25 JUN 0615	26	0.01	0.01	0.00	0.	25 JUN 1845	76	0.01	0.00	0.01	27.
25 JUN 0630	27	0.02	0.01	0.00	0.	25 JUN 1900	77	0.01	0.00	0.01	25.
25 JUN 0645	28	0.02	0.01	0.00	0.	25 JUN 1915	78	0.01	0.00	0.01	24.

25 JUN 0700	29	0.02	0.01	0.00	0.	*	25 JUN 1930	79	0.01	0.00	0.01	23.
25 JUN 0715	30	0.02	0.01	0.00	0.	*	25 JUN 1945	80	0.01	0.00	0.01	22.
25 JUN 0730	31	0.02	0.01	0.00	0.	*	25 JUN 2000	81	0.01	0.00	0.01	21.
25 JUN 0745	32	0.02	0.01	0.00	0.	*	25 JUN 2015	82	0.01	0.00	0.01	20.
25 JUN 0800	33	0.02	0.01	0.01	0.	*	25 JUN 2030	83	0.01	0.00	0.01	20.
25 JUN 0815	34	0.02	0.01	0.01	0.	*	25 JUN 2045	84	0.01	0.00	0.01	19.
25 JUN 0830	35	0.02	0.02	0.01	0.	*	25 JUN 2100	85	0.01	0.00	0.01	18.
25 JUN 0845	36	0.02	0.02	0.01	0.	*	25 JUN 2115	86	0.01	0.00	0.01	18.
25 JUN 0900	37	0.02	0.02	0.01	0.	*	25 JUN 2130	87	0.01	0.00	0.01	17.
25 JUN 0915	38	0.02	0.02	0.01	0.	*	25 JUN 2145	88	0.01	0.00	0.01	16.
25 JUN 0930	39	0.03	0.02	0.01	1.	*	25 JUN 2200	89	0.01	0.00	0.01	16.
25 JUN 0945	40	0.03	0.02	0.01	1.	*	25 JUN 2215	90	0.01	0.00	0.01	15.
25 JUN 1000	41	0.03	0.02	0.01	1.	*	25 JUN 2230	91	0.01	0.00	0.01	15.
25 JUN 1015	42	0.03	0.02	0.02	1.	*	25 JUN 2245	92	0.01	0.00	0.01	15.
25 JUN 1030	43	0.04	0.02	0.02	1.	*	25 JUN 2300	93	0.01	0.00	0.01	14.
25 JUN 1045	44	0.04	0.02	0.02	2.	*	25 JUN 2315	94	0.01	0.00	0.01	14.
25 JUN 1100	45	0.05	0.02	0.03	2.	*	25 JUN 2330	95	0.01	0.00	0.01	13.
25 JUN 1115	46	0.06	0.02	0.04	3.	*	25 JUN 2345	96	0.01	0.00	0.01	13.
25 JUN 1130	47	0.08	0.03	0.05	4.	*	26 JUN 0000	97	0.01	0.00	0.01	13.
25 JUN 1145	48	0.24	0.07	0.17	6.	*	26 JUN 0015	98	0.00	0.00	0.00	13.
25 JUN 1200	49	0.52	0.11	0.41	13.	*	26 JUN 0030	99	0.00	0.00	0.00	12.
25 JUN 1215	50	1.41	0.15	1.26	50.	*	26 JUN 0045	100	0.00	0.00	0.00	11.
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TOTAL RAINFALL = 4.28, TOTAL LOSS = 0.99, TOTAL EXCESS = 3.29

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
445.	12.75	(CFS)	125.	37.	36.	36.
		(INCHES)	2.134	2.514	2.514	2.514
		(AC-FT)	62.	73.	73.	73.

CUMULATIVE AREA = 0.54 SQ MI

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58 KK     *    CP9B    *
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60 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

61 HC HYDROGRAPH COMBINATION

ICOMP	2	NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION CP9B

SUM OF 2 HYDROGRAPHS

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLO
25 JUN 0000	1	0.	25 JUN 0615	26	0.	25 JUN 1230	51	207.	25 JUN 1845	76	11
25 JUN 0015	2	0.	25 JUN 0630	27	0.	25 JUN 1245	52	354.	25 JUN 1900	77	11
25 JUN 0030	3	0.	25 JUN 0645	28	0.	25 JUN 1300	53	284.	25 JUN 1915	78	10
25 JUN 0045	4	0.	25 JUN 0700	29	0.	25 JUN 1315	54	167.	25 JUN 1930	79	10
25 JUN 0100	5	0.	25 JUN 0715	30	0.	25 JUN 1330	55	103.	25 JUN 1945	80	9
25 JUN 0115	6	0.	25 JUN 0730	31	0.	25 JUN 1345	56	72.	25 JUN 2000	81	9
25 JUN 0130	7	0.	25 JUN 0745	32	0.	25 JUN 1400	57	57.	25 JUN 2015	82	9
25 JUN 0145	8	0.	25 JUN 0800	33	0.	25 JUN 1415	58	47.	25 JUN 2030	83	8
25 JUN 0200	9	0.	25 JUN 0815	34	0.	25 JUN 1430	59	40.	25 JUN 2045	84	8
25 JUN 0215	10	0.	25 JUN 0830	35	0.	25 JUN 1445	60	34.	25 JUN 2100	85	8
25 JUN 0230	11	0.	25 JUN 0845	36	0.	25 JUN 1500	61	30.	25 JUN 2115	86	8
25 JUN 0245	12	0.	25 JUN 0900	37	0.	25 JUN 1515	62	27.	25 JUN 2130	87	7
25 JUN 0300	13	0.	25 JUN 0915	38	0.	25 JUN 1530	63	24.	25 JUN 2145	88	7
25 JUN 0315	14	0.	25 JUN 0930	39	0.	25 JUN 1545	64	22.	25 JUN 2200	89	7
25 JUN 0330	15	0.	25 JUN 0945	40	1.	25 JUN 1600	65	20.	25 JUN 2215	90	7
25 JUN 0345	16	0.	25 JUN 1000	41	1.	25 JUN 1615	66	19.	25 JUN 2230	91	7
25 JUN 0400	17	0.	25 JUN 1015	42	1.	25 JUN 1630	67	17.	25 JUN 2245	92	6
25 JUN 0415	18	0.	25 JUN 1030	43	1.	25 JUN 1645	68	16.	25 JUN 2300	93	6
25 JUN 0430	19	0.	25 JUN 1045	44	2.	25 JUN 1700	69	15.	25 JUN 2315	94	6
25 JUN 0445	20	0.	25 JUN 1100	45	2.	25 JUN 1715	70	15.	25 JUN 2330	95	6
25 JUN 0500	21	0.	25 JUN 1115	46	3.	25 JUN 1730	71	14.	25 JUN 2345	96	6
25 JUN 0515	22	0.	25 JUN 1130	47	4.	25 JUN 1745	72	13.	26 JUN 0000	97	6
25 JUN 0530	23	0.	25 JUN 1145	48	6.	25 JUN 1800	73	13.	26 JUN 0015	98	6
25 JUN 0545	24	0.	25 JUN 1200	49	10.	25 JUN 1815	74	12.	26 JUN 0030	99	5
25 JUN 0600	25	0.	25 JUN 1215	50	49.	25 JUN 1830	75	12.	26 JUN 0045	100	5

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
354.	12.75	(CFS)	69.	20.	19.	19.
		(INCHES)	0.785	0.900	0.900	0.900
		(AC-FT)	34.	39.	39.	39.

CUMULATIVE AREA = 0.82 SQ MI

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81 KK     *    CP10C   *
          *            *
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83 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

84 HC HYDROGRAPH COMBINATION

ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION CP10C
SUM OF 2 HYDROGRAPHS

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
25 JUN 0000	1	1.	25 JUN 0615	26	0.	25 JUN 1230	51	362.	25 JUN 1845	76	26.
25 JUN 0015	2	1.	25 JUN 0630	27	0.	25 JUN 1245	52	611.	25 JUN 1900	77	24.
25 JUN 0030	3	0.	25 JUN 0645	28	0.	25 JUN 1300	53	548.	25 JUN 1915	78	23.
25 JUN 0045	4	0.	25 JUN 0700	29	0.	25 JUN 1315	54	380.	25 JUN 1930	79	22.
25 JUN 0100	5	0.	25 JUN 0715	30	0.	25 JUN 1330	55	257.	25 JUN 1945	80	21.
25 JUN 0115	6	0.	25 JUN 0730	31	0.	25 JUN 1345	56	185.	25 JUN 2000	81	21.
25 JUN 0130	7	0.	25 JUN 0745	32	0.	25 JUN 1400	57	141.	25 JUN 2015	82	20.
25 JUN 0145	8	0.	25 JUN 0800	33	0.	25 JUN 1415	58	116.	25 JUN 2030	83	19.
25 JUN 0200	9	0.	25 JUN 0815	34	0.	25 JUN 1430	59	98.	25 JUN 2045	84	18.
25 JUN 0215	10	0.	25 JUN 0830	35	0.	25 JUN 1445	60	84.	25 JUN 2100	85	18.
25 JUN 0230	11	0.	25 JUN 0845	36	0.	25 JUN 1500	61	74.	25 JUN 2115	86	17.
25 JUN 0245	12	0.	25 JUN 0900	37	0.	25 JUN 1515	62	64.	25 JUN 2130	87	17.
25 JUN 0300	13	0.	25 JUN 0915	38	0.	25 JUN 1530	63	58.	25 JUN 2145	88	16.
25 JUN 0315	14	0.	25 JUN 0930	39	0.	25 JUN 1545	64	53.	25 JUN 2200	89	16.
25 JUN 0330	15	0.	25 JUN 0945	40	0.	25 JUN 1600	65	48.	25 JUN 2215	90	15.
25 JUN 0345	16	0.	25 JUN 1000	41	0.	25 JUN 1615	66	44.	25 JUN 2230	91	15.
25 JUN 0400	17	0.	25 JUN 1015	42	1.	25 JUN 1630	67	41.	25 JUN 2245	92	15.
25 JUN 0415	18	0.	25 JUN 1030	43	1.	25 JUN 1645	68	39.	25 JUN 2300	93	14.
25 JUN 0430	19	0.	25 JUN 1045	44	1.	25 JUN 1700	69	36.	25 JUN 2315	94	14.
25 JUN 0445	20	0.	25 JUN 1100	45	2.	25 JUN 1715	70	34.	25 JUN 2330	95	14.
25 JUN 0500	21	0.	25 JUN 1115	46	3.	25 JUN 1730	71	33.	25 JUN 2345	96	13.
25 JUN 0515	22	0.	25 JUN 1130	47	4.	25 JUN 1745	72	31.	26 JUN 0000	97	13.
25 JUN 0530	23	0.	25 JUN 1145	48	7.	25 JUN 1800	73	29.	26 JUN 0015	98	13.
25 JUN 0545	24	0.	25 JUN 1200	49	15.	25 JUN 1815	74	28.	26 JUN 0030	99	12.
25 JUN 0600	25	0.	25 JUN 1215	50	110.	25 JUN 1830	75	27.	26 JUN 0045	100	12.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
611.	12.75	(CFS)	145.	42.	40.	40.
		(INCHES)	1.181	1.358	1.359	1.359
		(AC-FT)	72.	82.	82.	82.

CUMULATIVE AREA = 1.14 SQ MI

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91 KK SUB11

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93 KO        OUTPUT CONTROL VARIABLES
                  IPRNT          1  PRINT CONTROL
                  IPLOT          0  PLOT CONTROL
                  QSCAL         0.  HYDROGRAPH PLOT SCALE

             SUBBASIN RUNOFF DATA

94 BA        SUBBASIN CHARACTERISTICS
                  TAREA       0.06  SUBBASIN AREA

             PRECIPITATION DATA

10 PH                          DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
             ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
             5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
             0.72    1.41    2.47    2.77    2.97    3.35    3.81    4.28    0.00    0.00    0.00    0.00

                                                STORM AREA =    0.06

95 LS        SCS LOSS RATE
                  STRTL       0.22  INITIAL ABSTRACTION
                 CRVNBR      90.00  CURVE NUMBER
                  RTIMP       0.00  PERCENT IMPERVIOUS AREA

             KINEMATIC WAVE
96 UK          OVERLAND-FLOW ELEMENT NO. 1
                      L      1745.  OVERLAND FLOW LENGTH
                      S     0.0080  SLOPE
                      N      0.070  ROUGHNESS COEFFICIENT
                     PA      100.0  PERCENT OF SUBBASIN
97 RK          MAIN CHANNEL
                      L      1325.  CHANNEL LENGTH
                      S     0.0072  SLOPE
                      N      0.016  CHANNEL ROUGHNESS COEFFICIENT
                     CA       0.06  CONTRIBUTING AREA
                  SHAPE       TRAP  CHANNEL SHAPE
                     WD      16.00  BOTTOM WIDTH OR DIAMETER
                      Z       1.00  SIDE SLOPE
                 RUPSTQ        YES  ROUTE UPSTREAM HYDROGRAPH

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             COMPUTED KINEMATIC PARAMETERS
             ELEMENT     ALPHA        M      DT (MIN)   DX (FT)
                   1    1.9039    1.667       15.00     872.50
                   3    1.5931    1.523       15.00     662.50

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                                   HYDROGRAPH AT STATION    SUB11

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                                                  *
  DA MON HRMN  ORD    RAIN    LOSS  EXCESS    COMP Q   *   DA MON HRMN  ORD    RAIN    LOSS  EXCESS    COMP Q
                                                  *
  25 JUN 0000    1    0.00    0.00    0.00        1.   *   25 JUN 1230   51    0.30    0.02    0.28      485.
  25 JUN 0015    2    0.01    0.01    0.00        1.   *   25 JUN 1245   52    0.09    0.01    0.09      767.
  25 JUN 0030    3    0.01    0.01    0.00        1.   *   25 JUN 1300   53    0.07    0.00    0.06      629.
  25 JUN 0045    4    0.01    0.01    0.00        1.   *   25 JUN 1315   54    0.06    0.00    0.05      454.
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25 JUN 0100	5	0.01	0.01	0.00	0.	*	25 JUN 1330	55	0.05	0.00	0.04	316.
25 JUN 0115	6	0.01	0.01	0.00	0.	*	25 JUN 1345	56	0.04	0.00	0.04	229.
25 JUN 0130	7	0.01	0.01	0.00	0.	*	25 JUN 1400	57	0.04	0.00	0.03	175.
25 JUN 0145	8	0.01	0.01	0.00	0.	*	25 JUN 1415	58	0.03	0.00	0.03	142.
25 JUN 0200	9	0.01	0.01	0.00	0.	*	25 JUN 1430	59	0.03	0.00	0.03	119.
25 JUN 0215	10	0.01	0.01	0.00	0.	*	25 JUN 1445	60	0.03	0.00	0.03	103.
25 JUN 0230	11	0.01	0.01	0.00	0.	*	25 JUN 1500	61	0.03	0.00	0.02	90.
25 JUN 0245	12	0.01	0.01	0.00	0.	*	25 JUN 1515	62	0.03	0.00	0.02	79.
25 JUN 0300	13	0.01	0.01	0.00	0.	*	25 JUN 1530	63	0.02	0.00	0.02	70.
25 JUN 0315	14	0.01	0.01	0.00	0.	*	25 JUN 1545	64	0.02	0.00	0.02	64.
25 JUN 0330	15	0.01	0.01	0.00	0.	*	25 JUN 1600	65	0.02	0.00	0.02	59.
25 JUN 0345	16	0.01	0.01	0.00	0.	*	25 JUN 1615	66	0.02	0.00	0.02	54.
25 JUN 0400	17	0.01	0.01	0.00	0.	*	25 JUN 1630	67	0.02	0.00	0.02	50.
25 JUN 0415	18	0.01	0.01	0.00	0.	*	25 JUN 1645	68	0.02	0.00	0.02	47.
25 JUN 0430	19	0.01	0.01	0.00	0.	*	25 JUN 1700	69	0.02	0.00	0.02	44.
25 JUN 0445	20	0.01	0.01	0.00	0.	*	25 JUN 1715	70	0.02	0.00	0.02	42.
25 JUN 0500	21	0.01	0.01	0.00	0.	*	25 JUN 1730	71	0.02	0.00	0.02	40.
25 JUN 0515	22	0.01	0.01	0.00	0.	*	25 JUN 1745	72	0.02	0.00	0.01	38.
25 JUN 0530	23	0.01	0.01	0.00	0.	*	25 JUN 1800	73	0.02	0.00	0.01	36.
25 JUN 0545	24	0.01	0.01	0.00	0.	*	25 JUN 1815	74	0.01	0.00	0.01	34.
25 JUN 0600	25	0.01	0.01	0.00	0.	*	25 JUN 1830	75	0.01	0.00	0.01	33.
25 JUN 0615	26	0.01	0.01	0.00	0.	*	25 JUN 1845	76	0.01	0.00	0.01	31.
25 JUN 0630	27	0.02	0.01	0.00	0.	*	25 JUN 1900	77	0.01	0.00	0.01	30.
25 JUN 0645	28	0.02	0.01	0.00	0.	*	25 JUN 1915	78	0.01	0.00	0.01	28.
25 JUN 0700	29	0.02	0.01	0.00	0.	*	25 JUN 1930	79	0.01	0.00	0.01	27.
25 JUN 0715	30	0.02	0.01	0.00	0.	*	25 JUN 1945	80	0.01	0.00	0.01	26.
25 JUN 0730	31	0.02	0.02	0.00	0.	*	25 JUN 2000	81	0.01	0.00	0.01	25.
25 JUN 0745	32	0.02	0.02	0.00	0.	*	25 JUN 2015	82	0.01	0.00	0.01	24.
25 JUN 0800	33	0.02	0.02	0.00	0.	*	25 JUN 2030	83	0.01	0.00	0.01	23.
25 JUN 0815	34	0.02	0.02	0.00	0.	*	25 JUN 2045	84	0.01	0.00	0.01	22.
25 JUN 0830	35	0.02	0.02	0.01	0.	*	25 JUN 2100	85	0.01	0.00	0.01	22.
25 JUN 0845	36	0.02	0.02	0.01	0.	*	25 JUN 2115	86	0.01	0.00	0.01	21.
25 JUN 0900	37	0.02	0.02	0.01	0.	*	25 JUN 2130	87	0.01	0.00	0.01	20.
25 JUN 0915	38	0.02	0.02	0.01	0.	*	25 JUN 2145	88	0.01	0.00	0.01	20.
25 JUN 0930	39	0.03	0.02	0.01	0.	*	25 JUN 2200	89	0.01	0.00	0.01	19.
25 JUN 0945	40	0.03	0.02	0.01	0.	*	25 JUN 2215	90	0.01	0.00	0.01	19.
25 JUN 1000	41	0.03	0.02	0.01	0.	*	25 JUN 2230	91	0.01	0.00	0.01	18.
25 JUN 1015	42	0.03	0.02	0.02	1.	*	25 JUN 2245	92	0.01	0.00	0.01	18.
25 JUN 1030	43	0.04	0.02	0.02	1.	*	25 JUN 2300	93	0.01	0.00	0.01	17.
25 JUN 1045	44	0.04	0.02	0.02	2.	*	25 JUN 2315	94	0.01	0.00	0.01	17.
25 JUN 1100	45	0.05	0.02	0.03	3.	*	25 JUN 2330	95	0.01	0.00	0.01	16.
25 JUN 1115	46	0.06	0.03	0.03	4.	*	25 JUN 2345	96	0.01	0.00	0.01	16.
25 JUN 1130	47	0.08	0.03	0.05	5.	*	26 JUN 0000	97	0.01	0.00	0.01	16.
25 JUN 1145	48	0.24	0.08	0.16	8.	*	26 JUN 0015	98	0.00	0.00	0.00	15.
25 JUN 1200	49	0.52	0.13	0.39	18.	*	26 JUN 0030	99	0.00	0.00	0.00	15.
25 JUN 1215	50	1.41	0.17	1.23	110.	*	26 JUN 0045	100	0.00	0.00	0.00	14.
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TOTAL RAINFALL = 4.28, TOTAL LOSS = 1.09, TOTAL EXCESS = 3.19

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
767.	12.75	(CFS)	176.	51.	49.	49.
		(INCHES)	1.298	1.492	1.493	1.493
		(AC-FT)	87.	101.	101.	101.

CUMULATIVE AREA = 1.26 SQ MI

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            *            *
 98 KK      *   SUB12    *
            *            *
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100 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          1  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

                SUBBASIN RUNOFF DATA

101 BA          SUBBASIN CHARACTERISTICS
                      TAREA       0.10  SUBBASIN AREA

                PRECIPITATION DATA

 10 PH                            DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN   2-HR   3-HR   6-HR  12-HR  24-HR  2-DAY  4-DAY  7-DAY 10-DAY
                 0.72   1.41   2.47   2.77   2.97   3.35   3.81   4.28   0.00   0.00   0.00   0.00

                                                STORM AREA =    0.10

102 LS          SCS LOSS RATE
                     STRTL       0.22  INITIAL ABSTRACTION
                    CRVNBR      90.00  CURVE NUMBER
                     RTIMP       0.00  PERCENT IMPERVIOUS AREA

                KINEMATIC WAVE
103 UK            OVERLAND-FLOW ELEMENT NO. 1
                         L       1440.  OVERLAND FLOW LENGTH
                         S     0.0083  SLOPE
                         N      0.060  ROUGHNESS COEFFICIENT
                        PA      100.0  PERCENT OF SUBBASIN
104 RK            MAIN CHANNEL
                         L      2665.  CHANNEL LENGTH
                         S     0.0071  SLOPE
                         N      0.016  CHANNEL ROUGHNESS COEFFICIENT
                        CA       0.10  CONTRIBUTING AREA
                     SHAPE       TRAP  CHANNEL SHAPE
                        WD      17.00  BOTTOM WIDTH OR DIAMETER
                         Z       1.00  SIDE SLOPE
                    RUPSTQ        YES  ROUTE UPSTREAM HYDROGRAPH

                                                          ***

          COMPUTED KINEMATIC PARAMETERS
             ELEMENT     ALPHA       M      DT (MIN)   DX (FT)
                   1    2.2624   1.667       15.00     720.00
                   3    1.5192   1.528       15.00    1332.50

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HYDROGRAPH AT STATION SUB12

DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	1.	25 JUN 1230	51	0.30	0.02	0.28	588.
25 JUN 0015	2	0.01	0.01	0.00	1.	25 JUN 1245	52	0.09	0.01	0.09	921.
25 JUN 0030	3	0.01	0.01	0.00	1.	25 JUN 1300	53	0.07	0.00	0.06	692.
25 JUN 0045	4	0.01	0.01	0.00	1.	25 JUN 1315	54	0.06	0.00	0.05	515.
25 JUN 0100	5	0.01	0.01	0.00	1.	25 JUN 1330	55	0.05	0.00	0.04	367.
25 JUN 0115	6	0.01	0.01	0.00	1.	25 JUN 1345	56	0.04	0.00	0.04	268.
25 JUN 0130	7	0.01	0.01	0.00	0.	25 JUN 1400	57	0.04	0.00	0.03	204.
25 JUN 0145	8	0.01	0.01	0.00	0.	25 JUN 1415	58	0.03	0.00	0.03	164.
25 JUN 0200	9	0.01	0.01	0.00	0.	25 JUN 1430	59	0.03	0.00	0.03	138.
25 JUN 0215	10	0.01	0.01	0.00	0.	25 JUN 1445	60	0.03	0.00	0.03	118.
25 JUN 0230	11	0.01	0.01	0.00	0.	25 JUN 1500	61	0.03	0.00	0.02	103.
25 JUN 0245	12	0.01	0.01	0.00	0.	25 JUN 1515	62	0.03	0.00	0.02	91.
25 JUN 0300	13	0.01	0.01	0.00	0.	25 JUN 1530	63	0.02	0.00	0.02	81.
25 JUN 0315	14	0.01	0.01	0.00	0.	25 JUN 1545	64	0.02	0.00	0.02	74.
25 JUN 0330	15	0.01	0.01	0.00	0.	25 JUN 1600	65	0.02	0.00	0.02	68.
25 JUN 0345	16	0.01	0.01	0.00	0.	25 JUN 1615	66	0.02	0.00	0.02	63.
25 JUN 0400	17	0.01	0.01	0.00	0.	25 JUN 1630	67	0.02	0.00	0.02	58.
25 JUN 0415	18	0.01	0.01	0.00	0.	25 JUN 1645	68	0.02	0.00	0.02	54.
25 JUN 0430	19	0.01	0.01	0.00	0.	25 JUN 1700	69	0.02	0.00	0.02	51.
25 JUN 0445	20	0.01	0.01	0.00	0.	25 JUN 1715	70	0.02	0.00	0.02	48.
25 JUN 0500	21	0.01	0.01	0.00	0.	25 JUN 1730	71	0.02	0.00	0.02	46.
25 JUN 0515	22	0.01	0.01	0.00	0.	25 JUN 1745	72	0.02	0.00	0.01	43.
25 JUN 0530	23	0.01	0.01	0.00	0.	25 JUN 1800	73	0.02	0.00	0.01	41.
25 JUN 0545	24	0.01	0.01	0.00	0.	25 JUN 1815	74	0.01	0.00	0.01	39.
25 JUN 0600	25	0.01	0.01	0.00	0.	25 JUN 1830	75	0.01	0.00	0.01	38.
25 JUN 0615	26	0.01	0.01	0.00	0.	25 JUN 1845	76	0.01	0.00	0.01	36.
25 JUN 0630	27	0.02	0.01	0.00	0.	25 JUN 1900	77	0.01	0.00	0.01	34.
25 JUN 0645	28	0.02	0.01	0.00	0.	25 JUN 1915	78	0.01	0.00	0.01	33.
25 JUN 0700	29	0.02	0.01	0.00	0.	25 JUN 1930	79	0.01	0.00	0.01	31.
25 JUN 0715	30	0.02	0.01	0.00	0.	25 JUN 1945	80	0.01	0.00	0.01	30.
25 JUN 0730	31	0.02	0.02	0.00	0.	25 JUN 2000	81	0.01	0.00	0.01	29.
25 JUN 0745	32	0.02	0.02	0.00	0.	25 JUN 2015	82	0.01	0.00	0.01	28.
25 JUN 0800	33	0.02	0.02	0.00	0.	25 JUN 2030	83	0.01	0.00	0.01	27.
25 JUN 0815	34	0.02	0.02	0.00	0.	25 JUN 2045	84	0.01	0.00	0.01	26.
25 JUN 0830	35	0.02	0.02	0.01	0.	25 JUN 2100	85	0.01	0.00	0.01	25.
25 JUN 0845	36	0.02	0.02	0.01	0.	25 JUN 2115	86	0.01	0.00	0.01	24.
25 JUN 0900	37	0.02	0.02	0.01	0.	25 JUN 2130	87	0.01	0.00	0.01	23.
25 JUN 0915	38	0.02	0.02	0.01	0.	25 JUN 2145	88	0.01	0.00	0.01	23.
25 JUN 0930	39	0.03	0.02	0.01	1.	25 JUN 2200	89	0.01	0.00	0.01	22.
25 JUN 0945	40	0.03	0.02	0.01	1.	25 JUN 2215	90	0.01	0.00	0.01	21.
25 JUN 1000	41	0.03	0.02	0.01	1.	25 JUN 2230	91	0.01	0.00	0.01	21.
25 JUN 1015	42	0.03	0.02	0.02	1.	25 JUN 2245	92	0.01	0.00	0.01	20.
25 JUN 1030	43	0.04	0.02	0.02	2.	25 JUN 2300	93	0.01	0.00	0.01	20.
25 JUN 1045	44	0.04	0.02	0.02	3.	25 JUN 2315	94	0.01	0.00	0.01	19.
25 JUN 1100	45	0.05	0.02	0.03	4.	25 JUN 2330	95	0.01	0.00	0.01	19.
25 JUN 1115	46	0.06	0.03	0.03	5.	25 JUN 2345	96	0.01	0.00	0.01	19.
25 JUN 1130	47	0.08	0.03	0.05	8.	26 JUN 0000	97	0.01	0.00	0.01	18.
25 JUN 1145	48	0.24	0.08	0.16	11.	26 JUN 0015	98	0.00	0.00	0.00	18.
25 JUN 1200	49	0.52	0.13	0.39	24.	26 JUN 0030	99	0.00	0.00	0.00	17.
25 JUN 1215	50	1.41	0.17	1.23	117.	26 JUN 0045	100	0.00	0.00	0.00	16.

TOTAL RAINFALL = 4.28, TOTAL LOSS = 1.09, TOTAL EXCESS = 3.18

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
921.	12.75	(CFS)	204.	59.	57.	57.
		(INCHES)	1.392	1.603	1.604	1.604
		(AC-FT)	101.	117.	117.	117.

CUMULATIVE AREA = 1.36 SQ MI

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105 KK    *    SUB13   *
          *            *
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107 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

SUBBASIN RUNOFF DATA

108 BA SUBBASIN CHARACTERISTICS

TAREA	0.14	SUBBASIN AREA

PRECIPITATION DATA

10 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

HYDRO-35			TP-40					TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.72	1.41	2.47	2.77	2.97	3.35	3.81	4.28	0.00	0.00	0.00	0.00

STORM AREA = 0.14

109 LS SCS LOSS RATE

STRTL	0.38	INITIAL ABSTRACTION
CRVNBR	84.00	CURVE NUMBER
RTIMP	0.00	PERCENT IMPERVIOUS AREA

KINEMATIC WAVE

110 UK OVERLAND-FLOW ELEMENT NO. 1

L	1460.	OVERLAND FLOW LENGTH
S	0.0061	SLOPE
N	0.060	ROUGHNESS COEFFICIENT
PA	100.0	PERCENT OF SUBBASIN

111 RK MAIN CHANNEL

L	4000.	CHANNEL LENGTH
S	0.0053	SLOPE
N	0.016	CHANNEL ROUGHNESS COEFFICIENT
CA	0.14	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	17.00	BOTTOM WIDTH OR DIAMETER
Z	1.00	SIDE SLOPE
RUPSTQ	YES	ROUTE UPSTREAM HYDROGRAPH

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COMPUTED KINEMATIC PARAMETERS

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)
1	1.9395	1.667	15.00	730.00
3	1.3126	1.528	15.00	2000.00

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HYDROGRAPH AT STATION SUB13

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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	1.	25 JUN 1230	51	0.30	0.05	0.25	591.
25 JUN 0015	2	0.01	0.01	0.00	1.	25 JUN 1245	52	0.09	0.01	0.08	1016.
25 JUN 0030	3	0.01	0.01	0.00	1.	25 JUN 1300	53	0.07	0.01	0.06	825.
25 JUN 0045	4	0.01	0.01	0.00	1.	25 JUN 1315	54	0.06	0.01	0.05	616.
25 JUN 0100	5	0.01	0.01	0.00	1.	25 JUN 1330	55	0.05	0.01	0.04	449.
25 JUN 0115	6	0.01	0.01	0.00	1.	25 JUN 1345	56	0.04	0.01	0.04	331.
25 JUN 0130	7	0.01	0.01	0.00	1.	25 JUN 1400	57	0.04	0.00	0.03	252.
25 JUN 0145	8	0.01	0.01	0.00	1.	25 JUN 1415	58	0.03	0.00	0.03	201.
25 JUN 0200	9	0.01	0.01	0.00	0.	25 JUN 1430	59	0.03	0.00	0.03	167.
25 JUN 0215	10	0.01	0.01	0.00	0.	25 JUN 1445	60	0.03	0.00	0.02	143.
25 JUN 0230	11	0.01	0.01	0.00	0.	25 JUN 1500	61	0.03	0.00	0.02	124.
25 JUN 0245	12	0.01	0.01	0.00	0.	25 JUN 1515	62	0.03	0.00	0.02	109.
25 JUN 0300	13	0.01	0.01	0.00	0.	25 JUN 1530	63	0.02	0.00	0.02	98.
25 JUN 0315	14	0.01	0.01	0.00	0.	25 JUN 1545	64	0.02	0.00	0.02	88.
25 JUN 0330	15	0.01	0.01	0.00	0.	25 JUN 1600	65	0.02	0.00	0.02	81.
25 JUN 0345	16	0.01	0.01	0.00	0.	25 JUN 1615	66	0.02	0.00	0.02	74.
25 JUN 0400	17	0.01	0.01	0.00	0.	25 JUN 1630	67	0.02	0.00	0.02	69.
25 JUN 0415	18	0.01	0.01	0.00	0.	25 JUN 1645	68	0.02	0.00	0.02	64.
25 JUN 0430	19	0.01	0.01	0.00	0.	25 JUN 1700	69	0.02	0.00	0.02	60.
25 JUN 0445	20	0.01	0.01	0.00	0.	25 JUN 1715	70	0.02	0.00	0.01	57.
25 JUN 0500	21	0.01	0.01	0.00	0.	25 JUN 1730	71	0.02	0.00	0.01	54.
25 JUN 0515	22	0.01	0.01	0.00	0.	25 JUN 1745	72	0.02	0.00	0.01	51.
25 JUN 0530	23	0.01	0.01	0.00	0.	25 JUN 1800	73	0.02	0.00	0.01	49.
25 JUN 0545	24	0.01	0.01	0.00	0.	25 JUN 1815	74	0.01	0.00	0.01	47.
25 JUN 0600	25	0.01	0.01	0.00	0.	25 JUN 1830	75	0.01	0.00	0.01	44.
25 JUN 0615	26	0.01	0.01	0.00	0.	25 JUN 1845	76	0.01	0.00	0.01	42.
25 JUN 0630	27	0.02	0.02	0.00	0.	25 JUN 1900	77	0.01	0.00	0.01	41.
25 JUN 0645	28	0.02	0.02	0.00	0.	25 JUN 1915	78	0.01	0.00	0.01	39.
25 JUN 0700	29	0.02	0.02	0.00	0.	25 JUN 1930	79	0.01	0.00	0.01	37.
25 JUN 0715	30	0.02	0.02	0.00	0.	25 JUN 1945	80	0.01	0.00	0.01	35.
25 JUN 0730	31	0.02	0.02	0.00	0.	25 JUN 2000	81	0.01	0.00	0.01	34.
25 JUN 0745	32	0.02	0.02	0.00	0.	25 JUN 2015	82	0.01	0.00	0.01	33.
25 JUN 0800	33	0.02	0.02	0.00	0.	25 JUN 2030	83	0.01	0.00	0.01	31.
25 JUN 0815	34	0.02	0.02	0.00	0.	25 JUN 2045	84	0.01	0.00	0.01	30.
25 JUN 0830	35	0.02	0.02	0.00	0.	25 JUN 2100	85	0.01	0.00	0.01	29.
25 JUN 0845	36	0.02	0.02	0.00	0.	25 JUN 2115	86	0.01	0.00	0.01	28.
25 JUN 0900	37	0.02	0.02	0.00	0.	25 JUN 2130	87	0.01	0.00	0.01	28.
25 JUN 0915	38	0.02	0.02	0.00	0.	25 JUN 2145	88	0.01	0.00	0.01	27.
25 JUN 0930	39	0.03	0.02	0.00	0.	25 JUN 2200	89	0.01	0.00	0.01	26.
25 JUN 0945	40	0.03	0.02	0.00	0.	25 JUN 2215	90	0.01	0.00	0.01	25.
25 JUN 1000	41	0.03	0.03	0.01	0.	25 JUN 2230	91	0.01	0.00	0.01	25.
25 JUN 1015	42	0.03	0.03	0.01	1.	25 JUN 2245	92	0.01	0.00	0.01	24.
25 JUN 1030	43	0.04	0.03	0.01	1.	25 JUN 2300	93	0.01	0.00	0.01	23.
25 JUN 1045	44	0.04	0.03	0.01	2.	25 JUN 2315	94	0.01	0.00	0.01	23.

25 JUN 1100	45	0.05	0.04	0.01	3.	*	25 JUN 2330	95	0.01	0.00	0.01	22.
25 JUN 1115	46	0.06	0.04	0.02	4.	*	25 JUN 2345	96	0.01	0.00	0.01	22.
25 JUN 1130	47	0.08	0.05	0.03	6.	*	26 JUN 0000	97	0.01	0.00	0.01	21.
25 JUN 1145	48	0.24	0.14	0.10	9.	*	26 JUN 0015	98	0.00	0.00	0.00	21.
25 JUN 1200	49	0.52	0.22	0.29	19.	*	26 JUN 0030	99	0.00	0.00	0.00	20.
25 JUN 1215	50	1.41	0.35	1.06	90.	*	26 JUN 0045	100	0.00	0.00	0.00	19.
						*						

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TOTAL RAINFALL = 4.28, TOTAL LOSS = 1.66, TOTAL EXCESS = 2.62

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
1016.	12.75	(CFS)	235.	68.	66.	66.
		(INCHES)	1.457	1.677	1.678	1.678
		(AC-FT)	117.	134.	134.	134.

CUMULATIVE AREA = 1.50 SQ MI

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          *            *
244 KK    *    SUB29   *
          *            *
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246 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

SUBBASIN RUNOFF DATA

247 BA SUBBASIN CHARACTERISTICS

TAREA	0.32	SUBBASIN AREA

PRECIPITATION DATA

10 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.72	1.41	2.47	2.77	2.97	3.35	3.81	4.28	0.00	0.00	0.00	0.00

STORM AREA = 0.32

248 LS SCS LOSS RATE

STRTL	0.17	INITIAL ABSTRACTION
CRVNBR	92.00	CURVE NUMBER
RTIMP	0.00	PERCENT IMPERVIOUS AREA

LOSS RATE VARIABLES FOR SECOND OVERLAND FLOW ELEMENT

STRTL	0.17	INITIAL ABSTRACTION
CRVNBR	92.00	CURVE NUMBER
RTIMP	0.00	PERCENT IMPERVIOUS AREA

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                KINEMATIC WAVE
249 UK            OVERLAND-FLOW ELEMENT NO. 1
                        L        745.  OVERLAND FLOW LENGTH
                        S      0.0054  SLOPE
                        N       0.060  ROUGHNESS COEFFICIENT
                       PA        32.5  PERCENT OF SUBBASIN
250 UK            OVERLAND-FLOW ELEMENT NO. 2
                        L       1710.  OVERLAND FLOW LENGTH
                        S      0.0064  SLOPE
                        N       0.060  ROUGHNESS COEFFICIENT
                       PA        67.5  PERCENT OF SUBBASIN
251 RK            MAIN CHANNEL
                        L       5730.  CHANNEL LENGTH
                        S      0.0051  SLOPE
                        N       0.025  CHANNEL ROUGHNESS COEFFICIENT
                       CA        0.32  CONTRIBUTING AREA
                    SHAPE        TRAP  CHANNEL SHAPE
                       WD       50.00  BOTTOM WIDTH OR DIAMETER
                        Z        3.90  SIDE SLOPE
                   RUPSTQ         YES  ROUTE UPSTREAM HYDROGRAPH

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COMPUTED KINEMATIC PARAMETERS

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)
1	1.8249	1.667	15.00	372.50
2	1.9867	1.667	15.00	855.00
3	0.4577	1.535	15.00	2865.00

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HYDROGRAPH AT STATION SUB29

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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	1.	*	25 JUN 1230	51	0.30	0.01	0.29	2039.
25 JUN 0015	2	0.01	0.01	0.00	1.	*	25 JUN 1245	52	0.09	0.00	0.09	2597.
25 JUN 0030	3	0.01	0.01	0.00	1.	*	25 JUN 1300	53	0.07	0.00	0.07	2328.
25 JUN 0045	4	0.01	0.01	0.00	1.	*	25 JUN 1315	54	0.06	0.00	0.05	1776.
25 JUN 0100	5	0.01	0.01	0.00	1.	*	25 JUN 1330	55	0.05	0.00	0.05	1279.
25 JUN 0115	6	0.01	0.01	0.00	0.	*	25 JUN 1345	56	0.04	0.00	0.04	922.
25 JUN 0130	7	0.01	0.01	0.00	0.	*	25 JUN 1400	57	0.04	0.00	0.04	690.
25 JUN 0145	8	0.01	0.01	0.00	0.	*	25 JUN 1415	58	0.03	0.00	0.03	543.
25 JUN 0200	9	0.01	0.01	0.00	0.	*	25 JUN 1430	59	0.03	0.00	0.03	448.
25 JUN 0215	10	0.01	0.01	0.00	0.	*	25 JUN 1445	60	0.03	0.00	0.03	383.
25 JUN 0230	11	0.01	0.01	0.00	0.	*	25 JUN 1500	61	0.03	0.00	0.02	334.
25 JUN 0245	12	0.01	0.01	0.00	0.	*	25 JUN 1515	62	0.03	0.00	0.02	296.
25 JUN 0300	13	0.01	0.01	0.00	0.	*	25 JUN 1530	63	0.02	0.00	0.02	266.
25 JUN 0315	14	0.01	0.01	0.00	0.	*	25 JUN 1545	64	0.02	0.00	0.02	242.
25 JUN 0330	15	0.01	0.01	0.00	0.	*	25 JUN 1600	65	0.02	0.00	0.02	222.
25 JUN 0345	16	0.01	0.01	0.00	0.	*	25 JUN 1615	66	0.02	0.00	0.02	205.
25 JUN 0400	17	0.01	0.01	0.00	0.	*	25 JUN 1630	67	0.02	0.00	0.02	191.
25 JUN 0415	18	0.01	0.01	0.00	0.	*	25 JUN 1645	68	0.02	0.00	0.02	179.
25 JUN 0430	19	0.01	0.01	0.00	0.	*	25 JUN 1700	69	0.02	0.00	0.02	168.
25 JUN 0445	20	0.01	0.01	0.00	0.	*	25 JUN 1715	70	0.02	0.00	0.02	159.
25 JUN 0500	21	0.01	0.01	0.00	0.	*	25 JUN 1730	71	0.02	0.00	0.02	150.
25 JUN 0515	22	0.01	0.01	0.00	0.	*	25 JUN 1745	72	0.02	0.00	0.02	143.
25 JUN 0530	23	0.01	0.01	0.00	0.	*	25 JUN 1800	73	0.02	0.00	0.01	136.

25 JUN 0545	24	0.01	0.01	0.00	0.	*	25 JUN 1815	74	0.01	0.00	0.01	130.
25 JUN 0600	25	0.01	0.01	0.00	0.	*	25 JUN 1830	75	0.01	0.00	0.01	124.
25 JUN 0615	26	0.01	0.01	0.00	0.	*	25 JUN 1845	76	0.01	0.00	0.01	118.
25 JUN 0630	27	0.02	0.01	0.00	0.	*	25 JUN 1900	77	0.01	0.00	0.01	113.
25 JUN 0645	28	0.02	0.01	0.00	0.	*	25 JUN 1915	78	0.01	0.00	0.01	108.
25 JUN 0700	29	0.02	0.01	0.00	0.	*	25 JUN 1930	79	0.01	0.00	0.01	103.
25 JUN 0715	30	0.02	0.01	0.00	0.	*	25 JUN 1945	80	0.01	0.00	0.01	99.
25 JUN 0730	31	0.02	0.01	0.00	0.	*	25 JUN 2000	81	0.01	0.00	0.01	95.
25 JUN 0745	32	0.02	0.01	0.01	0.	*	25 JUN 2015	82	0.01	0.00	0.01	91.
25 JUN 0800	33	0.02	0.01	0.01	0.	*	25 JUN 2030	83	0.01	0.00	0.01	88.
25 JUN 0815	34	0.02	0.01	0.01	0.	*	25 JUN 2045	84	0.01	0.00	0.01	85.
25 JUN 0830	35	0.02	0.01	0.01	0.	*	25 JUN 2100	85	0.01	0.00	0.01	82.
25 JUN 0845	36	0.02	0.01	0.01	1.	*	25 JUN 2115	86	0.01	0.00	0.01	79.
25 JUN 0900	37	0.02	0.01	0.01	1.	*	25 JUN 2130	87	0.01	0.00	0.01	77.
25 JUN 0915	38	0.02	0.01	0.01	1.	*	25 JUN 2145	88	0.01	0.00	0.01	74.
25 JUN 0930	39	0.03	0.01	0.01	2.	*	25 JUN 2200	89	0.01	0.00	0.01	72.
25 JUN 0945	40	0.03	0.01	0.01	3.	*	25 JUN 2215	90	0.01	0.00	0.01	70.
25 JUN 1000	41	0.03	0.02	0.02	4.	*	25 JUN 2230	91	0.01	0.00	0.01	69.
25 JUN 1015	42	0.03	0.02	0.02	5.	*	25 JUN 2245	92	0.01	0.00	0.01	67.
25 JUN 1030	43	0.04	0.02	0.02	8.	*	25 JUN 2300	93	0.01	0.00	0.01	65.
25 JUN 1045	44	0.04	0.02	0.03	11.	*	25 JUN 2315	94	0.01	0.00	0.01	64.
25 JUN 1100	45	0.05	0.02	0.03	15.	*	25 JUN 2330	95	0.01	0.00	0.01	62.
25 JUN 1115	46	0.06	0.02	0.04	21.	*	25 JUN 2345	96	0.01	0.00	0.01	61.
25 JUN 1130	47	0.08	0.03	0.05	30.	*	26 JUN 0000	97	0.01	0.00	0.01	59.
25 JUN 1145	48	0.24	0.06	0.18	49.	*	26 JUN 0015	98	0.00	0.00	0.00	58.
25 JUN 1200	49	0.52	0.09	0.43	110.	*	26 JUN 0030	99	0.00	0.00	0.00	56.
25 JUN 1215	50	1.41	0.12	1.29	706.	*	26 JUN 0045	100	0.00	0.00	0.00	54.
						*						

****

TOTAL RAINFALL = 4.28, TOTAL LOSS = 0.89, TOTAL EXCESS = 3.39

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
2597.	12.75	(CFS)	683.	197.	191.	191.
		(INCHES)	2.336	2.689	2.690	2.690
		(AC-FT)	339.	390.	390.	390.

CUMULATIVE AREA = 2.72 SQ MI

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          **************
          *            *
252 KK    *    CPEND   *
          *            *
          **************
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254 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

255 HC HYDROGRAPH COMBINATION

ICOMP	2	NUMBER OF HYDROGRAPHS TO COMBINE

***

HYDROGRAPH AT STATION CPEND
SUM OF 2 HYDROGRAPHS

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
25 JUN 0000	1	2.	25 JUN 0615	26	0.	25 JUN 1230	51	2630.	25 JUN 1845	76	161.
25 JUN 0015	2	2.	25 JUN 0630	27	0.	25 JUN 1245	52	3614.	25 JUN 1900	77	154.
25 JUN 0030	3	2.	25 JUN 0645	28	0.	25 JUN 1300	53	3153.	25 JUN 1915	78	147.
25 JUN 0045	4	2.	25 JUN 0700	29	0.	25 JUN 1315	54	2392.	25 JUN 1930	79	140.
25 JUN 0100	5	2.	25 JUN 0715	30	0.	25 JUN 1330	55	1728.	25 JUN 1945	80	134.
25 JUN 0115	6	1.	25 JUN 0730	31	0.	25 JUN 1345	56	1253.	25 JUN 2000	81	129.
25 JUN 0130	7	1.	25 JUN 0745	32	0.	25 JUN 1400	57	942.	25 JUN 2015	82	124.
25 JUN 0145	8	1.	25 JUN 0800	33	0.	25 JUN 1415	58	745.	25 JUN 2030	83	119.
25 JUN 0200	9	1.	25 JUN 0815	34	0.	25 JUN 1430	59	615.	25 JUN 2045	84	115.
25 JUN 0215	10	1.	25 JUN 0830	35	0.	25 JUN 1445	60	525.	25 JUN 2100	85	111.
25 JUN 0230	11	1.	25 JUN 0845	36	1.	25 JUN 1500	61	458.	25 JUN 2115	86	108.
25 JUN 0245	12	1.	25 JUN 0900	37	1.	25 JUN 1515	62	406.	25 JUN 2130	87	104.
25 JUN 0300	13	1.	25 JUN 0915	38	1.	25 JUN 1530	63	364.	25 JUN 2145	88	101.
25 JUN 0315	14	0.	25 JUN 0930	39	2.	25 JUN 1545	64	330.	25 JUN 2200	89	98.
25 JUN 0330	15	0.	25 JUN 0945	40	3.	25 JUN 1600	65	303.	25 JUN 2215	90	96.
25 JUN 0345	16	0.	25 JUN 1000	41	4.	25 JUN 1615	66	280.	25 JUN 2230	91	93.
25 JUN 0400	17	0.	25 JUN 1015	42	6.	25 JUN 1630	67	260.	25 JUN 2245	92	91.
25 JUN 0415	18	0.	25 JUN 1030	43	9.	25 JUN 1645	68	243.	25 JUN 2300	93	88.
25 JUN 0430	19	0.	25 JUN 1045	44	13.	25 JUN 1700	69	229.	25 JUN 2315	94	86.
25 JUN 0445	20	0.	25 JUN 1100	45	18.	25 JUN 1715	70	216.	25 JUN 2330	95	84.
25 JUN 0500	21	0.	25 JUN 1115	46	24.	25 JUN 1730	71	204.	25 JUN 2345	96	82.
25 JUN 0515	22	0.	25 JUN 1130	47	35.	25 JUN 1745	72	194.	26 JUN 0000	97	81.
25 JUN 0530	23	0.	25 JUN 1145	48	58.	25 JUN 1800	73	185.	26 JUN 0015	98	79.
25 JUN 0545	24	0.	25 JUN 1200	49	129.	25 JUN 1815	74	176.	26 JUN 0030	99	76.
25 JUN 0600	25	0.	25 JUN 1215	50	796.	25 JUN 1830	75	168.	26 JUN 0045	100	73.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
3614.	12.75	(CFS)	918.	264.	256.	256.
		(INCHES)	2.023	2.329	2.329	2.329
		(AC-FT)	455.	524.	524.	524.

CUMULATIVE AREA = 4.22 SQ MI

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	SUB1	104.	12.75	28.	8.	8.	0.12		
ROUTED TO	CP4A	103.	12.75	28.	8.	8.	0.12		
HYDROGRAPH AT	SUB2	69.	13.00	24.	7.	7.	0.11		
HYDROGRAPH AT	SUB3	203.	13.00	72.	21.	21.	0.33		
2 COMBINED AT	CP4B	290.	13.00	100.	29.	28.	0.45		
HYDROGRAPH AT	SUB4	445.	12.75	125.	37.	36.	0.54		
DIVERSION TO	DIVERT	445.	0.25	125.	37.	36.	0.54		
HYDROGRAPH AT	CP9A	0.	0.25	0.	0.	0.	0.54		
HYDROGRAPH AT	SUB5	305.	12.50	41.	12.	11.	0.16		
HYDROGRAPH AT	SUB6	354.	12.75	69.	20.	19.	0.28		
2 COMBINED AT	CP9B	354.	12.75	69.	20.	19.	0.82		
ROUTED TO	CP10A	325.	12.75	69.	20.	19.	0.82		
HYDROGRAPH AT	SUB7	120.	12.75	24.	7.	7.	0.11		
HYDROGRAPH AT	SUB8+9	303.	12.75	75.	22.	21.	0.32		
ROUTED TO	CP10B	287.	12.75	75.	22.	21.	0.32		
2 COMBINED AT	CP10C	611.	12.75	145.	42.	40.	1.14		
HYDROGRAPH AT	SUB10	694.	12.75	159.	46.	44.	1.20		
HYDROGRAPH AT	SUB11	767.	12.75	176.	51.	49.	1.26		
HYDROGRAPH AT	SUB12	921.	12.75	204.	59.	57.	1.36		
HYDROGRAPH AT	SUB13	1016.	12.75	235.	68.	66.	1.50		
HYDROGRAPH AT	SUB14	214.	12.75	38.	11.	11.	0.16		
HYDROGRAPH AT	SUB15	230.	12.50	33.	9.	9.	0.14		
2 COMBINED AT	CP16	435.	12.50	71.	20.	20.	0.30		
HYDROGRAPH AT	SUB16	520.	12.50	97.	28.	27.	0.41		
HYDROGRAPH AT	SUB17	528.	12.75	114.	32.	31.	0.49		
HYDROGRAPH AT	SUB18	255.	12.50	55.	16.	15.	0.24		
2 COMBINED AT	CP19	779.	12.75	168.	48.	47.	0.73		

HYDROGRAPH AT	SUB19	904.	12.75	204.	58.	57.	0.85
HYDROGRAPH AT	SUB20	887.	12.75	209.	60.	58.	0.88
HYDROGRAPH AT	SUB21	345.	12.50	64.	18.	18.	0.28
HYDROGRAPH AT	SUB22	100.	12.50	15.	4.	4.	0.06
2 COMBINED AT	CP24	445.	12.50	78.	22.	22.	0.34
ROUTED TO	CP25A	392.	12.50	78.	22.	22.	0.34
HYDROGRAPH AT	SUB24	334.	12.50	50.	14.	14.	0.17
2 COMBINED AT	CP25A	726.	12.50	128.	37.	35.	0.51
ROUTED TO	CP25	684.	12.50	128.	37.	36.	0.51
HYDROGRAPH AT	SUB23	622.	12.75	139.	40.	39.	0.57
2 COMBINED AT	CP25	1235.	12.50	268.	77.	74.	1.08
HYDROGRAPH AT	SUB25	1282.	12.75	303.	87.	84.	1.21
HYDROGRAPH AT	SUB26	1309.	12.75	325.	93.	90.	1.31
2 COMBINED AT	CP29A	2196.	12.75	534.	153.	149.	2.19
HYDROGRAPH AT	SUB27	188.	12.50	27.	8.	8.	0.09
HYDROGRAPH AT	SUB28	360.	12.50	57.	16.	16.	0.21
2 COMBINED AT	CP29	2440.	12.75	591.	169.	164.	2.39
HYDROGRAPH AT	SUB29	2597.	12.75	683.	197.	191.	2.72
2 COMBINED AT	CPEND	3614.	12.75	918.	264.	256.	4.22

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*** NORMAL END OF HEC-1 ***
101
SIMONS8      job terminated at 25-JUN-1986 12:21:43.35

  Accounting information:
  Buffered I/O count:          182     Peak working set size:    500
  Direct I/O count:            390     Peak page file size:     1843
  Page faults:                2421     Mounted volumes:            0
  Charged CPU time:    0 00:01:10.41   Elapsed time:     0 00:01:42.61
$
```

APPENDIX D

HEC-1 Printout, 50-Year Event, No Diversion at Thunderbird Road

```
T OUTER13B24.DAT
*DIAGRAM
*NO LIST
ID          ------------ SIMONS, LI & ASSOCIATES, INC.  PAZ-DC-01 ------------
ID      DELEUW, CATHER & CO.  OUTER LOOP HIGHWAY PROJECT CONCEPT DRAINAGE PLAN
ID         ALL SUBBASINS TO PIMA RD CHANNEL, EXISTING RUNOFF CHARACTERISTICS
ID            50-YR, 24-HR RAINFALL USING HYPOTHETICAL STORM DISTRIBUTION
IT   15. 25JUN86      0.     100.
IO    5.      0.
KK  SUB1
KM      RUNOFF FROM SUB-BASIN 1
BA0.1242
*       HYPOTHETICAL STORM DISTRIBUTION
PH                0.65    1.27    2.23    2.49    2.67    3.01    3.41    3.82
LS    0.      84
UK 1965.  0.0102    0.10    100.
RK 4220.  0.0101   0.016  0.1242    TRAP     10.      1.
KK  CP4A
KM      ROUTE SUB1 TO CP4
RK  500.  0.0100   0.016  0.1242    TRAP     10.      1.
KK  SUB2
KM      RUNOFF FROM SUB-BASIN 2
BA0.1106
LS    0.      84
UK 2885.  0.0099    0.10    100.
RK 1200.  0.0021   0.025  0.1106    TRAP     25.      1.
KK  SUB3
KM      RUNOFF FROM SUB-BASIN 3
BA0.2192
LS    0.      84
UK 2920.  0.0099    0.10    100.
RK 1580.  0.0027   0.025  0.3298    TRAP     25.      1.     YES
KK  CP4B
KM      COMBINE HYDROGRAPHS CP4A & SUB3
KO    1.
HC    2.
KK  SUB4
KM      RUNOFF FROM SUB-BASIN 4
KO    1.
BA0.0887
LS    0.      91
UK 1154.  0.0052    0.06    100.
RK 2785.  0.0083   0.016  0.4540    TRAP     12.      1.     YES
KK  CP9A
KM      ROUTE SUB-BASIN 4 TO CP9
RK 2285.  0.0088   0.016  0.5740    TRAP     12.      1.
KK  SUB5
KM      RUNOFF FROM SUB-BASIN 5
BA0.1555
LS    0.      91              0.      84.
UK  450.  0.0050   0.025   45.92
UK 3020.  0.0050   0.025   54.08
RK 2530.  0.0040   0.025  0.1555    TRAP     25.      1.
KK  SUB6
KM      RUNOFF FROM SUB-BASIN 6
BA0.1200
LS    0.      84
UK 1730.  0.0092    0.08    100.
RK 2800.  0.0075   0.040  0.2280    TRAP      0.    100.     YES
KK  CP9B
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KM      COMBINE HYDROGRAPHS CP9A & SUB6
KO    1.
HC    2.
KK CP10A
KM      ROUTE CP9 TO CP10
RK 2665.  0.0067   0.016  0.8182    TRAP     15.      1.
KK  SUB7
KM      RUNOFF FROM SUB-BASIN 7
BA0.1080
LS    0.      84
UK 1254.  0.0043    0.07    100.
RK 2565.  0.0082   0.040  0.1080    TRAP      0.    100.
KKSUB8+9
KM      RUNOFF FROM SUB-BASINS 8 AND 9
BA0.2118
LS    0.      88              0.     84.
UK 1025.  0.0047    0.08   39.90
UK 1635.  0.0063    0.10   60.10
RK 2665.  0.0071   0.025  0.3198    TRAP     25.      1.     YES
KK CP10B
KM      ROUTE SUB8+9 TO CP10
RK 1335.  0.0015   0.025  0.3198    TRAP     25.      1.
KK CP10C
KM      COMBINE HYDROGRAPHS CP10A & CP10B
KO    1.
HC    2.
KK SUB10
KM      RUNOFF FROM SUB-BASIN 10
BA0.0626
LS    0.      84
UK 1105.  0.0094    0.07    100.
RK 1325.  0.0072   0.016  1.1380    TRAP     15.      1.     YES
KK SUB11
KM      RUNOFF FROM SUB-BASIN 11
KO    1.
BA0.0626
LS    0.      90
UK 1745.  0.0080    0.07    100.
RK 1325.  0.0072   0.016  1.2014    TRAP     16.      1.     YES
KK SUB12
KM      RUNOFF FROM SUB-BASIN 12
KO    1.
BA0.1012
LS    0.      90
UK 1440.  0.0083    0.06    100.
RK 2665.  0.0071   0.016  1.2632    TRAP     17.      1.     YES
KK SUB13
KM      RUNOFF FROM SUB-BASIN 13
KO    1.
BA0.1374
LS    0.     84.
UK 1460.  0.0061    0.06    100.
RK 4000.  0.0053   0.016  1.4006    TRAP     17.      1.     YES
KK SUB14
KM      RUNOFF FROM SUB-BASIN 14
BA0.1611
LS    0.      84              0.     84
UK 1075.  0.0140    0.10   64.31
UK  661.  0.0136    0.10   35.69
RK 5360.  0.0080   0.025  0.1611    TRAP      5.      8.
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KK SUB15
KM      RUNOFF FROM SUB-BASIN 15
BA0.1402
LS    0.      84              0.      84
UK  365.  0.0133    0.10   33.31
UK  855.  0.0129    0.10   66.69
RK 5310.  0.0075   0.037  0.1402    TRAP      6.      5.
KK CP16
KM      COMBINE HYDROGRAPHS SUB14 & SUB15
HC    2.
KK SUB16
KM      RUNOFF FROM SUB-BASIN 16
BA0.1133
LS    0.      84              0.      84
UK  830.  0.0102    0.10   24.54
UK 1170.  0.0098    0.10   75.46
RK 1895.  0.0095   0.037  0.1133    TRAP      6.      5.     YES
KK SUB17
KM      RUNOFF FROM SUB-BASIN 17
BA0.0712
LS    0.     84.              0.     84.
UK  240.  0.0085    0.09   53.79
UK  210.  0.0143    0.09   46.21
RK 5970.  0.0069   0.025  0.0712    TRAP      5.      6.     YES
KK SUB18
KM      RUNOFF FROM SUB-BASIN 18
BA0.2398
LS    0.     84.              0.     84.
UK  235.  0.0128    0.09   26.31
UK 1020.  0.0098    0.09   73.69
RK 7590.  0.0074   0.065  0.2398    TRAP      0.      9.
KK CP19
KM      COMBINE HYDROGRAPHS SUB17 & SUB18
HC    2.
KK SUB19
KM      RUNOFF FROM SUB-BASIN 19
BA0.1288
LS    0.     90.              0.     90.
UK 1175.  0.0042    0.07   54.81
UK 1040.  0.0030    0.07   45.19
RK 2850.  0.0053   0.030  0.1288    TRAP      6.      6.     YES
KK SUB20
KM      RUNOFF FROM SUB-BASIN 20
BA0.0218
LS    0.     90.              0.     90.
UK  120.  0.0083    0.06   16.97
UK  715.  0.0098    0.06   83.03
RK 1510.  0.0079   0.032  0.0218    TRAP     10.      6.     YES
KK SUB21
KM      RUNOFF FROM SUB-BASIN 21
BA0.2765
LS    0.     84.              0.     84.
UK  410.  0.0098    0.09   26.15
UK 1755.  0.0134    0.09   73.85
RK 6560.  0.0120   0.035  0.2765    TRAP      1.      7.
KK SUB22
KM      RUNOFF FROM SUB-BASIN 22
BA0.0595
LS    0.     84.              0.     84.
UK  370.  0.0176    0.09   50.76
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UK  490.  0.0179    0.09   49.24
RK 3630.  0.0152    0.03  0.0595    TRAP      1.      13.
KK  CP24
KM      COMBINE HYDROGRAPHS SUB21 & SUB22
HC    2.
KK CP25A
KM      ROUTE CP24 TO CP25A
RK 1992.  0.0080   0.025  0.3360    TRAP      3.       7.
KK SUB24
KM      RUNOFF FROM SUB-BASIN 24
BA0.1711
LS    0.     90.              0.     90.
UK  175.  0.0171    0.09   19.70
UK  955.  0.0168    0.09   80.30
RK 7505.  0.0120   0.025  0.1711    TRAP      3.       7.
KK CP25A
KM      COMBINE CP24 & SUB24
HC    2.
KK  CP25
KM      ROUTE CP25A TO CP25
RK 1023.  0.0049   0.035  0.5071    TRAP      8.       4.
KK SUB23
KM      RUNOFF FROM SUB-BASIN 23
BA0.5706
LS    0.     86.              0.     86.
UK 1605.  0.0125    0.10   74.26
UK  610.  0.0172    0.10   25.74
RK11130.  0.0079   0.035  0.5706    TRAP      8.       4.
KK  CP25
KM      COMBINE HYDROGRAPHS CP25A & SUB23
HC    2.
KK SUB25
KM      RUNOFF FROM SUB-BASIN 25
BA0.1364
LS    0.     86.              0.     90.
UK 1400.  0.0030    0.10   47.87
UK  885.  0.0030    0.07   52.13
RK 2655.  0.0068   0.036  0.1364    TRAP     12.       3.     YES
KK SUB26
KM      RUNOFF FROM SUB-BASIN 26
BA0.0963
LS    0.     84.              0.     84.
UK  790.  0.0076    0.06   33.75
UK  885.  0.0068    0.08   66.25
RK 2585.  0.0046   0.038  0.0963    TRAP      2.       6.     YES
KK CP29A
KM      COMBINE HYDROGRAPHS SUB20 & SUB 26
HC    2.
KK SUB27
KM      RUNOFF FROM SUB-BASIN 27
BA0.0925
LS    0.     92.              0.     90.
UK  355.  0.0030    0.07   40.22
UK  500.  0.0030    0.07   59.78
RK 2695.  0.0074   0.025  0.0925    TRAP     25.       1.
KK SUB28
KM      RUNOFF FROM SUB-BASIN 28
BA0.1155
LS    0.     86.              0.     86.
UK  755.  0.0079    0.06   30.74
```

```
UK  985.  0.0081    0.06   69.26
RK 2510.  0.0056   0.036  0.1155    TRAP     10.      3.     YES
KK  CP29
KM      COMBINE HYDROGRAPHS CP29A & SUB28
HC    2.
KK SUB29
KM      RUNOFF FROM SUB-BASIN 29
KO    1.
BA0.3230
LS    0.     92.              0.     92.
UK  745.  0.0054    0.06   32.54
UK 1710.  0.0064    0.06   67.46
RK 5730.  0.0051   0.025  0.3230    TRAP     50.     3.9     YES
KK CPEND
KM      COMBINE HYDROGRAPHS CP13 & SUB29
KO    1.
HC    2.
ZZ
$ T OUTER13B24.OUT
$ SET NOVERIFY

THOUGHT OF THE DAY FROM ' V A X '

It's a poor workman who blames his tools.

        ***  NOTE TO MASS 11 USERS ***

  **PLEASE KEEP SASI INFORMED OF ANY PROBLEMS**


$ ASSIGN DUMMY SYS$PRINT
$ ASSIGN OUTER13B24.DAT INPUT
$! OUTPUT OF HEC1 GOES TO THE LOG FILE
$ RUN [USERS.SIMONS.SIMONS1]HEC1


**********************************************                    ************************************
*                                            *                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *                    *   U.S. ARMY CORPS OF ENGINEERS
```

```
*            FEBRUARY 1981            *
*          REVISED 30 OCT 81          *
*                                     *
*  RUN DATE      25-J    TIME      14:2 *
*                                     *
*************************************
```


```
* THE HYDROLOGIC ENGINEERING CENTER
*        609 SECOND STREET
*      DAVIS, CALIFORNIA 95616
* (916) 440-3285 OR (FTS) 448-3285
*
*************************************
```


```
X    X  XXXXXXX   XXXXX         X
X    X  X       X    X        XX
X    X  X       X              X
XXXXXXX  XXXX    X      XXXXX   X
X    X  X       X              X
X    X  X       X    X         X
X    X  XXXXXXX   XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. SEE SEPTEMBER 1981 INPUT DESCRIPTION FOR NEW DEFINITIONS.

HEC-1 INPUT PAGE 1

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

              *DIAGRAM
*** NOLIST ***
```

```
                 SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION
 NO.       (.) CONNECTOR        (<---) RETURN OF DIVERTED FLOW

  7        SUB1
             V
             V
 14        CP4A
             .
             .
 17          .        SUB2
             .          V
             .          V
 23          .        SUB3 ***
             .          .
             .          .
 29        CP4B............
             V
             V
 33        SUB4 ***
             V
             V
 40        CP9A
             .
             .
 43          .        SUB5
             .          V
             .          V
 50          .        SUB6 ***
             .          .
             .          .
 56        CP9B............
             V
             V
 60        CP10A
             .
             .
 63          .        SUB7
             .          V
             .          V
 69          .      SUB8+9 ***
             .          V
             .          V
 76          .      CP10B
             .          .
             .          .
 79        CP10C............
             V
             V
```

```
83      SUB10 ***
          V
          V
89      SUB11 ***
          V
          V
96      SUB12 ***
          V
          V
103     SUB13 ***
          .
          .
110       .     SUB14
          .       .
          .       .
117       .       .       SUB15
          .       .         .
          .       .         .
124       .     CP16............
                  V
                  V
127       .   SUB16 ***
                  V
                  V
134       .   SUB17 ***
          .       .
          .       .
141       .       .       SUB18
          .       .         .
          .       .         .
148       .     CP19............
                  V
                  V
151       .   SUB19 ***
                  V
                  V
158       .   SUB20 ***
          .       .
          .       .
165       .       .       SUB21
          .       .         .
          .       .         .
172       .       .         .     SUB22
          .       .         .       .
          .       .         .       .
179       .       .       CP24............
                          V
                          V
182       .       .     CP25A
          .       .         .
          .       .         .
185       .       .         .     SUB24
          .       .         .       .
          .       .         .       .
192       .       .     CP25A............
                          V
                          V
195       .       .     CP25
          .       .         .
          .       .         .
```

```
198          .          .          .      SUB23
             .          .          .          .
             .          .          .          .
205          .          .      CP25............
             .          .          V
             .          .          V
208          .          .      SUB25 ***
             .          .          V
             .          .          V
215          .          .      SUB26 ***
             .          .          .
             .          .          .
222          .      CP29A............
             .          .
             .          .
225          .          .      SUB27
             .          .          V
             .          .          V
232          .          .      SUB28 ***
             .          .          .
             .          .          .
239          .      CP29............
             .          V
             .          V
242          .      SUB29 ***
             .          .
             .          .
250      CPEND............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*****************************************                    ****************************************
*                                       *                    *                                      *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *                    *   U.S. ARMY CORPS OF ENGINEERS       *
*            FEBRUARY 1981              *                    *  THE HYDROLOGIC ENGINEERING CENTER   *
*         REVISED 30 OCT 81             *                    *         609 SECOND STREET            *
*                                       *                    *       DAVIS, CALIFORNIA 95616        *
*  RUN DATE     25-J    TIME     14:2    *                    *  (916) 440-3285 OR (FTS) 448-3285    *
*                                       *                    *                                      *
*****************************************                    ****************************************
```

---------- SIMONS, LI & ASSOCIATES, INC. PAZ-DC-01 ----------
DELEUW, CATHER & CO. - OUTER LOOP HIGHWAY PROJECT CONCEPT DRAINAGE PLAN
ALL SUBBASINS TO PIMA RD CHANNEL, EXISTING RUNOFF CHARACTERISTICS
50-YR, 24-HR RAINFALL USING HYPOTHETICAL STORM DISTRIBUTION

```
  6 IO        OUTPUT CONTROL VARIABLES
                  IPRNT          5  PRINT CONTROL
                  IPLOT          0  PLOT CONTROL
                  QSCAL         0.  HYDROGRAPH PLOT SCALE

 IT           HYDROGRAPH TIME DATA
                  NMIN          15  MINUTES IN COMPUTATION INTERVAL
                  IDATE     25JUN86  STARTING DATE
```

```
                ITIME        0000  STARTING TIME
                   NQ         100  NUMBER OF HYDROGRAPH ORDINATES
              NDDATE     26JUN86  ENDING DATE
              NDTIME        0045  ENDING TIME

          COMPUTATION INTERVAL    0.25 HOURS
              TOTAL TIME BASE    24.75 HOURS

     ENGLISH UNITS
         DRAINAGE AREA          SQUARE MILES
         PRECIPITATION DEPTH    INCHES
         LENGTH, ELEVATION      FEET
         FLOW                   CUBIC FEET PER SECOND
         STORAGE VOLUME         ACRE-FEET
         SURFACE AREA           ACRES
         TEMPERATURE            DEGREES FAHRENHEIT


***********************************************************************************************************************

          ***************
          *             *
 29 KK    *     CP4B    *
          *             *
          ***************

 31 KO        OUTPUT CONTROL VARIABLES
                IPRNT          1  PRINT CONTROL
                IPLOT          0  PLOT CONTROL
                QSCAL         0.  HYDROGRAPH PLOT SCALE

 32 HC        HYDROGRAPH COMBINATION
                ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                    ***

***********************************************************************************************************************

                                    HYDROGRAPH AT STATION     CP4B
                                      SUM OF  2 HYDROGRAPHS

***********************************************************************************************************************
                                 *                                 *                                 *                                 *
 DA MON HRMN  ORD     FLOW       *  DA MON HRMN  ORD     FLOW      *  DA MON HRMN  ORD     FLOW      *  DA MON HRMN  ORD     FLOW
                                 *                                 *                                 *
 25 JUN 0000   1      0.         *  25 JUN 0615  26      0.        *  25 JUN 1230  51     136.       *  25 JUN 1845  76      20.
 25 JUN 0015   2      0.         *  25 JUN 0630  27      0.        *  25 JUN 1245  52     215.       *  25 JUN 1900  77      19.
 25 JUN 0030   3      0.         *  25 JUN 0645  28      0.        *  25 JUN 1300  53     224.       *  25 JUN 1915  78      18.
 25 JUN 0045   4      0.         *  25 JUN 0700  29      0.        *  25 JUN 1315  54     202.       *  25 JUN 1930  79      17.
 25 JUN 0100   5      0.         *  25 JUN 0715  30      0.        *  25 JUN 1330  55     172.       *  25 JUN 1945  80      17.
 25 JUN 0115   6      0.         *  25 JUN 0730  31      0.        *  25 JUN 1345  56     143.       *  25 JUN 2000  81      16.
 25 JUN 0130   7      0.         *  25 JUN 0745  32      0.        *  25 JUN 1400  57     120.       *  25 JUN 2015  82      15.
 25 JUN 0145   8      0.         *  25 JUN 0800  33      0.        *  25 JUN 1415  58     101.       *  25 JUN 2030  83      15.
 25 JUN 0200   9      0.         *  25 JUN 0815  34      0.        *  25 JUN 1430  59      87.       *  25 JUN 2045  84      14.
 25 JUN 0215  10      0.         *  25 JUN 0830  35      0.        *  25 JUN 1445  60      75.       *  25 JUN 2100  85      14.
 25 JUN 0230  11      0.         *  25 JUN 0845  36      0.        *  25 JUN 1500  61      66.       *  25 JUN 2115  86      13.
 25 JUN 0245  12      0.         *  25 JUN 0900  37      0.        *  25 JUN 1515  62      58.       *  25 JUN 2130  87      13.
 25 JUN 0300  13      0.         *  25 JUN 0915  38      0.        *  25 JUN 1530  63      52.       *  25 JUN 2145  88      12.
```

25 JUN 0315	14	0.	*	25 JUN 0930	39	0.	*	25 JUN 1545	64	47.	*	25 JUN 2200	89	12.
25 JUN 0330	15	0.	*	25 JUN 0945	40	0.	*	25 JUN 1600	65	43.	*	25 JUN 2215	90	11.
25 JUN 0345	16	0.	*	25 JUN 1000	41	0.	*	25 JUN 1615	66	39.	*	25 JUN 2230	91	11.
25 JUN 0400	17	0.	*	25 JUN 1015	42	0.	*	25 JUN 1630	67	36.	*	25 JUN 2245	92	11.
25 JUN 0415	18	0.	*	25 JUN 1030	43	0.	*	25 JUN 1645	68	33.	*	25 JUN 2300	93	11.
25 JUN 0430	19	0.	*	25 JUN 1045	44	0.	*	25 JUN 1700	69	31.	*	25 JUN 2315	94	10.
25 JUN 0445	20	0.	*	25 JUN 1100	45	0.	*	25 JUN 1715	70	29.	*	25 JUN 2330	95	10.
25 JUN 0500	21	0.	*	25 JUN 1115	46	0.	*	25 JUN 1730	71	27.	*	25 JUN 2345	96	10.
25 JUN 0515	22	0.	*	25 JUN 1130	47	0.	*	25 JUN 1745	72	25.	*	26 JUN 0000	97	9.
25 JUN 0530	23	0.	*	25 JUN 1145	48	0.	*	25 JUN 1800	73	24.	*	26 JUN 0015	98	9.
25 JUN 0545	24	0.	*	25 JUN 1200	49	2.	*	25 JUN 1815	74	23.	*	26 JUN 0030	99	9.
25 JUN 0600	25	0.	*	25 JUN 1215	50	14.	*	25 JUN 1830	75	21.	*	26 JUN 0045	100	8.
			*				*				*			

****

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
224.	13.00	(CFS)	83.	25.	24.	24.
		(INCHES)	1.707	2.017	2.017	2.017
		(AC-FT)	41.	49.	49.	49.

CUMULATIVE AREA = 0.45 SQ MI

*** ***

```
          **************
          *            *
33 KK     *    SUB4    *
          *            *
          **************
```

35 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

SUBBASIN RUNOFF DATA

36 BA SUBBASIN CHARACTERISTICS

TAREA 0.09 SUBBASIN AREA

PRECIPITATION DATA

10 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.65	1.27	2.23	2.49	2.67	3.01	3.41	3.82	0.00	0.00	0.00	0.00

STORM AREA = 0.09

37 LS SCS LOSS RATE

STRTL	0.20	INITIAL ABSTRACTION
CRVNBR	91.00	CURVE NUMBER
RTIMP	0.00	PERCENT IMPERVIOUS AREA

KINEMATIC WAVE

38 UK OVERLAND-FLOW ELEMENT NO. 1

L	1154.	OVERLAND FLOW LENGTH
S	0.0052	SLOPE
N	0.060	ROUGHNESS COEFFICIENT
PA	100.0	PERCENT OF SUBBASIN

39 RK MAIN CHANNEL

L	2785.	CHANNEL LENGTH
S	0.0083	SLOPE
N	0.016	CHANNEL ROUGHNESS COEFFICIENT
CA	0.09	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	12.00	BOTTOM WIDTH OR DIAMETER
Z	1.00	SIDE SLOPE
RUPSTQ	YES	ROUTE UPSTREAM HYDROGRAPH

***

COMPUTED KINEMATIC PARAMETERS

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)
1	1.7908	1.667	15.00	577.00
3	2.0537	1.496	15.00	1392.50

HYDROGRAPH AT STATION SUB4

DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	0.	*	25 JUN 1230	51	0.27	0.02	0.25	233.
25 JUN 0015	2	0.01	0.01	0.00	0.	*	25 JUN 1245	52	0.08	0.01	0.08	258.
25 JUN 0030	3	0.01	0.01	0.00	0.	*	25 JUN 1300	53	0.06	0.00	0.06	261.
25 JUN 0045	4	0.01	0.01	0.00	0.	*	25 JUN 1315	54	0.05	0.00	0.05	233.
25 JUN 0100	5	0.01	0.01	0.00	0.	*	25 JUN 1330	55	0.04	0.00	0.04	199.
25 JUN 0115	6	0.01	0.01	0.00	0.	*	25 JUN 1345	56	0.04	0.00	0.03	166.
25 JUN 0130	7	0.01	0.01	0.00	0.	*	25 JUN 1400	57	0.03	0.00	0.03	139.
25 JUN 0145	8	0.01	0.01	0.00	0.	*	25 JUN 1415	58	0.03	0.00	0.03	118.
25 JUN 0200	9	0.01	0.01	0.00	0.	*	25 JUN 1430	59	0.03	0.00	0.03	101.
25 JUN 0215	10	0.01	0.01	0.00	0.	*	25 JUN 1445	60	0.02	0.00	0.02	87.
25 JUN 0230	11	0.01	0.01	0.00	0.	*	25 JUN 1500	61	0.02	0.00	0.02	77.
25 JUN 0245	12	0.01	0.01	0.00	0.	*	25 JUN 1515	62	0.02	0.00	0.02	68.
25 JUN 0300	13	0.01	0.01	0.00	0.	*	25 JUN 1530	63	0.02	0.00	0.02	61.
25 JUN 0315	14	0.01	0.01	0.00	0.	*	25 JUN 1545	64	0.02	0.00	0.02	55.
25 JUN 0330	15	0.01	0.01	0.00	0.	*	25 JUN 1600	65	0.02	0.00	0.02	50.
25 JUN 0345	16	0.01	0.01	0.00	0.	*	25 JUN 1615	66	0.02	0.00	0.02	46.
25 JUN 0400	17	0.01	0.01	0.00	0.	*	25 JUN 1630	67	0.02	0.00	0.02	42.
25 JUN 0415	18	0.01	0.01	0.00	0.	*	25 JUN 1645	68	0.02	0.00	0.02	39.
25 JUN 0430	19	0.01	0.01	0.00	0.	*	25 JUN 1700	69	0.02	0.00	0.01	36.
25 JUN 0445	20	0.01	0.01	0.00	0.	*	25 JUN 1715	70	0.01	0.00	0.01	34.
25 JUN 0500	21	0.01	0.01	0.00	0.	*	25 JUN 1730	71	0.01	0.00	0.01	32.
25 JUN 0515	22	0.01	0.01	0.00	0.	*	25 JUN 1745	72	0.01	0.00	0.01	30.
25 JUN 0530	23	0.01	0.01	0.00	0.	*	25 JUN 1800	73	0.01	0.00	0.01	28.
25 JUN 0545	24	0.01	0.01	0.00	0.	*	25 JUN 1815	74	0.01	0.00	0.01	27.
25 JUN 0600	25	0.01	0.01	0.00	0.	*	25 JUN 1830	75	0.01	0.00	0.01	25.
25 JUN 0615	26	0.01	0.01	0.00	0.	*	25 JUN 1845	76	0.01	0.00	0.01	24.
25 JUN 0630	27	0.01	0.01	0.00	0.	*	25 JUN 1900	77	0.01	0.00	0.01	23.
25 JUN 0645	28	0.01	0.01	0.00	0.	*	25 JUN 1915	78	0.01	0.00	0.01	22.
25 JUN 0700	29	0.01	0.01	0.00	0.	*	25 JUN 1930	79	0.01	0.00	0.01	21.
25 JUN 0715	30	0.02	0.01	0.00	0.	*	25 JUN 1945	80	0.01	0.00	0.01	20.

25 JUN 0730	31	0.02	0.01	0.00	0.	*	25 JUN 2000	81	0.01	0.00	0.01	19.
25 JUN 0745	32	0.02	0.01	0.00	0.	*	25 JUN 2015	82	0.01	0.00	0.01	18.
25 JUN 0800	33	0.02	0.01	0.00	0.	*	25 JUN 2030	83	0.01	0.00	0.01	17.
25 JUN 0815	34	0.02	0.01	0.00	0.	*	25 JUN 2045	84	0.01	0.00	0.01	17.
25 JUN 0830	35	0.02	0.01	0.00	0.	*	25 JUN 2100	85	0.01	0.00	0.01	16.
25 JUN 0845	36	0.02	0.01	0.01	0.	*	25 JUN 2115	86	0.01	0.00	0.01	16.
25 JUN 0900	37	0.02	0.02	0.01	0.	*	25 JUN 2130	87	0.01	0.00	0.01	15.
25 JUN 0915	38	0.02	0.01	0.01	0.	*	25 JUN 2145	88	0.01	0.00	0.01	15.
25 JUN 0930	39	0.02	0.02	0.01	0.	*	25 JUN 2200	89	0.01	0.00	0.01	14.
25 JUN 0945	40	0.03	0.02	0.01	0.	*	25 JUN 2215	90	0.01	0.00	0.01	14.
25 JUN 1000	41	0.03	0.02	0.01	0.	*	25 JUN 2230	91	0.01	0.00	0.01	13.
25 JUN 1015	42	0.03	0.02	0.01	1.	*	25 JUN 2245	92	0.01	0.00	0.01	13.
25 JUN 1030	43	0.03	0.02	0.02	1.	*	25 JUN 2300	93	0.01	0.00	0.01	13.
25 JUN 1045	44	0.04	0.02	0.02	1.	*	25 JUN 2315	94	0.01	0.00	0.01	12.
25 JUN 1100	45	0.05	0.02	0.02	1.	*	25 JUN 2330	95	0.01	0.00	0.01	12.
25 JUN 1115	46	0.05	0.02	0.03	2.	*	25 JUN 2345	96	0.01	0.00	0.01	12.
25 JUN 1130	47	0.07	0.03	0.04	2.	*	26 JUN 0000	97	0.01	0.00	0.01	11.
25 JUN 1145	48	0.22	0.08	0.14	3.	*	26 JUN 0015	98	0.00	0.00	0.00	11.
25 JUN 1200	49	0.47	0.11	0.36	8.	*	26 JUN 0030	99	0.00	0.00	0.00	11.
25 JUN 1215	50	1.27	0.16	1.11	35.	*	26 JUN 0045	100	0.00	0.00	0.00	10.
						*						

****

TOTAL RAINFALL = 3.82, TOTAL LOSS = 0.97, TOTAL EXCESS = 2.84

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
358.	12.75	(CFS)	105.	31.	30.	30.
		(INCHES)	1.799	2.126	2.126	2.126
		(AC-FT)	52.	62.	62.	62.

CUMULATIVE AREA = 0.54 SQ MI

*** ***

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          **************
          *            *
56 KK     *    CP9B    *
          *            *
          **************
```

58 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

59 HC HYDROGRAPH COMBINATION

ICOMP	2	NUMBER OF HYDROGRAPHS TO COMBINE

***

****

HYDROGRAPH AT STATION CP9B
SUM OF 2 HYDROGRAPHS

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLO
25 JUN 0000	1	1.	25 JUN 0615	26	0.	25 JUN 1230	51	346.	25 JUN 1845	76	34
25 JUN 0015	2	0.	25 JUN 0630	27	0.	25 JUN 1245	52	624.	25 JUN 1900	77	32
25 JUN 0030	3	0.	25 JUN 0645	28	0.	25 JUN 1300	53	524.	25 JUN 1915	78	31
25 JUN 0045	4	0.	25 JUN 0700	29	0.	25 JUN 1315	54	390.	25 JUN 1930	79	29.
25 JUN 0100	5	0.	25 JUN 0715	30	0.	25 JUN 1330	55	299.	25 JUN 1945	80	28.
25 JUN 0115	6	0.	25 JUN 0730	31	0.	25 JUN 1345	56	239.	25 JUN 2000	81	27.
25 JUN 0130	7	0.	25 JUN 0745	32	0.	25 JUN 1400	57	197.	25 JUN 2015	82	26.
25 JUN 0145	8	0.	25 JUN 0800	33	0.	25 JUN 1415	58	165.	25 JUN 2030	83	25.
25 JUN 0200	9	0.	25 JUN 0815	34	0.	25 JUN 1430	59	141.	25 JUN 2045	84	24.
25 JUN 0215	10	0.	25 JUN 0830	35	0.	25 JUN 1445	60	122.	25 JUN 2100	85	23.
25 JUN 0230	11	0.	25 JUN 0845	36	0.	25 JUN 1500	61	107.	25 JUN 2115	86	22.
25 JUN 0245	12	0.	25 JUN 0900	37	0.	25 JUN 1515	62	95.	25 JUN 2130	87	22.
25 JUN 0300	13	0.	25 JUN 0915	38	0.	25 JUN 1530	63	84.	25 JUN 2145	88	21.
25 JUN 0315	14	0.	25 JUN 0930	39	0.	25 JUN 1545	64	76.	25 JUN 2200	89	20.
25 JUN 0330	15	0.	25 JUN 0945	40	0.	25 JUN 1600	65	69.	25 JUN 2215	90	20.
25 JUN 0345	16	0.	25 JUN 1000	41	1.	25 JUN 1615	66	63.	25 JUN 2230	91	19.
25 JUN 0400	17	0.	25 JUN 1015	42	1.	25 JUN 1630	67	58.	25 JUN 2245	92	19.
25 JUN 0415	18	0.	25 JUN 1030	43	1.	25 JUN 1645	68	54.	25 JUN 2300	93	18.
25 JUN 0430	19	0.	25 JUN 1045	44	2.	25 JUN 1700	69	51.	25 JUN 2315	94	18.
25 JUN 0445	20	0.	25 JUN 1100	45	3.	25 JUN 1715	70	47.	25 JUN 2330	95	17.
25 JUN 0500	21	0.	25 JUN 1115	46	3.	25 JUN 1730	71	45.	25 JUN 2345	96	17.
25 JUN 0515	22	0.	25 JUN 1130	47	5.	25 JUN 1745	72	42.	26 JUN 0000	97	16.
25 JUN 0530	23	0.	25 JUN 1145	48	7.	25 JUN 1800	73	40.	26 JUN 0015	98	16.
25 JUN 0545	24	0.	25 JUN 1200	49	13.	25 JUN 1815	74	38.	26 JUN 0030	99	15.
25 JUN 0600	25	0.	25 JUN 1215	50	61.	25 JUN 1830	75	36.	26 JUN 0045	100	15.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
624.	12.75	(CFS)	164.	48.	46.	46.
		(INCHES)	1.860	2.175	2.176	2.176
		(AC-FT)	81.	95.	95.	95.

CUMULATIVE AREA = 0.82 SQ MI

```
79 KK      **************
           *            *
           *    CP10C   *
           *            *
           **************

81 KO          OUTPUT CONTROL VARIABLES
                   IPRNT          1  PRINT CONTROL
                   IPLOT          0  PLOT CONTROL
                   QSCAL          0.  HYDROGRAPH PLOT SCALE

82 HC          HYDROGRAPH COMBINATION
                   ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
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HYDROGRAPH AT STATION CP10C
SUM OF 2 HYDROGRAPHS

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
25 JUN 0000	1	1.	25 JUN 0615	26	0.	25 JUN 1230	51	438.	25 JUN 1845	76	47.
25 JUN 0015	2	1.	25 JUN 0630	27	0.	25 JUN 1245	52	818.	25 JUN 1900	77	44.
25 JUN 0030	3	1.	25 JUN 0645	28	0.	25 JUN 1300	53	757.	25 JUN 1915	78	42.
25 JUN 0045	4	0.	25 JUN 0700	29	0.	25 JUN 1315	54	577.	25 JUN 1930	79	40.
25 JUN 0100	5	0.	25 JUN 0715	30	0.	25 JUN 1330	55	437.	25 JUN 1945	80	39.
25 JUN 0115	6	0.	25 JUN 0730	31	0.	25 JUN 1345	56	343.	25 JUN 2000	81	37.
25 JUN 0130	7	0.	25 JUN 0745	32	0.	25 JUN 1400	57	279.	25 JUN 2015	82	36.
25 JUN 0145	8	0.	25 JUN 0800	33	0.	25 JUN 1415	58	232.	25 JUN 2030	83	34.
25 JUN 0200	9	0.	25 JUN 0815	34	0.	25 JUN 1430	59	197.	25 JUN 2045	84	33.
25 JUN 0215	10	0.	25 JUN 0830	35	0.	25 JUN 1445	60	170.	25 JUN 2100	85	32.
25 JUN 0230	11	0.	25 JUN 0845	36	0.	25 JUN 1500	61	147.	25 JUN 2115	86	31.
25 JUN 0245	12	0.	25 JUN 0900	37	0.	25 JUN 1515	62	130.	25 JUN 2130	87	30.
25 JUN 0300	13	0.	25 JUN 0915	38	0.	25 JUN 1530	63	116.	25 JUN 2145	88	29.
25 JUN 0315	14	0.	25 JUN 0930	39	0.	25 JUN 1545	64	104.	25 JUN 2200	89	28.
25 JUN 0330	15	0.	25 JUN 0945	40	0.	25 JUN 1600	65	95.	25 JUN 2215	90	27.
25 JUN 0345	16	0.	25 JUN 1000	41	0.	25 JUN 1615	66	86.	25 JUN 2230	91	26.
25 JUN 0400	17	0.	25 JUN 1015	42	0.	25 JUN 1630	67	80.	25 JUN 2245	92	26.
25 JUN 0415	18	0.	25 JUN 1030	43	1.	25 JUN 1645	68	74.	25 JUN 2300	93	25.
25 JUN 0430	19	0.	25 JUN 1045	44	1.	25 JUN 1700	69	69.	25 JUN 2315	94	24.
25 JUN 0445	20	0.	25 JUN 1100	45	2.	25 JUN 1715	70	65.	25 JUN 2330	95	24.
25 JUN 0500	21	0.	25 JUN 1115	46	3.	25 JUN 1730	71	61.	25 JUN 2345	96	23.
25 JUN 0515	22	0.	25 JUN 1130	47	4.	25 JUN 1745	72	58.	26 JUN 0000	97	23.
25 JUN 0530	23	0.	25 JUN 1145	48	6.	25 JUN 1800	73	54.	26 JUN 0015	98	22.
25 JUN 0545	24	0.	25 JUN 1200	49	13.	25 JUN 1815	74	52.	26 JUN 0030	99	21.
25 JUN 0600	25	0.	25 JUN 1215	50	103.	25 JUN 1830	75	49.	26 JUN 0045	100	20.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
818.	12.75	(CFS)	228.	66.	64.	64.
		(INCHES)	1.861	2.170	2.171	2.171
		(AC-FT)	113.	132.	132.	132.

CUMULATIVE AREA = 1.14 SQ MI

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        *            *
89 KK   *   SUB11    *
        *            *
        **************
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91 KO OUTPUT CONTROL VARIABLES

```
                IPRNT          1  PRINT CONTROL
                IPLOT          0  PLOT CONTROL
                QSCAL         0.  HYDROGRAPH PLOT SCALE

          SUBBASIN RUNOFF DATA

92 BA       SUBBASIN CHARACTERISTICS
                TAREA       0.06  SUBBASIN AREA

            PRECIPITATION DATA

10 PH                          DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
          ..... HYDRO-35 ......  ............... TP-40 ...............  ........... TP-49 ...........
          5-MIN  15-MIN  60-MIN   2-HR   3-HR   6-HR  12-HR  24-HR  2-DAY  4-DAY  7-DAY 10-DAY
           0.65   1.27   2.23   2.49   2.67   3.01   3.41   3.82   0.00   0.00   0.00   0.00

                                        STORM AREA =    0.06

93 LS       SCS LOSS RATE
                STRTL       0.22  INITIAL ABSTRACTION
               CRVNBR      90.00  CURVE NUMBER
                RTIMP       0.00  PERCENT IMPERVIOUS AREA

            KINEMATIC WAVE
94 UK         OVERLAND-FLOW ELEMENT NO. 1
                  L        1745.  OVERLAND FLOW LENGTH
                  S       0.0080  SLOPE
                  N        0.070  ROUGHNESS COEFFICIENT
                 PA        100.0  PERCENT OF SUBBASIN
95 RK         MAIN CHANNEL
                  L        1325.  CHANNEL LENGTH
                  S       0.0072  SLOPE
                  N        0.016  CHANNEL ROUGHNESS COEFFICIENT
                 CA         0.06  CONTRIBUTING AREA
              SHAPE         TRAP  CHANNEL SHAPE
                 WD        16.00  BOTTOM WIDTH OR DIAMETER
                  Z         1.00  SIDE SLOPE
             RUPSTQ          YES  ROUTE UPSTREAM HYDROGRAPH

                                                  ***

      COMPUTED KINEMATIC PARAMETERS
          ELEMENT     ALPHA        M      DT (MIN)   DX (FT)
                1    1.9039    1.667        15.00     872.50
                3    1.5931    1.523        15.00     662.50

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                                    HYDROGRAPH AT STATION    SUB11

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                                                                                *
  DA MON HRMN  ORD   RAIN   LOSS  EXCESS    COMP Q      *    DA MON HRMN  ORD   RAIN   LOSS  EXCESS    COMP Q
                                                                                *
  25 JUN 0000    1   0.00   0.00   0.00        1.      *    25 JUN 1230   51   0.27   0.02   0.25       507.
  25 JUN 0015    2   0.01   0.01   0.00        1.      *    25 JUN 1245   52   0.08   0.01   0.07       928.
  25 JUN 0030    3   0.01   0.01   0.00        1.      *    25 JUN 1300   53   0.06   0.00   0.05       831.
  25 JUN 0045    4   0.01   0.01   0.00        1.      *    25 JUN 1315   54   0.05   0.00   0.05       646.
  25 JUN 0100    5   0.01   0.01   0.00        1.      *    25 JUN 1330   55   0.04   0.00   0.04       493.
  25 JUN 0115    6   0.01   0.01   0.00        0.      *    25 JUN 1345   56   0.04   0.00   0.03       386.
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25 JUN 0130	7	0.01	0.01	0.00	0.	*	25 JUN 1400	57	0.03	0.00	0.03	312.
25 JUN 0145	8	0.01	0.01	0.00	0.	*	25 JUN 1415	58	0.03	0.00	0.03	259.
25 JUN 0200	9	0.01	0.01	0.00	0.	*	25 JUN 1430	59	0.03	0.00	0.03	220.
25 JUN 0215	10	0.01	0.01	0.00	0.	*	25 JUN 1445	60	0.02	0.00	0.02	189.
25 JUN 0230	11	0.01	0.01	0.00	0.	*	25 JUN 1500	61	0.02	0.00	0.02	164.
25 JUN 0245	12	0.01	0.01	0.00	0.	*	25 JUN 1515	62	0.02	0.00	0.02	145.
25 JUN 0300	13	0.01	0.01	0.00	0.	*	25 JUN 1530	63	0.02	0.00	0.02	129.
25 JUN 0315	14	0.01	0.01	0.00	0.	*	25 JUN 1545	64	0.02	0.00	0.02	116.
25 JUN 0330	15	0.01	0.01	0.00	0.	*	25 JUN 1600	65	0.02	0.00	0.02	106.
25 JUN 0345	16	0.01	0.01	0.00	0.	*	25 JUN 1615	66	0.02	0.00	0.02	96.
25 JUN 0400	17	0.01	0.01	0.00	0.	*	25 JUN 1630	67	0.02	0.00	0.02	89.
25 JUN 0415	18	0.01	0.01	0.00	0.	*	25 JUN 1645	68	0.02	0.00	0.02	82.
25 JUN 0430	19	0.01	0.01	0.00	0.	*	25 JUN 1700	69	0.02	0.00	0.01	77.
25 JUN 0445	20	0.01	0.01	0.00	0.	*	25 JUN 1715	70	0.01	0.00	0.01	72.
25 JUN 0500	21	0.01	0.01	0.00	0.	*	25 JUN 1730	71	0.01	0.00	0.01	68.
25 JUN 0515	22	0.01	0.01	0.00	0.	*	25 JUN 1745	72	0.01	0.00	0.01	64.
25 JUN 0530	23	0.01	0.01	0.00	0.	*	25 JUN 1800	73	0.01	0.00	0.01	61.
25 JUN 0545	24	0.01	0.01	0.00	0.	*	25 JUN 1815	74	0.01	0.00	0.01	57.
25 JUN 0600	25	0.01	0.01	0.00	0.	*	25 JUN 1830	75	0.01	0.00	0.01	55.
25 JUN 0615	26	0.01	0.01	0.00	0.	*	25 JUN 1845	76	0.01	0.00	0.01	52.
25 JUN 0630	27	0.01	0.01	0.00	0.	*	25 JUN 1900	77	0.01	0.00	0.01	49.
25 JUN 0645	28	0.01	0.01	0.00	0.	*	25 JUN 1915	78	0.01	0.00	0.01	47.
25 JUN 0700	29	0.01	0.01	0.00	0.	*	25 JUN 1930	79	0.01	0.00	0.01	45.
25 JUN 0715	30	0.02	0.01	0.00	0.	*	25 JUN 1945	80	0.01	0.00	0.01	43.
25 JUN 0730	31	0.02	0.01	0.00	0.	*	25 JUN 2000	81	0.01	0.00	0.01	41.
25 JUN 0745	32	0.02	0.01	0.00	0.	*	25 JUN 2015	82	0.01	0.00	0.01	40.
25 JUN 0800	33	0.02	0.01	0.00	0.	*	25 JUN 2030	83	0.01	0.00	0.01	38.
25 JUN 0815	34	0.02	0.01	0.00	0.	*	25 JUN 2045	84	0.01	0.00	0.01	37.
25 JUN 0830	35	0.02	0.02	0.00	0.	*	25 JUN 2100	85	0.01	0.00	0.01	35.
25 JUN 0845	36	0.02	0.02	0.00	0.	*	25 JUN 2115	86	0.01	0.00	0.01	34.
25 JUN 0900	37	0.02	0.02	0.01	0.	*	25 JUN 2130	87	0.01	0.00	0.01	33.
25 JUN 0915	38	0.02	0.02	0.01	0.	*	25 JUN 2145	88	0.01	0.00	0.01	32.
25 JUN 0930	39	0.02	0.02	0.01	0.	*	25 JUN 2200	89	0.01	0.00	0.01	31.
25 JUN 0945	40	0.03	0.02	0.01	0.	*	25 JUN 2215	90	0.01	0.00	0.01	30.
25 JUN 1000	41	0.03	0.02	0.01	0.	*	25 JUN 2230	91	0.01	0.00	0.01	29.
25 JUN 1015	42	0.03	0.02	0.01	0.	*	25 JUN 2245	92	0.01	0.00	0.01	29.
25 JUN 1030	43	0.03	0.02	0.01	0.	*	25 JUN 2300	93	0.01	0.00	0.01	28.
25 JUN 1045	44	0.04	0.02	0.02	1.	*	25 JUN 2315	94	0.01	0.00	0.01	27.
25 JUN 1100	45	0.05	0.02	0.02	2.	*	25 JUN 2330	95	0.01	0.00	0.01	26.
25 JUN 1115	46	0.05	0.03	0.03	3.	*	25 JUN 2345	96	0.01	0.00	0.01	26.
25 JUN 1130	47	0.07	0.03	0.04	4.	*	26 JUN 0000	97	0.01	0.00	0.01	25.
25 JUN 1145	48	0.22	0.09	0.13	6.	*	26 JUN 0015	98	0.00	0.00	0.00	25.
25 JUN 1200	49	0.47	0.13	0.34	14.	*	26 JUN 0030	99	0.00	0.00	0.00	24.
25 JUN 1215	50	1.27	0.18	1.09	95.	*	26 JUN 0045	100	0.00	0.00	0.00	23.
						*						

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TOTAL RAINFALL = 3.82, TOTAL LOSS = 1.07, TOTAL EXCESS = 2.75

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
928.	12.75	(CFS)	255.	74.	72.	72.
		(INCHES)	1.876	2.184	2.185	2.185
		(AC-FT)	126.	147.	147.	147.

CUMULATIVE AREA = 1.26 SQ MI

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*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 96 KK    *    SUB12   *
          *            *
          **************

 98 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          1  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

            SUBBASIN RUNOFF DATA

 99 BA          SUBBASIN CHARACTERISTICS
                     TAREA       0.10  SUBBASIN AREA

            PRECIPITATION DATA

 10 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
            ..... HYDRO-35 .......   ............... TP-40 ...............   ........... TP-49 ...........
            5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
             0.65    1.27    2.23    2.49    2.67    3.01    3.41    3.82    0.00    0.00    0.00    0.00

                                                   STORM AREA =    0.10

 100 LS         SCS LOSS RATE
                     STRTL       0.22  INITIAL ABSTRACTION
                    CRVNBR      90.00  CURVE NUMBER
                     RTIMP       0.00  PERCENT IMPERVIOUS AREA

            KINEMATIC WAVE
 101 UK          OVERLAND FLOW ELEMENT NO. 1
                         L      1440.  OVERLAND FLOW LENGTH
                         S     0.0083  SLOPE
                         N      0.060  ROUGHNESS COEFFICIENT
                        PA      100.0  PERCENT OF SUBBASIN
 102 RK          MAIN CHANNEL
                         L      2665.  CHANNEL LENGTH
                         S     0.0071  SLOPE
                         N      0.016  CHANNEL ROUGHNESS COEFFICIENT
                        CA       0.10  CONTRIBUTING AREA
                     SHAPE       TRAP  CHANNEL SHAPE
                        WD      17.00  BOTTOM WIDTH OR DIAMETER
                         Z       1.00  SIDE SLOPE
                    RUPSTQ        YES  ROUTE UPSTREAM HYDROGRAPH

                                                   ***

        COMPUTED KINEMATIC PARAMETERS
            ELEMENT    ALPHA       M      DT (MIN)   DX (FT)
                  1   2.2624   1.667       15.00     720.00
                  3   1.5192   1.528       15.00    1332.50

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                                        HYDROGRAPH AT STATION    SUB12
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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	1.	25 JUN 1230	51	0.27	0.02	0.25	570.
25 JUN 0015	2	0.01	0.01	0.00	1.	25 JUN 1245	52	0.08	0.01	0.07	1044.
25 JUN 0030	3	0.01	0.01	0.00	1.	25 JUN 1300	53	0.06	0.00	0.05	884.
25 JUN 0045	4	0.01	0.01	0.00	1.	25 JUN 1315	54	0.05	0.00	0.05	703.
25 JUN 0100	5	0.01	0.01	0.00	1.	25 JUN 1330	55	0.04	0.00	0.04	541.
25 JUN 0115	6	0.01	0.01	0.00	1.	25 JUN 1345	56	0.04	0.00	0.03	424.
25 JUN 0130	7	0.01	0.01	0.00	1.	25 JUN 1400	57	0.03	0.00	0.03	342.
25 JUN 0145	8	0.01	0.01	0.00	0.	25 JUN 1415	58	0.03	0.00	0.03	284.
25 JUN 0200	9	0.01	0.01	0.00	0.	25 JUN 1430	59	0.03	0.00	0.03	240.
25 JUN 0215	10	0.01	0.01	0.00	0.	25 JUN 1445	60	0.02	0.00	0.02	206.
25 JUN 0230	11	0.01	0.01	0.00	0.	25 JUN 1500	61	0.02	0.00	0.02	179.
25 JUN 0245	12	0.01	0.01	0.00	0.	25 JUN 1515	62	0.02	0.00	0.02	158.
25 JUN 0300	13	0.01	0.01	0.00	0.	25 JUN 1530	63	0.02	0.00	0.02	141.
25 JUN 0315	14	0.01	0.01	0.00	0.	25 JUN 1545	64	0.02	0.00	0.02	127.
25 JUN 0330	15	0.01	0.01	0.00	0.	25 JUN 1600	65	0.02	0.00	0.02	115.
25 JUN 0345	16	0.01	0.01	0.00	0.	25 JUN 1615	66	0.02	0.00	0.02	105.
25 JUN 0400	17	0.01	0.01	0.00	0.	25 JUN 1630	67	0.02	0.00	0.02	97.
25 JUN 0415	18	0.01	0.01	0.00	0.	25 JUN 1645	68	0.02	0.00	0.02	90.
25 JUN 0430	19	0.01	0.01	0.00	0.	25 JUN 1700	69	0.02	0.00	0.01	84.
25 JUN 0445	20	0.01	0.01	0.00	0.	25 JUN 1715	70	0.01	0.00	0.01	78.
25 JUN 0500	21	0.01	0.01	0.00	0.	25 JUN 1730	71	0.01	0.00	0.01	74.
25 JUN 0515	22	0.01	0.01	0.00	0.	25 JUN 1745	72	0.01	0.00	0.01	70.
25 JUN 0530	23	0.01	0.01	0.00	0.	25 JUN 1800	73	0.01	0.00	0.01	66.
25 JUN 0545	24	0.01	0.01	0.00	0.	25 JUN 1815	74	0.01	0.00	0.01	62.
25 JUN 0600	25	0.01	0.01	0.00	0.	25 JUN 1830	75	0.01	0.00	0.01	59.
25 JUN 0615	26	0.01	0.01	0.00	0.	25 JUN 1845	76	0.01	0.00	0.01	56.
25 JUN 0630	27	0.01	0.01	0.00	0.	25 JUN 1900	77	0.01	0.00	0.01	54.
25 JUN 0645	28	0.01	0.01	0.00	0.	25 JUN 1915	78	0.01	0.00	0.01	51.
25 JUN 0700	29	0.01	0.01	0.00	0.	25 JUN 1930	79	0.01	0.00	0.01	49.
25 JUN 0715	30	0.02	0.01	0.00	0.	25 JUN 1945	80	0.01	0.00	0.01	47.
25 JUN 0730	31	0.02	0.01	0.00	0.	25 JUN 2000	81	0.01	0.00	0.01	45.
25 JUN 0745	32	0.02	0.01	0.00	0.	25 JUN 2015	82	0.01	0.00	0.01	43.
25 JUN 0800	33	0.02	0.01	0.00	0.	25 JUN 2030	83	0.01	0.00	0.01	41.
25 JUN 0815	34	0.02	0.01	0.00	0.	25 JUN 2045	84	0.01	0.00	0.01	40.
25 JUN 0830	35	0.02	0.02	0.00	0.	25 JUN 2100	85	0.01	0.00	0.01	38.
25 JUN 0845	36	0.02	0.02	0.00	0.	25 JUN 2115	86	0.01	0.00	0.01	37.
25 JUN 0900	37	0.02	0.02	0.01	0.	25 JUN 2130	87	0.01	0.00	0.01	36.
25 JUN 0915	38	0.02	0.02	0.01	0.	25 JUN 2145	88	0.01	0.00	0.01	35.
25 JUN 0930	39	0.02	0.02	0.01	0.	25 JUN 2200	89	0.01	0.00	0.01	34.
25 JUN 0945	40	0.03	0.02	0.01	0.	25 JUN 2215	90	0.01	0.00	0.01	33.
25 JUN 1000	41	0.03	0.02	0.01	0.	25 JUN 2230	91	0.01	0.00	0.01	32.
25 JUN 1015	42	0.03	0.02	0.01	1.	25 JUN 2245	92	0.01	0.00	0.01	31.
25 JUN 1030	43	0.03	0.02	0.01	1.	25 JUN 2300	93	0.01	0.00	0.01	30.
25 JUN 1045	44	0.04	0.02	0.02	1.	25 JUN 2315	94	0.01	0.00	0.01	29.
25 JUN 1100	45	0.05	0.02	0.02	2.	25 JUN 2330	95	0.01	0.00	0.01	29.
25 JUN 1115	46	0.05	0.03	0.03	3.	25 JUN 2345	96	0.01	0.00	0.01	28.
25 JUN 1130	47	0.07	0.03	0.04	5.	26 JUN 0000	97	0.01	0.00	0.01	27.
25 JUN 1145	48	0.22	0.09	0.13	8.	26 JUN 0015	98	0.00	0.00	0.00	27.
25 JUN 1200	49	0.47	0.13	0.34	18.	26 JUN 0030	99	0.00	0.00	0.00	26.
25 JUN 1215	50	1.27	0.18	1.08	95.	26 JUN 0045	100	0.00	0.00	0.00	25.

TOTAL RAINFALL = 3.82, TOTAL LOSS = 1.07, TOTAL EXCESS = 2.75

PEAK FLOW TIME MAXIMUM AVERAGE FLOW

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  (CFS)      (HR)                 6-HR       24-HR       72-HR     24.75-HR
   1044.    12.75      (CFS)     279.         81.         79.         79.
                     (INCHES)    1.902       2.213       2.213       2.213
                      (AC-FT)    138.        161.        161.        161.

                   CUMULATIVE AREA =    1.36 SQ MI


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          **************
          *            *
 103 KK   *    SUB13   *
          *            *
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 105 KO        OUTPUT CONTROL VARIABLES
                   IPRNT          1  PRINT CONTROL
                   IPLOT          0  PLOT CONTROL
                   QSCAL         0.  HYDROGRAPH PLOT SCALE

            SUBBASIN RUNOFF DATA

 106 BA        SUBBASIN CHARACTERISTICS
                   TAREA       0.14  SUBBASIN AREA

               PRECIPITATION DATA

 10 PH                          DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....  ............... TP-40 ...............  ........... TP-49 ...........
               5-MIN 15-MIN 60-MIN   2-HR   3-HR   6-HR  12-HR  24-HR  2-DAY  4-DAY  7-DAY 10-DAY
                0.65   1.27   2.23   2.49   2.67   3.01   3.41   3.82   0.00   0.00   0.00   0.00

                                                STORM AREA =    0.14

 107 LS        SCS LOSS RATE
                   STRTL       0.38  INITIAL ABSTRACTION
                   CRVNBR     84.00  CURVE NUMBER
                   RTIMP       0.00  PERCENT IMPERVIOUS AREA

               KINEMATIC WAVE
 108 UK         OVERLAND-FLOW ELEMENT NO. 1
                       L      1460.  OVERLAND FLOW LENGTH
                       S     0.0061  SLOPE
                       N      0.060  ROUGHNESS COEFFICIENT
                      PA      100.0  PERCENT OF SUBBASIN
 109 RK         MAIN CHANNEL
                       L      4000.  CHANNEL LENGTH
                       S     0.0053  SLOPE
                       N      0.016  CHANNEL ROUGHNESS COEFFICIENT
                      CA       0.14  CONTRIBUTING AREA
                   SHAPE       TRAP  CHANNEL SHAPE
                      WD      17.00  BOTTOM WIDTH OR DIAMETER
                       Z       1.00  SIDE SLOPE
                  RUPSTQ        YES  ROUTE UPSTREAM HYDROGRAPH

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COMPUTED KINEMATIC PARAMETERS

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)
1	1.9395	1.667	15.00	730.00
3	1.3126	1.528	15.00	2000.00

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HYDROGRAPH AT STATION SUB13

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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	1.	*	25 JUN 1230	51	0.27	0.05	0.22	528.
25 JUN 0015	2	0.01	0.01	0.00	1.	*	25 JUN 1245	52	0.08	0.01	0.07	1069.
25 JUN 0030	3	0.01	0.01	0.00	1.	*	25 JUN 1300	53	0.06	0.01	0.05	991.
25 JUN 0045	4	0.01	0.01	0.00	1.	*	25 JUN 1315	54	0.05	0.01	0.04	797.
25 JUN 0100	5	0.01	0.01	0.00	1.	*	25 JUN 1330	55	0.04	0.01	0.04	620.
25 JUN 0115	6	0.01	0.01	0.00	1.	*	25 JUN 1345	56	0.04	0.01	0.03	486.
25 JUN 0130	7	0.01	0.01	0.00	1.	*	25 JUN 1400	57	0.03	0.01	0.03	390.
25 JUN 0145	8	0.01	0.01	0.00	1.	*	25 JUN 1415	58	0.03	0.00	0.03	322.
25 JUN 0200	9	0.01	0.01	0.00	1.	*	25 JUN 1430	59	0.03	0.00	0.02	272.
25 JUN 0215	10	0.01	0.01	0.00	0.	*	25 JUN 1445	60	0.02	0.00	0.02	233.
25 JUN 0230	11	0.01	0.01	0.00	0.	*	25 JUN 1500	61	0.02	0.00	0.02	202.
25 JUN 0245	12	0.01	0.01	0.00	0.	*	25 JUN 1515	62	0.02	0.00	0.02	178.
25 JUN 0300	13	0.01	0.01	0.00	0.	*	25 JUN 1530	63	0.02	0.00	0.02	158.
25 JUN 0315	14	0.01	0.01	0.00	0.	*	25 JUN 1545	64	0.02	0.00	0.02	142.
25 JUN 0330	15	0.01	0.01	0.00	0.	*	25 JUN 1600	65	0.02	0.00	0.02	129.
25 JUN 0345	16	0.01	0.01	0.00	0.	*	25 JUN 1615	66	0.02	0.00	0.02	118.
25 JUN 0400	17	0.01	0.01	0.00	0.	*	25 JUN 1630	67	0.02	0.00	0.01	108.
25 JUN 0415	18	0.01	0.01	0.00	0.	*	25 JUN 1645	68	0.02	0.00	0.01	100.
25 JUN 0430	19	0.01	0.01	0.00	0.	*	25 JUN 1700	69	0.02	0.00	0.01	93.
25 JUN 0445	20	0.01	0.01	0.00	0.	*	25 JUN 1715	70	0.01	0.00	0.01	87.
25 JUN 0500	21	0.01	0.01	0.00	0.	*	25 JUN 1730	71	0.01	0.00	0.01	82.
25 JUN 0515	22	0.01	0.01	0.00	0.	*	25 JUN 1745	72	0.01	0.00	0.01	78.
25 JUN 0530	23	0.01	0.01	0.00	0.	*	25 JUN 1800	73	0.01	0.00	0.01	73.
25 JUN 0545	24	0.01	0.01	0.00	0.	*	25 JUN 1815	74	0.01	0.00	0.01	70.
25 JUN 0600	25	0.01	0.01	0.00	0.	*	25 JUN 1830	75	0.01	0.00	0.01	66.
25 JUN 0615	26	0.01	0.01	0.00	0.	*	25 JUN 1845	76	0.01	0.00	0.01	63.
25 JUN 0630	27	0.01	0.01	0.00	0.	*	25 JUN 1900	77	0.01	0.00	0.01	60.
25 JUN 0645	28	0.01	0.01	0.00	0.	*	25 JUN 1915	78	0.01	0.00	0.01	57.
25 JUN 0700	29	0.01	0.01	0.00	0.	*	25 JUN 1930	79	0.01	0.00	0.01	54.
25 JUN 0715	30	0.02	0.02	0.00	0.	*	25 JUN 1945	80	0.01	0.00	0.01	52.
25 JUN 0730	31	0.02	0.02	0.00	0.	*	25 JUN 2000	81	0.01	0.00	0.01	50.
25 JUN 0745	32	0.02	0.02	0.00	0.	*	25 JUN 2015	82	0.01	0.00	0.01	48.
25 JUN 0800	33	0.02	0.02	0.00	0.	*	25 JUN 2030	83	0.01	0.00	0.01	46.
25 JUN 0815	34	0.02	0.02	0.00	0.	*	25 JUN 2045	84	0.01	0.00	0.01	44.
25 JUN 0830	35	0.02	0.02	0.00	0.	*	25 JUN 2100	85	0.01	0.00	0.01	43.
25 JUN 0845	36	0.02	0.02	0.00	0.	*	25 JUN 2115	86	0.01	0.00	0.01	41.
25 JUN 0900	37	0.02	0.02	0.00	0.	*	25 JUN 2130	87	0.01	0.00	0.01	40.
25 JUN 0915	38	0.02	0.02	0.00	0.	*	25 JUN 2145	88	0.01	0.00	0.01	39.
25 JUN 0930	39	0.02	0.02	0.00	0.	*	25 JUN 2200	89	0.01	0.00	0.01	37.
25 JUN 0945	40	0.03	0.02	0.00	0.	*	25 JUN 2215	90	0.01	0.00	0.01	36.
25 JUN 1000	41	0.03	0.03	0.00	0.	*	25 JUN 2230	91	0.01	0.00	0.01	35.
25 JUN 1015	42	0.03	0.03	0.00	0.	*	25 JUN 2245	92	0.01	0.00	0.01	34.
25 JUN 1030	43	0.03	0.03	0.01	0.	*	25 JUN 2300	93	0.01	0.00	0.01	33.
25 JUN 1045	44	0.04	0.03	0.01	1.	*	25 JUN 2315	94	0.01	0.00	0.01	33.
25 JUN 1100	45	0.05	0.04	0.01	1.	*	25 JUN 2330	95	0.01	0.00	0.01	32.
25 JUN 1115	46	0.05	0.04	0.01	2.	*	25 JUN 2345	96	0.01	0.00	0.01	31.

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25 JUN 1130  47   0.07   0.05   0.02      3.    *    26 JUN 0000  97   0.01   0.00   0.01      30.
25 JUN 1145  48   0.22   0.14   0.08      5.    *    26 JUN 0015  98   0.00   0.00   0.00      30.
25 JUN 1200  49   0.47   0.23   0.24     12.    *    26 JUN 0030  99   0.00   0.00   0.00      29.
25 JUN 1215  50   1.27   0.36   0.91     65.    *    26 JUN 0045 100   0.00   0.00   0.00      28.
                                                  *
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TOTAL RAINFALL =  3.82, TOTAL LOSS =  1.61, TOTAL EXCESS =  2.21

PEAK FLOW    TIME                          MAXIMUM AVERAGE FLOW
  (CFS)      (HR)                  6-HR      24-HR      72-HR     24.75-HR
  1069.     12.75       (CFS)      305.       89.        86.        86.
                      (INCHES)    1.890      2.193      2.194      2.194
                       (AC-FT)     151.      176.       176.       176.

                    CUMULATIVE AREA =    1.50 SQ MI


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          *            *
242 KK    *   SUB29    *
          *            *
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244 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          1  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

                SUBBASIN RUNOFF DATA

245 BA          SUBBASIN CHARACTERISTICS
                     TAREA       0.32  SUBBASIN AREA

                PRECIPITATION DATA

10 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....  ............... TP-40 ...............  ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN   2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 0.65    1.27    2.23    2.49    2.67    3.01    3.41    3.82    0.00    0.00    0.00    0.00

                                                STORM AREA =    0.32

246 LS          SCS LOSS RATE
                     STRTL       0.17  INITIAL ABSTRACTION
                    CRVNBR      92.00  CURVE NUMBER
                     RTIMP       0.00  PERCENT IMPERVIOUS AREA

                LOSS RATE VARIABLES FOR SECOND OVERLAND FLOW ELEMENT
                     STRTL       0.17  INITIAL ABSTRACTION
                    CRVNBR      92.00  CURVE NUMBER
                     RTIMP       0.00  PERCENT IMPERVIOUS AREA

                KINEMATIC WAVE
247 UK          OVERLAND-FLOW ELEMENT NO. 1
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L 745. OVERLAND FLOW LENGTH
S 0.0054 SLOPE
N 0.060 ROUGHNESS COEFFICIENT
PA 32.5 PERCENT OF SUBBASIN

248 UK OVERLAND-FLOW ELEMENT NO. 2
L 1710. OVERLAND FLOW LENGTH
S 0.0064 SLOPE
N 0.060 ROUGHNESS COEFFICIENT
PA 67.5 PERCENT OF SUBBASIN

249 RK MAIN CHANNEL
L 5730. CHANNEL LENGTH
S 0.0051 SLOPE
N 0.025 CHANNEL ROUGHNESS COEFFICIENT
CA 0.32 CONTRIBUTING AREA
SHAPE TRAP CHANNEL SHAPE
WD 50.00 BOTTOM WIDTH OR DIAMETER
Z 3.90 SIDE SLOPE
RUPSTQ YES ROUTE UPSTREAM HYDROGRAPH

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COMPUTED KINEMATIC PARAMETERS

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)
1	1.8249	1.667	15.00	372.50
2	1.9867	1.667	15.00	855.00
3	0.4577	1.535	15.00	2865.00

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HYDROGRAPH AT STATION SUB29

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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	1.	*	25 JUN 1230	51	0.27	0.02	0.26	1481.
25 JUN 0015	2	0.01	0.01	0.00	1.	*	25 JUN 1245	52	0.08	0.00	0.08	2030.
25 JUN 0030	3	0.01	0.01	0.00	1.	*	25 JUN 1300	53	0.06	0.00	0.06	1935.
25 JUN 0045	4	0.01	0.01	0.00	1.	*	25 JUN 1315	54	0.05	0.00	0.05	1561.
25 JUN 0100	5	0.01	0.01	0.00	1.	*	25 JUN 1330	55	0.04	0.00	0.04	1171.
25 JUN 0115	6	0.01	0.01	0.00	0.	*	25 JUN 1345	56	0.04	0.00	0.04	864.
25 JUN 0130	7	0.01	0.01	0.00	0.	*	25 JUN 1400	57	0.03	0.00	0.03	653.
25 JUN 0145	8	0.01	0.01	0.00	0.	*	25 JUN 1415	58	0.03	0.00	0.03	514.
25 JUN 0200	9	0.01	0.01	0.00	0.	*	25 JUN 1430	59	0.03	0.00	0.03	423.
25 JUN 0215	10	0.01	0.01	0.00	0.	*	25 JUN 1445	60	0.02	0.00	0.02	359.
25 JUN 0230	11	0.01	0.01	0.00	0.	*	25 JUN 1500	61	0.02	0.00	0.02	312.
25 JUN 0245	12	0.01	0.01	0.00	0.	*	25 JUN 1515	62	0.02	0.00	0.02	276.
25 JUN 0300	13	0.01	0.01	0.00	0.	*	25 JUN 1530	63	0.02	0.00	0.02	247.
25 JUN 0315	14	0.01	0.01	0.00	0.	*	25 JUN 1545	64	0.02	0.00	0.02	223.
25 JUN 0330	15	0.01	0.01	0.00	0.	*	25 JUN 1600	65	0.02	0.00	0.02	204.
25 JUN 0345	16	0.01	0.01	0.00	0.	*	25 JUN 1615	66	0.02	0.00	0.02	187.
25 JUN 0400	17	0.01	0.01	0.00	0.	*	25 JUN 1630	67	0.02	0.00	0.02	173.
25 JUN 0415	18	0.01	0.01	0.00	0.	*	25 JUN 1645	68	0.02	0.00	0.02	162.
25 JUN 0430	19	0.01	0.01	0.00	0.	*	25 JUN 1700	69	0.02	0.00	0.01	151.
25 JUN 0445	20	0.01	0.01	0.00	0.	*	25 JUN 1715	70	0.01	0.00	0.01	142.
25 JUN 0500	21	0.01	0.01	0.00	0.	*	25 JUN 1730	71	0.01	0.00	0.01	134.
25 JUN 0515	22	0.01	0.01	0.00	0.	*	25 JUN 1745	72	0.01	0.00	0.01	127.
25 JUN 0530	23	0.01	0.01	0.00	0.	*	25 JUN 1800	73	0.01	0.00	0.01	121.
25 JUN 0545	24	0.01	0.01	0.00	0.	*	25 JUN 1815	74	0.01	0.00	0.01	115.
25 JUN 0600	25	0.01	0.01	0.00	0.	*	25 JUN 1830	75	0.01	0.00	0.01	110.

25 JUN 0615	26	0.01	0.01	0.00	0.	*	25 JUN 1845	76	0.01	0.00	0.01	105.
25 JUN 0630	27	0.01	0.01	0.00	0.	*	25 JUN 1900	77	0.01	0.00	0.01	100.
25 JUN 0645	28	0.01	0.01	0.00	0.	*	25 JUN 1915	78	0.01	0.00	0.01	96.
25 JUN 0700	29	0.01	0.01	0.00	0.	*	25 JUN 1930	79	0.01	0.00	0.01	91.
25 JUN 0715	30	0.02	0.01	0.00	0.	*	25 JUN 1945	80	0.01	0.00	0.01	88.
25 JUN 0730	31	0.02	0.01	0.00	0.	*	25 JUN 2000	81	0.01	0.00	0.01	84.
25 JUN 0745	32	0.02	0.01	0.00	0.	*	25 JUN 2015	82	0.01	0.00	0.01	81.
25 JUN 0800	33	0.02	0.01	0.00	0.	*	25 JUN 2030	83	0.01	0.00	0.01	78.
25 JUN 0815	34	0.02	0.01	0.01	0.	*	25 JUN 2045	84	0.01	0.00	0.01	75.
25 JUN 0830	35	0.02	0.01	0.01	0.	*	25 JUN 2100	85	0.01	0.00	0.01	72.
25 JUN 0845	36	0.02	0.01	0.01	0.	*	25 JUN 2115	86	0.01	0.00	0.01	70.
25 JUN 0900	37	0.02	0.01	0.01	0.	*	25 JUN 2130	87	0.01	0.00	0.01	68.
25 JUN 0915	38	0.02	0.01	0.01	0.	*	25 JUN 2145	88	0.01	0.00	0.01	66.
25 JUN 0930	39	0.02	0.01	0.01	1.	*	25 JUN 2200	89	0.01	0.00	0.01	64.
25 JUN 0945	40	0.03	0.01	0.01	1.	*	25 JUN 2215	90	0.01	0.00	0.01	62.
25 JUN 1000	41	0.03	0.02	0.01	1.	*	25 JUN 2230	91	0.01	0.00	0.01	60.
25 JUN 1015	42	0.03	0.02	0.02	2.	*	25 JUN 2245	92	0.01	0.00	0.01	59.
25 JUN 1030	43	0.03	0.02	0.02	3.	*	25 JUN 2300	93	0.01	0.00	0.01	57.
25 JUN 1045	44	0.04	0.02	0.02	5.	*	25 JUN 2315	94	0.01	0.00	0.01	56.
25 JUN 1100	45	0.05	0.02	0.03	7.	*	25 JUN 2330	95	0.01	0.00	0.01	54.
25 JUN 1115	46	0.05	0.02	0.03	11.	*	25 JUN 2345	96	0.01	0.00	0.01	53.
25 JUN 1130	47	0.07	0.03	0.04	16.	*	26 JUN 0000	97	0.01	0.00	0.01	52.
25 JUN 1145	48	0.22	0.07	0.15	28.	*	26 JUN 0015	98	0.00	0.00	0.00	50.
25 JUN 1200	49	0.47	0.10	0.37	78.	*	26 JUN 0030	99	0.00	0.00	0.00	49.
25 JUN 1215	50	1.27	0.13	1.14	469.	*	26 JUN 0045	100	0.00	0.00	0.00	47.

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TOTAL RAINFALL = 3.82, TOTAL LOSS = 0.88, TOTAL EXCESS = 2.94

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
2030.	12.75	(CFS)	579.	167.	162.	162.
		(INCHES)	1.981	2.283	2.284	2.284
		(AC-FT)	287.	331.	331.	331.

CUMULATIVE AREA = 2.72 SQ MI

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          *            *
250 KK    *    CPEND   *
          *            *
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252 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

253 HC HYDROGRAPH COMBINATION

ICOMP	2	NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION CPEND
SUM OF 2 HYDROGRAPHS

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
25 JUN 0000	1	2.	25 JUN 0615	26	0.	25 JUN 1230	51	2009.	25 JUN 1845	76	167.
25 JUN 0015	2	2.	25 JUN 0630	27	0.	25 JUN 1245	52	3099.	25 JUN 1900	77	160.
25 JUN 0030	3	2.	25 JUN 0645	28	0.	25 JUN 1300	53	2927.	25 JUN 1915	78	153.
25 JUN 0045	4	2.	25 JUN 0700	29	0.	25 JUN 1315	54	2358.	25 JUN 1930	79	146.
25 JUN 0100	5	2.	25 JUN 0715	30	0.	25 JUN 1330	55	1791.	25 JUN 1945	80	140.
25 JUN 0115	6	1.	25 JUN 0730	31	0.	25 JUN 1345	56	1350.	25 JUN 2000	81	134.
25 JUN 0130	7	1.	25 JUN 0745	32	0.	25 JUN 1400	57	1043.	25 JUN 2015	82	128.
25 JUN 0145	8	1.	25 JUN 0800	33	0.	25 JUN 1415	58	837.	25 JUN 2030	83	124.
25 JUN 0200	9	1.	25 JUN 0815	34	0.	25 JUN 1430	59	694.	25 JUN 2045	84	119.
25 JUN 0215	10	1.	25 JUN 0830	35	0.	25 JUN 1445	60	592.	25 JUN 2100	85	115.
25 JUN 0230	11	1.	25 JUN 0845	36	0.	25 JUN 1500	61	514.	25 JUN 2115	86	111.
25 JUN 0245	12	1.	25 JUN 0900	37	0.	25 JUN 1515	62	453.	25 JUN 2130	87	107.
25 JUN 0300	13	1.	25 JUN 0915	38	1.	25 JUN 1530	63	405.	25 JUN 2145	88	104.
25 JUN 0315	14	1.	25 JUN 0930	39	1.	25 JUN 1545	64	365.	25 JUN 2200	89	101.
25 JUN 0330	15	0.	25 JUN 0945	40	1.	25 JUN 1600	65	333.	25 JUN 2215	90	98.
25 JUN 0345	16	0.	25 JUN 1000	41	2.	25 JUN 1615	66	305.	25 JUN 2230	91	96.
25 JUN 0400	17	0.	25 JUN 1015	42	2.	25 JUN 1630	67	282.	25 JUN 2245	92	93.
25 JUN 0415	18	0.	25 JUN 1030	43	4.	25 JUN 1645	68	262.	25 JUN 2300	93	91.
25 JUN 0430	19	0.	25 JUN 1045	44	5.	25 JUN 1700	69	245.	25 JUN 2315	94	88.
25 JUN 0445	20	0.	25 JUN 1100	45	8.	25 JUN 1715	70	230.	25 JUN 2330	95	86.
25 JUN 0500	21	0.	25 JUN 1115	46	13.	25 JUN 1730	71	216.	25 JUN 2345	96	84.
25 JUN 0515	22	0.	25 JUN 1130	47	19.	25 JUN 1745	72	205.	26 JUN 0000	97	82.
25 JUN 0530	23	0.	25 JUN 1145	48	33.	25 JUN 1800	73	194.	26 JUN 0015	98	80.
25 JUN 0545	24	0.	25 JUN 1200	49	89.	25 JUN 1815	74	185.	26 JUN 0030	99	78.
25 JUN 0600	25	0.	25 JUN 1215	50	535.	25 JUN 1830	75	176.	26 JUN 0045	100	75.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
3099.	12.75	(CFS)	883.	255.	248.	248.
		(INCHES)	1.946	2.251	2.252	2.252
		(AC-FT)	438.	507.	507.	507.

CUMULATIVE AREA = 4.22 SQ MI

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND

TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	SUB1	79.	12.75	23.	7.	7.	0.12		
ROUTED TO	CP4A	78.	12.75	23.	7.	7.	0.12		
HYDROGRAPH AT	SUB2	53.	13.00	20.	6.	6.	0.11		
HYDROGRAPH AT	SUB3	154.	13.00	60.	18.	17.	0.33		
2 COMBINED AT	CP4B	224.	13.00	83.	25.	24.	0.45		
HYDROGRAPH AT	SUB4	358.	12.75	105.	31.	30.	0.54		
ROUTED TO	CP9A	339.	12.75	105.	31.	30.	0.54		
HYDROGRAPH AT	SUB5	255.	12.50	35.	10.	10.	0.16		
HYDROGRAPH AT	SUB6	285.	12.75	59.	17.	16.	0.28		
2 COMBINED AT	CP9B	624.	12.75	164.	48.	46.	0.82		
ROUTED TO	CP10A	579.	12.75	164.	48.	46.	0.82		
HYDROGRAPH AT	SUB7	92.	12.75	21.	6.	6.	0.11		
HYDROGRAPH AT	SUB8+9	257.	12.75	64.	18.	18.	0.32		
ROUTED TO	CP10B	239.	12.75	64.	18.	18.	0.32		
2 COMBINED AT	CP10C	818.	12.75	228.	66.	64.	1.14		
HYDROGRAPH AT	SUB10	880.	12.75	240.	70.	68.	1.20		
HYDROGRAPH AT	SUB11	938.	12.75	255.	74.	72.	1.26		
HYDROGRAPH AT	SUB12	1044.	12.75	279.	81.	79.	1.36		
HYDROGRAPH AT	SUB13	1069.	12.75	305.	89.	86.	1.50		
HYDROGRAPH AT	SUB14	185.	12.75	33.	9.	9.	0.16		
HYDROGRAPH AT	SUB15	195.	12.50	28.	8.	8.	0.14		
2 COMBINED AT	CP16	359.	12.50	61.	17.	17.	0.30		
HYDROGRAPH AT	SUB16	414.	12.50	83.	24.	23.	0.41		
HYDROGRAPH AT	SUB17	434.	12.75	97.	27.	27.	0.49		
HYDROGRAPH AT	SUB18	209.	12.75	47.	13.	13.	0.24		
2 COMBINED AT	CP19	644.	12.75	143.	41.	40.	0.73		
HYDROGRAPH AT	SUB19	712.	12.75	174.	50.	48.	0.85		
HYDROGRAPH AT	SUB20	681.	12.75	178.	51.	50.	0.88		

HYDROGRAPH AT	SUB21	270.	12.50	54.	15.	15.	0.28
HYDROGRAPH AT	SUB22	85.	12.50	12.	3.	3.	0.06
2 COMBINED AT	CP24	355.	12.50	66.	19.	18.	0.34
ROUTED TO	CP25A	306.	12.50	67.	19.	18.	0.34
HYDROGRAPH AT	SUB24	295.	12.50	42.	12.	11.	0.17
2 COMBINED AT	CP25A	601.	12.50	108.	31.	30.	0.51
ROUTED TO	CP25	564.	12.50	109.	31.	30.	0.51
HYDROGRAPH AT	SUB23	501.	12.75	117.	34.	33.	0.57
2 COMBINED AT	CP25	967.	12.75	225.	65.	63.	1.08
HYDROGRAPH AT	SUB25	1038.	12.75	255.	73.	71.	1.21
HYDROGRAPH AT	SUB26	1043.	12.75	274.	78.	76.	1.31
2 COMBINED AT	CP29A	1724.	12.75	452.	130.	126.	2.19
HYDROGRAPH AT	SUB27	166.	12.50	24.	7.	7.	0.09
HYDROGRAPH AT	SUB28	308.	12.50	49.	14.	13.	0.21
2 COMBINED AT	CP29	1924.	12.75	500.	143.	139.	2.39
HYDROGRAPH AT	SUB29	2030.	12.75	579.	167.	162.	2.72
2 COMBINED AT	CPEND	3099.	12.75	883.	255.	248.	4.22

```
*** NORMAL END OF HEC-1 ***
101
  SIMONS8      job terminated at 25-JUN-1986 14:27:03.64

  Accounting information:
  Buffered I/O count:          179     Peak working set size:   500
  Direct I/O count:            388     Peak page file size:    1843
  Page faults:                1991     Mounted volumes:           0
  Charged CPU time:     0 00:01:10.81  Elapsed time:     0 00:01:43.48
```

APPENDIX E

HEC-1 Printout, 50-Year Event, Diversion at Thunderbird Road

```
T OUTER14B24.DAT
*DIAGRAM
*NO LIST
ID        ------------ SIMONS, LI & ASSOCIATES, INC.  PAZ-DC-01 ------------
ID      DELEUW, CATHER & CO.  OUTER LOOP HIGHWAY PROJECT CONCEPT DRAINAGE PLAN
ID          DIVERSION AT THUNDERBIRD RD, EXISTING RUNOFF CHARACTERISTICS
ID           50-YR, 24-HR RAINFALL USING HYPOTHETICAL STORM DISTRIBUTION
IT  15. 25JUN86    0.     100.
IO   5.     0.
KK  SUB1
KM      RUNOFF FROM SUB-BASIN 1
BA0.1242
*       HYPOTHETICAL STORM DISTRIBUTION
PH                0.65    1.27    2.23    3.49    2.67    3.01    3.41    3.82
LS   0.     84
UK 1965.  0.0102    0.10    100.
RK 4220.  0.0101   0.016  0.1242   TRAP    10.     1.
KK  CP4A
KM      ROUTE SUB1 TO CP4
RK  500.  0.0100   0.016  0.1242   TRAP    10.     1.
KK  SUB2
KM      RUNOFF FROM SUB-BASIN 2
BA0.1106
LS   0.     84
UK 2885.  0.0099    0.10    100.
RK 1200.  0.0021   0.025  0.1106   TRAP    25.     1.
KK  SUB3
KM      RUNOFF FROM SUB-BASIN 3
BA0.2192
LS   0.     84
UK 2920.  0.0099    0.10    100.
RK 1580.  0.0027   0.025  0.3298   TRAP    25.     1.     YES
KK  CP4B
KM      COMBINE HYDROGRAPHS CP4A & SUB3
KO   1.
HC   2.
KK  SUB4
KM      RUNOFF FROM SUB-BASIN 4
KO   1.
BA0.0887
LS   0.     91
UK 1154.  0.0052    0.06    100.
RK 2785.  0.0083   0.016  0.4540   TRAP    12.     1.     YES
KK  CP9A
KM      DIVERT FLOW TO WEST SIDE OF PIMA ROAD
DTDIVERT
DI   0.    100.    200.    300.    400.    500.
DQ   0.    100.    200.    300.    400.    500.
KK  SUB5
KM      RUNOFF FROM SUB-BASIN 5
BA0.1555
LS   0.     91              0.     84.
UK  450.  0.0050   0.025   45.92
UK 3020.  0.0050   0.025   54.08
RK 2530.  0.0040   0.025  0.1555   TRAP    25.     1.
KK  SUB6
KM      RUNOFF FROM SUB-BASIN 6
BA0.1200
LS   0.     84
UK 1730.  0.0092    0.08    100.
```

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RK 2800.  0.0075   0.040  0.2280    TRAP      0.    100.     YES
KK  CP9B
KM      COMBINE HYDROGRAPHS CP9A & SUB6
KO    1.
HC    2.
KK CP10A
KM      ROUTE CP9 TO CP10
RK 2665.  0.0067   0.016  0.8182    TRAP     15.      1.
KK  SUB7
KM      RUNOFF FROM SUB-BASIN 7
BA0.1080
LS    0.      84
UK 1254.  0.0043    0.07    100.
RK 2565.  0.0082   0.040  0.1080    TRAP      0.    100.
KKSUB8+9
KM      RUNOFF FROM SUB-BASINS 8 AND 9
BA0.2118
LS    0.      88              0.     84.
UK 1025.  0.0047    0.08   39.90
UK 1635.  0.0063    0.10   60.10
RK 2665.  0.0071   0.040  0.3198    TRAP     25.      1.     YES
KK CP10B
KM      ROUTE SUB8+9 TO CP10
RK 1335.  0.0015   0.025  0.3198    TRAP     25.      1.
KK CP10C
KM      COMBINE HYDROGRAPHS CP10A & CP10B
KO    1.
HC    2.
KK SUB10
KM      RUNOFF FROM SUB-BASIN 10
BA0.0626
LS    0.      84
UK 1105.  0.0094    0.07    100.
RK 1325.  0.0072   0.016  1.1380    TRAP     15.      1.     YES
KK SUB11
KM      RUNOFF FROM SUB-BASIN 11
KO    1.
BA0.0626
LS    0.      90
UK 1745.  0.0080    0.07    100.
RK 1325.  0.0072   0.016  1.2014    TRAP     16.      1.     YES
KK SUB12
KM      RUNOFF FROM SUB-BASIN 12
KO    1.
BA0.1012
LS    0.      90
UK 1440.  0.0083    0.06    100.
RK 2665.  0.0071   0.016  1.2632    TRAP     17.      1.     YES
KK SUB13
KM      RUNOFF FROM SUB-BASIN 13
KO    1.
BA0.1374
LS    0.      84.
UK 1460.  0.0061    0.06    100.
RK 4000.  0.0053   0.016  1.4006    TRAP     17.      1.     YES
KK SUB14
KM      RUNOFF FROM SUB-BASIN 14
BA0.1611
LS    0.      84              0.     84
UK 1075.  0.0140    0.10   64.31
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UK  661.  0.0136    0.10   35.69
RK 5360.  0.0080   0.025  0.1611    TRAP      5.      8.
KK SUB15
KM      RUNOFF FROM SUB-BASIN 15
BA0.1402
LS    0.      84              0.      84
UK  365.  0.0133    0.10   33.31
UK  855.  0.0129    0.10   66.69
RK 5310.  0.0075   0.037  0.1402    TRAP      6.      5.
KK  CP16
KM      COMBINE HYDROGRAPHS SUB14 & SUB15
HC    2.
KK SUB16
KM      RUNOFF FROM SUB-BASIN 16
BA0.1133
LS    0.      84              0.      84
UK  830.  0.0102    0.10   24.54
UK 1170.  0.0098    0.10   75.46
RK 1895.  0.0095   0.037  0.1133    TRAP      6.      5.     YES
KK SUB17
KM      RUNOFF FROM SUB-BASIN 17
BA0.0712
LS    0.      84.             0.      84.
UK  240.  0.0085    0.09   53.79
UK  210.  0.0143    0.09   46.21
RK 5970.  0.0069   0.025  0.0712    TRAP      5.      6.     YES
KK SUB18
KM      RUNOFF FROM SUB-BASIN 18
BA0.2398
LS    0.      84.             0.      84.
UK  235.  0.0128    0.09   26.31
UK 1020.  0.0098    0.09   73.69
RK 7590.  0.0074   0.065  0.2398    TRAP      0.      9.
KK  CP19
KM      COMBINE HYDROGRAPHS SUB17 & SUB18
HC    2.
KK SUB19
KM      RUNOFF FROM SUB-BASIN 19
BA0.1288
LS    0.      90.             0.      90.
UK 1175.  0.0042    0.07   54.81
UK 1040.  0.0030    0.07   45.19
RK 2850.  0.0053   0.016  0.1288    TRAP      6.      6.     YES
KK SUB20
KM      RUNOFF FROM SUB-BASIN 20
BA0.0218
LS    0.      90.             0.      90.
UK  120.  0.0083    0.06   16.97
UK  715.  0.0098    0.06   83.03
RK 1510.  0.0079   0.032  0.0218    TRAP     10.      6.     YES
KK SUB21
KM      RUNOFF FROM SUB-BASIN 21
BA0.2765
LS    0.      84.             0.      84.
UK  410.  0.0098    0.09   26.15
UK 1755.  0.0134    0.09   73.85
RK 6560.  0.0120   0.035  0.2765    TRAP      1.      7.
KK SUB22
KM      RUNOFF FROM SUB-BASIN 22
BA0.0595
```

```
LS    0.     84.              0.     84.
UK  370.  0.0176    0.09   50.76
UK  490.  0.0179    0.09   49.24
RK 3630.  0.0152    0.03  0.0595    TRAP      1.      13.
KK  CP24
KM      COMBINE HYDROGRAPHS SUB21 & SUB22
HC    2.
KK CP25A
KM      ROUTE CP24 TO CP25A
RK 1992.  0.0080   0.025  0.3360    TRAP      3.       7.
KK SUB24
KM      RUNOFF FROM SUB-BASIN 24
BA0.1711
LS    0.     90.              0.     90.
UK  175.  0.0171    0.09   19.70
UK  955.  0.0168    0.09   80.30
RK 7505.  0.0120   0.025  0.1711    TRAP      3.       7.
KK CP25A
KM      COMBINE CP24 & SUB24
HC    2.
KK  CP25
KM      ROUTE CP25A TO CP25
RK 1023.  0.0049   0.035  0.5071    TRAP      8.       4.
KK SUB23
KM      RUNOFF FROM SUB-BASIN 23
BA0.5706
LS    0.     86.              0.     86.
UK 1605.  0.0125    0.10   74.26
UK  610.  0.0172    0.10   25.74
RK11130.  0.0079   0.035  0.5706    TRAP      8.       4.
KK  CP25
KM      COMBINE HYDROGRAPHS CP25A & SUB23
HC    2.
KK SUB25
KM      RUNOFF FROM SUB-BASIN 25
BA0.1364
LS    0.     86.              0.     90.
UK 1400.  0.0030    0.10   47.87
UK  885.  0.0030    0.07   52.13
RK 2655.  0.0068   0.036  0.1364    TRAP     12.       3.     YES
KK SUB26
KM      RUNOFF FROM SUB-BASIN 26
BA0.0963
LS    0.     84.              0.     84.
UK  790.  0.0076    0.06   33.75
UK  885.  0.0068    0.08   66.25
RK 2585.  0.0046   0.038  0.0963    TRAP      2.       6.     YES
KK CP29A
KM      COMBINE HYDROGRAPHS SUB20 & SUB 26
HC    2.
KK SUB27
KM      RUNOFF FROM SUB-BASIN 27
BA0.0925
LS    0.     92.              0.     90.
UK  355.  0.0030    0.07   40.22
UK  500.  0.0030    0.07   59.78
RK 2695.  0.0074   0.025  0.0925    TRAP     25.       1.
KK SUB28
KM      RUNOFF FROM SUB-BASIN 28
BA0.1155
```

```
LS    0.     86.              0.     86.
UK  755.  0.0079    0.06   30.74
UK  985.  0.0081    0.06   69.26
RK 2510.  0.0056   0.036  0.1155    TRAP     10.      3.     YES
KK CP29
KM      COMBINE HYDROGRAPHS CP29A & SUB28
HC    2.
KK SUB29
KM      RUNOFF FROM SUB-BASIN 29
KO    1.
BA0.3230
LS    0.     92.              0.     92.
UK  745.  0.0054    0.06   32.54
UK 1710.  0.0064    0.06   67.46
RK 5730.  0.0051   0.025  0.3230    TRAP     50.     3.9     YES
KK CPEND
KM      COMBINE HYDROGRAPHS CP13 & SUB29
KO    1.
HC    2.
ZZ
$ T OUTER14B24.OUT
$ SET NOVERIFY
```

THOUGHT OF THE DAY FROM ' V A X '

Better to use medicines at the outset than at the last moment.

*** NOTE TO MASS 11 USERS ***

PLEASE KEEP SASI INFORMED OF ANY PROBLEMS

```
$ ASSIGN DUMMY SYS$PRINT
$ ASSIGN OUTER14B24.DAT INPUT
$! OUTPUT OF HEC1 GOES TO THE LOG FILE
$ RUN [USERS.SIMONS.SIMONS1]HEC1
```

********** **********

```
*                                        *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)     *
*            FEBRUARY 1981               *
*           REVISED 30 OCT 81            *
*                                        *
*  RUN DATE      25-J    TIME      14:4  *
*                                        *
******************************************
```


```
*                                        *
*    U.S. ARMY CORPS OF ENGINEERS        *
*  THE HYDROLOGIC ENGINEERING CENTEI     *
*          609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616          *
*  (916) 440-3285 OR (FTS) 448-3285      *
*                                        *
******************************************
```


```
X     X  XXXXXXX   XXXXX          X
X     X  X       X     X        XX
X     X  X       X               X
XXXXXXX  XXXX    X       XXXXX   X
X     X  X       X               X
X     X  X       X     X         X
X     X  XXXXXXX  XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. SEE SEPTEMBER 1981 INPUT DESCRIPTION FOR NEW DEFINITIONS.

HEC-1 INPUT


```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

              *DIAGRAM
*** NOLIST ***
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
LINE      (V) ROUTING          (--->) DIVERSION
 NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED FLOW

  7       SUB1
            V
            V
 14       CP4A
            .
            .
 17         .        SUB2
            .          V
            .          V
 23         .        SUB3 ***
            .          .
            .          .
 29       CP4B............
            V
            V
 33       SUB4 ***
            .
            .
 42         .-------> DIVERT
 40       CP9A
            .
            .
 45         .        SUB5
            .          V
            .          V
 52         .        SUB6 ***
            .          .
            .          .
 58       CP9B............
            V
            V
 62       CP10A
            .
            .
 65         .        SUB7
            .          V
            .          V
 71         .      SUB8+9 ***
            .          V
            .          V
 78         .      CP10B
            .          .
            .          .
```

```
81    CP10C............
      V
      V
85    SUB10 ***
      V
      V
91    SUB11 ***
      V
      V
98    SUB12 ***
      V
      V
105   SUB13 ***
      .
      .
112   .     SUB14
      .     .
      .     .
119   .     .     SUB15
      .     .     .
      .     .     .
126   .     CP16............
      .     V
      .     V
129   .     SUB16 ***
      .     V
      .     V
136   .     SUB17 ***
      .     .
      .     .
143   .     .     SUB18
      .     .     .
      .     .     .
150   .     CP19............
      .     V
      .     V
153   .     SUB19 ***
      .     V
      .     V
160   .     SUB20 ***
      .     .
      .     .
167   .     .     SUB21
      .     .     .
      .     .     .
174   .     .     .     SUB22
      .     .     .     .
      .     .     .     .
181   .     .     CP24............
      .     .     V
      .     .     V
184   .     .     CP25A
      .     .     .
      .     .     .
187   .     .     .     SUB24
      .     .     .     .
      .     .     .     .
194   .     .     CP25A............
      .     .     V
      .     .     V
```

```
197                 .           .        CP25
                    .           .          .
                    .           .          .
200                 .           .          .      SUB23
                    .           .          .          .
                    .           .          .          .
207                 .           .        CP25.........
                    .           .          V
                    .           .          V
210                 .           .       SUB25 ***
                    .           .          V
                    .           .          V
217                 .           .       SUB26 ***
                    .           .          .
                    .           .          .
224                 .       CP29A..........
                    .           .
                    .           .
227                 .           .       SUB27
                    .           .          V
                    .           .          V
234                 .           .       SUB28 ***
                    .           .          .
                    .           .          .
241                 .       CP29..........
                    .           V
                    .           V
244                 .       SUB29 ***
                    .           .
                    .           .
252             CPEND..........
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
****************************************
*                                      *
*  FLOOD HYDROGRAPH PACKAGE (HEC-1)    *
*            FEBRUARY 1981             *
*          REVISED 30 OCT 81           *
*                                      *
*  RUN DATE      25-J    TIME     14:4 *
*                                      *
****************************************
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*************************************
*                                   *
*  U.S. ARMY CORPS OF ENGINEERS     *
*  THE HYDROLOGIC ENGINEERING CENTER *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*  (916) 440-3285 OR (FTS) 448-3285 *
*                                   *
*************************************
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---------- SIMONS, LI & ASSOCIATES, INC. PAZ-DC-01 ----------
DELEUW, CATHER & CO. - OUTER LOOP HIGHWAY PROJECT CONCEPT DRAINAGE PLAN
DIVERSION AT THUNDERBIRD RD, EXISTING RUNOFF CHARACTERISTICS
50-YR, 24-HR RAINFALL USING HYPOTHETICAL STORM DISTRIBUTION

```
  6 IO        OUTPUT CONTROL VARIABLES
                IPRNT          5  PRINT CONTROL
                IPLOT          0  PLOT CONTROL
                QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT         HYDROGRAPH TIME DATA
```

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                NMIN        15  MINUTES IN COMPUTATION INTERVAL
               IDATE    25JUN86  STARTING DATE
               ITIME      0000  STARTING TIME
                  NQ       100  NUMBER OF HYDROGRAPH ORDINATES
              NDDATE    26JUN86  ENDING DATE
              NDTIME      0045  ENDING TIME

        COMPUTATION INTERVAL    0.25 HOURS
             TOTAL TIME BASE   24.75 HOURS

    ENGLISH UNITS
        DRAINAGE AREA          SQUARE MILES
        PRECIPITATION DEPTH    INCHES
        LENGTH, ELEVATION      FEET
        FLOW                   CUBIC FEET PER SECOND
        STORAGE VOLUME         ACRE-FEET
        SURFACE AREA           ACRES
        TEMPERATURE            DEGREES FAHRENHEIT

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

        **************
        *            *
 29 KK  *    CP4B    *
        *            *
        **************

 31 KO      OUTPUT CONTROL VARIABLES
                IPRNT        1  PRINT CONTROL
                IPLOT        0  PLOT CONTROL
                QSCAL       0.  HYDROGRAPH PLOT SCALE

 32 HC      HYDROGRAPH COMBINATION
                ICOMP        2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                    ***

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                                HYDROGRAPH AT STATION     CP4B
                                     SUM OF  2 HYDROGRAPHS

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DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
25 JUN 0000	1	0.	25 JUN 0615	26	0.	25 JUN 1230	51	136.	25 JUN 1845	76	20.
25 JUN 0015	2	0.	25 JUN 0630	27	0.	25 JUN 1245	52	215.	25 JUN 1900	77	19.
25 JUN 0030	3	0.	25 JUN 0645	28	0.	25 JUN 1300	53	224.	25 JUN 1915	78	18.
25 JUN 0045	4	0.	25 JUN 0700	29	0.	25 JUN 1315	54	202.	25 JUN 1930	79	17.
25 JUN 0100	5	0.	25 JUN 0715	30	0.	25 JUN 1330	55	172.	25 JUN 1945	80	17.
25 JUN 0115	6	0.	25 JUN 0730	31	0.	25 JUN 1345	56	143.	25 JUN 2000	81	16.
25 JUN 0130	7	0.	25 JUN 0745	32	0.	25 JUN 1400	57	120.	25 JUN 2015	82	15.
25 JUN 0145	8	0.	25 JUN 0800	33	0.	25 JUN 1415	58	101.	25 JUN 2030	83	15.
25 JUN 0200	9	0.	25 JUN 0815	34	0.	25 JUN 1430	59	87.	25 JUN 2045	84	14.
25 JUN 0215	10	0.	25 JUN 0830	35	0.	25 JUN 1445	60	75.	25 JUN 2100	85	14.
25 JUN 0230	11	0.	25 JUN 0845	36	0.	25 JUN 1500	61	66.	25 JUN 2115	86	13.

25 JUN 0245	12	0.	*	25 JUN 0900	37	0.	*	25 JUN 1515	62	58.	*	25 JUN 2130	87	13
25 JUN 0300	13	0.	*	25 JUN 0915	38	0.	*	25 JUN 1530	63	52.	*	25 JUN 2145	88	12
25 JUN 0315	14	0.	*	25 JUN 0930	39	0.	*	25 JUN 1545	64	47.	*	25 JUN 2200	89	12
25 JUN 0330	15	0.	*	25 JUN 0945	40	0.	*	25 JUN 1600	65	43.	*	25 JUN 2215	90	11
25 JUN 0345	16	0.	*	25 JUN 1000	41	0.	*	25 JUN 1615	66	39.	*	25 JUN 2230	91	11
25 JUN 0400	17	0.	*	25 JUN 1015	42	0.	*	25 JUN 1630	67	36.	*	25 JUN 2245	92	11
25 JUN 0415	18	0.	*	25 JUN 1030	43	0.	*	25 JUN 1645	68	33.	*	25 JUN 2300	93	11
25 JUN 0430	19	0.	*	25 JUN 1045	44	0.	*	25 JUN 1700	69	31.	*	25 JUN 2315	94	10
25 JUN 0445	20	0.	*	25 JUN 1100	45	0.	*	25 JUN 1715	70	29.	*	25 JUN 2330	95	10
25 JUN 0500	21	0.	*	25 JUN 1115	46	0.	*	25 JUN 1730	71	27.	*	25 JUN 2345	96	10
25 JUN 0515	22	0.	*	25 JUN 1130	47	0.	*	25 JUN 1745	72	25.	*	26 JUN 0000	97	9
25 JUN 0530	23	0.	*	25 JUN 1145	48	0.	*	25 JUN 1800	73	24.	*	26 JUN 0015	98	9
25 JUN 0545	24	0.	*	25 JUN 1200	49	2.	*	25 JUN 1815	74	23.	*	26 JUN 0030	99	9
25 JUN 0600	25	0.	*	25 JUN 1215	50	14.	*	25 JUN 1830	75	21.	*	26 JUN 0045	100	8
			*				*				*			

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PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
224.	13.00	(CFS)	83.	25.	24.	24.
		(INCHES)	1.707	2.017	2.017	2.017
		(AC-FT)	41.	49.	49.	49.

CUMULATIVE AREA = 0.45 SQ MI

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            **************
            *            *
33 KK       *    SUB4    *
            *            *
            **************
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35 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

SUBBASIN RUNOFF DATA

36 BA SUBBASIN CHARACTERISTICS

TAREA	0.09	SUBBASIN AREA

PRECIPITATION DATA

10 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.65	1.27	2.23	2.49	2.67	3.01	3.41	3.82	0.00	0.00	0.00	0.00

STORM AREA = 0.09

37 LS SCS LOSS RATE

STRTL	0.20	INITIAL ABSTRACTION
CRVNBR	91.00	CURVE NUMBER
PTIMP	0.00	PERCENT IMPERVIOUS AREA

KINEMATIC WAVE

38 UK OVERLAND-FLOW ELEMENT NO. 1

L	1154.	OVERLAND FLOW LENGTH
S	0.0052	SLOPE
N	0.060	ROUGHNESS COEFFICIENT
PA	100.0	PERCENT OF SUBBASIN

39 RK MAIN CHANNEL

L	2785.	CHANNEL LENGTH
S	0.0083	SLOPE
N	0.016	CHANNEL ROUGHNESS COEFFICIENT
CA	0.09	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	12.00	BOTTOM WIDTH OR DIAMETER
Z	1.00	SIDE SLOPE
RUPSTQ	YES	ROUTE UPSTREAM HYDROGRAPH

***

COMPUTED KINEMATIC PARAMETERS

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)
1	1.7908	1.667	15.00	577.00
3	2.0537	1.496	15.00	1392.50

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HYDROGRAPH AT STATION SUB4

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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	0.	25 JUN 1230	51	0.27	0.02	0.25	233.
25 JUN 0015	2	0.01	0.01	0.00	0.	25 JUN 1245	52	0.08	0.01	0.08	358.
25 JUN 0030	3	0.01	0.01	0.00	0.	25 JUN 1300	53	0.06	0.00	0.06	261.
25 JUN 0045	4	0.01	0.01	0.00	0.	25 JUN 1315	54	0.05	0.00	0.05	233.
25 JUN 0100	5	0.01	0.01	0.00	0.	25 JUN 1330	55	0.04	0.00	0.04	199.
25 JUN 0115	6	0.01	0.01	0.00	0.	25 JUN 1345	56	0.04	0.00	0.03	166.
25 JUN 0130	7	0.01	0.01	0.00	0.	25 JUN 1400	57	0.03	0.00	0.03	139.
25 JUN 0145	8	0.01	0.01	0.00	0.	25 JUN 1415	58	0.03	0.00	0.03	118.
25 JUN 0200	9	0.01	0.01	0.00	0.	25 JUN 1430	59	0.03	0.00	0.03	101.
25 JUN 0215	10	0.01	0.01	0.00	0.	25 JUN 1445	60	0.02	0.00	0.02	87.
25 JUN 0230	11	0.01	0.01	0.00	0.	25 JUN 1500	61	0.02	0.00	0.02	77.
25 JUN 0245	12	0.01	0.01	0.00	0.	25 JUN 1515	62	0.02	0.00	0.02	68.
25 JUN 0300	13	0.01	0.01	0.00	0.	25 JUN 1530	63	0.02	0.00	0.02	61.
25 JUN 0315	14	0.01	0.01	0.00	0.	25 JUN 1545	64	0.02	0.00	0.02	55.
25 JUN 0330	15	0.01	0.01	0.00	0.	25 JUN 1600	65	0.02	0.00	0.02	50.
25 JUN 0345	16	0.01	0.01	0.00	0.	25 JUN 1615	66	0.02	0.00	0.02	46.
25 JUN 0400	17	0.01	0.01	0.00	0.	25 JUN 1630	67	0.02	0.00	0.02	42.
25 JUN 0415	18	0.01	0.01	0.00	0.	25 JUN 1645	68	0.02	0.00	0.02	39.
25 JUN 0430	19	0.01	0.01	0.00	0.	25 JUN 1700	69	0.02	0.00	0.01	36.
25 JUN 0445	20	0.01	0.01	0.00	0.	25 JUN 1715	70	0.01	0.00	0.01	34.
25 JUN 0500	21	0.01	0.01	0.00	0.	25 JUN 1730	71	0.01	0.00	0.01	32.
25 JUN 0515	22	0.01	0.01	0.00	0.	25 JUN 1745	72	0.01	0.00	0.01	30.
25 JUN 0530	23	0.01	0.01	0.00	0.	25 JUN 1800	73	0.01	0.00	0.01	28.
25 JUN 0545	24	0.01	0.01	0.00	0.	25 JUN 1815	74	0.01	0.00	0.01	27.
25 JUN 0600	25	0.01	0.01	0.00	0.	25 JUN 1830	75	0.01	0.00	0.01	25.
25 JUN 0615	26	0.01	0.01	0.00	0.	25 JUN 1845	76	0.01	0.00	0.01	24.
25 JUN 0630	27	0.01	0.01	0.00	0.	25 JUN 1900	77	0.01	0.00	0.01	23.
25 JUN 0645	28	0.01	0.01	0.00	0.	25 JUN 1915	78	0.01	0.00	0.01	22.

25 JUN 0700	29	0.01	0.01	0.00	0.	*	25 JUN 1930	79	0.01	0.00	0.01	21.
25 JUN 0715	30	0.02	0.01	0.00	0.	*	25 JUN 1945	80	0.01	0.00	0.01	20.
25 JUN 0730	31	0.02	0.01	0.00	0.	*	25 JUN 2000	81	0.01	0.00	0.01	19.
25 JUN 0745	32	0.02	0.01	0.00	0.	*	25 JUN 2015	82	0.01	0.00	0.01	18.
25 JUN 0800	33	0.02	0.01	0.00	0.	*	25 JUN 2030	83	0.01	0.00	0.01	17.
25 JUN 0815	34	0.02	0.01	0.00	0.	*	25 JUN 2045	84	0.01	0.00	0.01	17.
25 JUN 0830	35	0.02	0.01	0.00	0.	*	25 JUN 2100	85	0.01	0.00	0.01	16.
25 JUN 0845	36	0.02	0.01	0.01	0.	*	25 JUN 2115	86	0.01	0.00	0.01	16.
25 JUN 0900	37	0.02	0.02	0.01	0.	*	25 JUN 2130	87	0.01	0.00	0.01	15.
25 JUN 0915	38	0.02	0.01	0.01	0.	*	25 JUN 2145	88	0.01	0.00	0.01	15.
25 JUN 0930	39	0.02	0.02	0.01	0.	*	25 JUN 2200	89	0.01	0.00	0.01	14.
25 JUN 0945	40	0.03	0.02	0.01	0.	*	25 JUN 2215	90	0.01	0.00	0.01	14.
25 JUN 1000	41	0.03	0.02	0.01	0.	*	25 JUN 2230	91	0.01	0.00	0.01	13.
25 JUN 1015	42	0.03	0.02	0.01	1.	*	25 JUN 2245	92	0.01	0.00	0.01	13.
25 JUN 1030	43	0.03	0.02	0.02	1.	*	25 JUN 2300	93	0.01	0.00	0.01	13.
25 JUN 1045	44	0.04	0.02	0.02	1.	*	25 JUN 2315	94	0.01	0.00	0.01	12.
25 JUN 1100	45	0.05	0.02	0.02	1.	*	25 JUN 2330	95	0.01	0.00	0.01	12.
25 JUN 1115	46	0.05	0.02	0.03	2.	*	25 JUN 2345	96	0.01	0.00	0.01	12.
25 JUN 1130	47	0.07	0.03	0.04	2.	*	26 JUN 0000	97	0.01	0.00	0.01	11.
25 JUN 1145	48	0.22	0.08	0.14	3.	*	26 JUN 0015	98	0.00	0.00	0.00	11.
25 JUN 1200	49	0.47	0.11	0.36	8.	*	26 JUN 0030	99	0.00	0.00	0.00	11.
25 JUN 1215	50	1.27	0.16	1.11	35.	*	26 JUN 0045	100	0.00	0.00	0.00	10.
						*						

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TOTAL RAINFALL = 3.82, TOTAL LOSS = 0.97, TOTAL EXCESS = 2.84

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
358.	12.75	(CFS)	105.	31.	30.	30.
		(INCHES)	1.799	2.126	2.126	2.126
		(AC-FT)	52.	62.	62.	62.

CUMULATIVE AREA = 0.54 SQ MI

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          *            *
58 KK     *    CP9B    *
          *            *
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60 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

61 HC HYDROGRAPH COMBINATION

ICOMP	2	NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION CP9B

SUM OF 2 HYDROGRAPHS

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLO
25 JUN 0000	1	0.	25 JUN 0615	26	0.	25 JUN 1230	51	148.	25 JUN 1845	76	10
25 JUN 0015	2	0.	25 JUN 0630	27	0.	25 JUN 1245	52	285.	25 JUN 1900	77	9
25 JUN 0030	3	0.	25 JUN 0645	28	0.	25 JUN 1300	53	248.	25 JUN 1915	78	9
25 JUN 0045	4	0.	25 JUN 0700	29	0.	25 JUN 1315	54	153.	25 JUN 1930	79	8
25 JUN 0100	5	0.	25 JUN 0715	30	0.	25 JUN 1330	55	95.	25 JUN 1945	80	8
25 JUN 0115	6	0.	25 JUN 0730	31	0.	25 JUN 1345	56	66.	25 JUN 2000	81	8
25 JUN 0130	7	0.	25 JUN 0745	32	0.	25 JUN 1400	57	52.	25 JUN 2015	82	8
25 JUN 0145	8	0.	25 JUN 0800	33	0.	25 JUN 1415	58	42.	25 JUN 2030	83	7
25 JUN 0200	9	0.	25 JUN 0815	34	0.	25 JUN 1430	59	36.	25 JUN 2045	84	7
25 JUN 0215	10	0.	25 JUN 0830	35	0.	25 JUN 1445	60	32.	25 JUN 2100	85	7
25 JUN 0230	11	0.	25 JUN 0845	36	0.	25 JUN 1500	61	28.	25 JUN 2115	86	7
25 JUN 0245	12	0.	25 JUN 0900	37	0.	25 JUN 1515	62	25.	25 JUN 2130	87	6
25 JUN 0300	13	0.	25 JUN 0915	38	0.	25 JUN 1530	63	22.	25 JUN 2145	88	6
25 JUN 0315	14	0.	25 JUN 0930	39	0.	25 JUN 1545	64	19.	25 JUN 2200	89	6
25 JUN 0330	15	0.	25 JUN 0945	40	0.	25 JUN 1600	65	18.	25 JUN 2215	90	6.
25 JUN 0345	16	0.	25 JUN 1000	41	0.	25 JUN 1615	66	17.	25 JUN 2230	91	6.
25 JUN 0400	17	0.	25 JUN 1015	42	0.	25 JUN 1630	67	16.	25 JUN 2245	92	6.
25 JUN 0415	18	0.	25 JUN 1030	43	1.	25 JUN 1645	68	15.	25 JUN 2300	93	5.
25 JUN 0430	19	0.	25 JUN 1045	44	1.	25 JUN 1700	69	14.	25 JUN 2315	94	5.
25 JUN 0445	20	0.	25 JUN 1100	45	1.	25 JUN 1715	70	13.	25 JUN 2330	95	5.
25 JUN 0500	21	0.	25 JUN 1115	46	2.	25 JUN 1730	71	12.	25 JUN 2345	96	5.
25 JUN 0515	22	0.	25 JUN 1130	47	3.	25 JUN 1745	72	12.	26 JUN 0000	97	5.
25 JUN 0530	23	0.	25 JUN 1145	48	4.	25 JUN 1800	73	11.	26 JUN 0015	98	5.
25 JUN 0545	24	0.	25 JUN 1200	49	6.	25 JUN 1815	74	11.	26 JUN 0030	99	5.
25 JUN 0600	25	0.	25 JUN 1215	50	31.	25 JUN 1830	75	10.	26 JUN 0045	100	4.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
285.	12.75	(CFS)	59.	17.	16.	16.
		(INCHES)	0.666	0.762	0.762	0.762
		(AC-FT)	29.	33.	33.	33.

CUMULATIVE AREA = 0.82 SQ MI

81 KK CP10C

83 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

84 HC HYDROGRAPH COMBINATION

ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION CP10C
SUM OF 2 HYDROGRAPHS

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
25 JUN 0000	1	1.	25 JUN 0615	26	0.	25 JUN 1230	51	255.	25 JUN 1845	76	22
25 JUN 0015	2	1.	25 JUN 0630	27	0.	25 JUN 1245	52	485.	25 JUN 1900	77	21
25 JUN 0030	3	0.	25 JUN 0645	28	0.	25 JUN 1300	53	471.	25 JUN 1915	78	20
25 JUN 0045	4	0.	25 JUN 0700	29	0.	25 JUN 1315	54	342.	25 JUN 1930	79	19
25 JUN 0100	5	0.	25 JUN 0715	30	0.	25 JUN 1330	55	235.	25 JUN 1945	80	19
25 JUN 0115	6	0.	25 JUN 0730	31	0.	25 JUN 1345	56	170.	25 JUN 2000	81	18
25 JUN 0130	7	0.	25 JUN 0745	32	0.	25 JUN 1400	57	131.	25 JUN 2015	82	17
25 JUN 0145	8	0.	25 JUN 0800	33	0.	25 JUN 1415	58	107.	25 JUN 2030	83	17
25 JUN 0200	9	0.	25 JUN 0815	34	0.	25 JUN 1430	59	89.	25 JUN 2045	84	16.
25 JUN 0215	10	0.	25 JUN 0830	35	0.	25 JUN 1445	60	76.	25 JUN 2100	85	16
25 JUN 0230	11	0.	25 JUN 0845	36	0.	25 JUN 1500	61	65.	25 JUN 2115	86	15.
25 JUN 0245	12	0.	25 JUN 0900	37	0.	25 JUN 1515	62	58.	25 JUN 2130	87	15.
25 JUN 0300	13	0.	25 JUN 0915	38	0.	25 JUN 1530	63	52.	25 JUN 2145	88	14.
25 JUN 0315	14	0.	25 JUN 0930	39	0.	25 JUN 1545	64	46.	25 JUN 2200	89	14.
25 JUN 0330	15	0.	25 JUN 0945	40	0.	25 JUN 1600	65	42.	25 JUN 2215	90	13.
25 JUN 0345	16	0.	25 JUN 1000	41	0.	25 JUN 1615	66	39.	25 JUN 2230	91	13.
25 JUN 0400	17	0.	25 JUN 1015	42	0.	25 JUN 1630	67	36.	25 JUN 2245	92	13.
25 JUN 0415	18	0.	25 JUN 1030	43	0.	25 JUN 1645	68	34.	25 JUN 2300	93	12.
25 JUN 0430	19	0.	25 JUN 1045	44	1.	25 JUN 1700	69	32.	25 JUN 2315	94	12.
25 JUN 0445	20	0.	25 JUN 1100	45	1.	25 JUN 1715	70	30.	25 JUN 2330	95	12.
25 JUN 0500	21	0.	25 JUN 1115	46	1.	25 JUN 1730	71	29.	25 JUN 2345	96	12.
25 JUN 0515	22	0.	25 JUN 1130	47	2.	25 JUN 1745	72	27.	26 JUN 0000	97	11.
25 JUN 0530	23	0.	25 JUN 1145	48	3.	25 JUN 1800	73	26.	26 JUN 0015	98	11.
25 JUN 0545	24	0.	25 JUN 1200	49	7.	25 JUN 1815	74	25.	26 JUN 0030	99	11.
25 JUN 0600	25	0.	25 JUN 1215	50	69.	25 JUN 1830	75	23.	26 JUN 0045	100	10.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
485.	12.75	(CFS)	122.	35.	34.	34.
		(INCHES)	1.000	1.150	1.151	1.151
		(AC-FT)	61.	70.	70.	70.

CUMULATIVE AREA = 1.14 SQ MI

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91 KK SUB11

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93 KO        OUTPUT CONTROL VARIABLES
                  IPRNT          1  PRINT CONTROL
                  IPLOT          0  PLOT CONTROL
                  QSCAL         0.  HYDROGRAPH PLOT SCALE

           SUBBASIN RUNOFF DATA

94 BA        SUBBASIN CHARACTERISTICS
                  TAREA       0.06  SUBBASIN AREA

             PRECIPITATION DATA

10 PH                          DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
             ..... HYDRO-35 .....  ............... TP-40 ...............  ........... TP-49 ...........
             5-MIN  15-MIN  60-MIN   2-HR   3-HR   6-HR  12-HR  24-HR  2-DAY  4-DAY  7-DAY 10-DAY
             ------------------------------------------------------------------------------------------
             0.65   1.27    2.23    2.49   2.67   3.01   3.41   3.82   0.00   0.00   0.00   0.00

                                          STORM AREA =    0.06

95 LS        SCS LOSS RATE
                  STRTL       0.22  INITIAL ABSTRACTION
                  CRVNBR     90.00  CURVE NUMBER
                  RTIMP       0.00  PERCENT IMPERVIOUS AREA

             KINEMATIC WAVE
96 UK          OVERLAND-FLOW ELEMENT NO. 1
                     L       1745.  OVERLAND FLOW LENGTH
                     S      0.0080  SLOPE
                     N       0.070  ROUGHNESS COEFFICIENT
                    PA       100.0  PERCENT OF SUBBASIN
97 RK          MAIN CHANNEL
                     L       1325.  CHANNEL LENGTH
                     S      0.0072  SLOPE
                     N       0.016  CHANNEL ROUGHNESS COEFFICIENT
                    CA        0.06  CONTRIBUTING AREA
                 SHAPE        TRAP  CHANNEL SHAPE
                    WD       16.00  BOTTOM WIDTH OR DIAMETER
                     Z        1.00  SIDE SLOPE
                RUPSTQ         YES  ROUTE UPSTREAM HYDROGRAPH

                                          ***

           COMPUTED KINEMATIC PARAMETERS
             ELEMENT     ALPHA       M      DT (MIN)   DX (FT)
                   1    1.9039   1.667       15.00     872.50
                   3    1.5931   1.523       15.00     662.50

*****************************************************************************************************************

                                   HYDROGRAPH AT STATION    SUB11

*****************************************************************************************************************
                                                                *
  DA MON HRMN  ORD    RAIN    LOSS  EXCESS     COMP Q          *   DA MON HRMN  ORD    RAIN    LOSS  EXCESS     COMP Q
                                                                *
  25 JUN 0000    1    0.00    0.00    0.00         1.          *   25 JUN 1230   51    0.27    0.02    0.25       347.
  25 JUN 0015    2    0.01    0.01    0.00         1.          *   25 JUN 1245   52    0.08    0.01    0.07       612.
  25 JUN 0030    3    0.01    0.01    0.00         1.          *   25 JUN 1300   53    0.06    0.00    0.05       541.
  25 JUN 0045    4    0.01    0.01    0.00         1.          *   25 JUN 1315   54    0.05    0.00    0.05       408.
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25 JUN 0100	5	0.01	0.01	0.00	0.	*
25 JUN 0115	6	0.01	0.01	0.00	0.	*
25 JUN 0130	7	0.01	0.01	0.00	0.	*
25 JUN 0145	8	0.01	0.01	0.00	0.	*
25 JUN 0200	9	0.01	0.01	0.00	0.	*
25 JUN 0215	10	0.01	0.01	0.00	0.	*
25 JUN 0230	11	0.01	0.01	0.00	0.	*
25 JUN 0245	12	0.01	0.01	0.00	0.	*
25 JUN 0300	13	0.01	0.01	0.00	0.	*
25 JUN 0315	14	0.01	0.01	0.00	0.	*
25 JUN 0330	15	0.01	0.01	0.00	0.	*
25 JUN 0345	16	0.01	0.01	0.00	0.	*
25 JUN 0400	17	0.01	0.01	0.00	0.	*
25 JUN 0415	18	0.01	0.01	0.00	0.	*
25 JUN 0430	19	0.01	0.01	0.00	0.	*
25 JUN 0445	20	0.01	0.01	0.00	0.	*
25 JUN 0500	21	0.01	0.01	0.00	0.	*
25 JUN 0515	22	0.01	0.01	0.00	0.	*
25 JUN 0530	23	0.01	0.01	0.00	0.	*
25 JUN 0545	24	0.01	0.01	0.00	0.	*
25 JUN 0600	25	0.01	0.01	0.00	0.	*
25 JUN 0615	26	0.01	0.01	0.00	0.	*
25 JUN 0630	27	0.01	0.01	0.00	0.	*
25 JUN 0645	28	0.01	0.01	0.00	0.	*
25 JUN 0700	29	0.01	0.01	0.00	0.	*
25 JUN 0715	30	0.02	0.01	0.00	0.	*
25 JUN 0730	31	0.02	0.01	0.00	0.	*
25 JUN 0745	32	0.02	0.01	0.00	0.	*
25 JUN 0800	33	0.02	0.01	0.00	0.	*
25 JUN 0815	34	0.02	0.01	0.00	0.	*
25 JUN 0830	35	0.02	0.02	0.00	0.	*
25 JUN 0845	36	0.02	0.02	0.00	0.	*
25 JUN 0900	37	0.02	0.02	0.01	0.	*
25 JUN 0915	38	0.02	0.02	0.01	0.	*
25 JUN 0930	39	0.02	0.02	0.01	0.	*
25 JUN 0945	40	0.03	0.02	0.01	0.	*
25 JUN 1000	41	0.03	0.02	0.01	0.	*
25 JUN 1015	42	0.03	0.02	0.01	0.	*
25 JUN 1030	43	0.03	0.02	0.01	0.	*
25 JUN 1045	44	0.04	0.02	0.02	1.	*
25 JUN 1100	45	0.05	0.02	0.02	1.	*
25 JUN 1115	46	0.05	0.03	0.03	2.	*
25 JUN 1130	47	0.07	0.03	0.04	3.	*
25 JUN 1145	48	0.22	0.09	0.13	4.	*
25 JUN 1200	49	0.47	0.13	0.34	10.	*
25 JUN 1215	50	1.27	0.18	1.09	67.	*
25 JUN 1330	55	0.04	0.00	0.04	289.	
25 JUN 1345	56	0.04	0.00	0.03	210.	
25 JUN 1400	57	0.03	0.00	0.03	162.	
25 JUN 1415	58	0.03	0.00	0.03	131.	
25 JUN 1430	59	0.03	0.00	0.03	109.	
25 JUN 1445	60	0.02	0.00	0.02	93.	
25 JUN 1500	61	0.02	0.00	0.02	80.	
25 JUN 1515	62	0.02	0.00	0.02	71.	
25 JUN 1530	63	0.02	0.00	0.02	63.	
25 JUN 1545	64	0.02	0.00	0.02	57.	
25 JUN 1600	65	0.02	0.00	0.02	52.	
25 JUN 1615	66	0.02	0.00	0.02	48.	
25 JUN 1630	67	0.02	0.00	0.02	45.	
25 JUN 1645	68	0.02	0.00	0.02	42.	
25 JUN 1700	69	0.02	0.00	0.01	39.	
25 JUN 1715	70	0.01	0.00	0.01	37.	
25 JUN 1730	71	0.01	0.00	0.01	35.	
25 JUN 1745	72	0.01	0.00	0.01	33.	
25 JUN 1800	73	0.01	0.00	0.01	31.	
25 JUN 1815	74	0.01	0.00	0.01	30.	
25 JUN 1830	75	0.01	0.00	0.01	29.	
25 JUN 1845	76	0.01	0.00	0.01	27.	
25 JUN 1900	77	0.01	0.00	0.01	26.	
25 JUN 1915	78	0.01	0.00	0.01	25.	
25 JUN 1930	79	0.01	0.00	0.01	24.	
25 JUN 1945	80	0.01	0.00	0.01	23.	
25 JUN 2000	81	0.01	0.00	0.01	22.	
25 JUN 2015	82	0.01	0.00	0.01	21.	
25 JUN 2030	83	0.01	0.00	0.01	20.	
25 JUN 2045	84	0.01	0.00	0.01	20.	
25 JUN 2100	85	0.01	0.00	0.01	19.	
25 JUN 2115	86	0.01	0.00	0.01	18.	
25 JUN 2130	87	0.01	0.00	0.01	18.	
25 JUN 2145	88	0.01	0.00	0.01	17.	
25 JUN 2200	89	0.01	0.00	0.01	17.	
25 JUN 2215	90	0.01	0.00	0.01	16.	
25 JUN 2230	91	0.01	0.00	0.01	16.	
25 JUN 2245	92	0.01	0.00	0.01	15.	
25 JUN 2300	93	0.01	0.00	0.01	15.	
25 JUN 2315	94	0.01	0.00	0.01	15.	
25 JUN 2330	95	0.01	0.00	0.01	14.	
25 JUN 2345	96	0.01	0.00	0.01	14.	
26 JUN 0000	97	0.01	0.00	0.01	14.	
26 JUN 0015	98	0.00	0.00	0.00	13.	
26 JUN 0030	99	0.00	0.00	0.00	13.	
26 JUN 0045	100	0.00	0.00	0.00	12.	

****

TOTAL RAINFALL = 3.82, TOTAL LOSS = 1.07, TOTAL EXCESS = 2.75

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
612.	12.75	(CFS)	150.	43.	42.	42.
		(INCHES)	1.101	1.267	1.268	1.268
		(AC-FT)	74.	85.	85.	85.

CUMULATIVE AREA = 1.26 SQ MI

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            **************
            *            *
 98 KK      *   SUB12    *
            *            *
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100 KO        OUTPUT CONTROL VARIABLES
                   IPRNT          1  PRINT CONTROL
                   IPLOT          0  PLOT CONTROL
                   QSCAL         0.  HYDROGRAPH PLOT SCALE

              SUBBASIN RUNOFF DATA

101 BA        SUBBASIN CHARACTERISTICS
                   TAREA       0.10  SUBBASIN AREA

              PRECIPITATION DATA

 10 PH                          DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
              5-MIN  15-MIN  60-MIN   2-HR   3-HR   6-HR  12-HR  24-HR   2-DAY   4-DAY   7-DAY  10-DAY
               0.65   1.27   2.23   2.49   2.67   3.01   3.41   3.82    0.00    0.00    0.00    0.00

                                          STORM AREA =    0.10

102 LS        SCS LOSS RATE
                  STRTL       0.22  INITIAL ABSTRACTION
                 CRVNBR      90.00  CURVE NUMBER
                  RTIMP       0.00  PERCENT IMPERVIOUS AREA

              KINEMATIC WAVE
103 UK          OVERLAND-FLOW ELEMENT NO. 1
                      L       1440.  OVERLAND FLOW LENGTH
                      S     0.0083  SLOPE
                      N      0.060  ROUGHNESS COEFFICIENT
                     PA      100.0  PERCENT OF SUBBASIN
104 RK          MAIN CHANNEL
                      L      2665.  CHANNEL LENGTH
                      S     0.0071  SLOPE
                      N      0.016  CHANNEL ROUGHNESS COEFFICIENT
                     CA       0.10  CONTRIBUTING AREA
                  SHAPE       TRAP  CHANNEL SHAPE
                     WD      17.00  BOTTOM WIDTH OR DIAMETER
                      Z       1.00  SIDE SLOPE
                 RUPSTR        YES  ROUTE UPSTREAM HYDROGRAPH

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COMPUTED KINEMATIC PARAMETERS

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)
1	2.2624	1.667	15.00	720.00
3	1.5192	1.528	15.00	1332.50

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HYDROGRAPH AT STATION SUB12

DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	1.	25 JUN 1230	51	0.27	0.02	0.25	429.
25 JUN 0015	2	0.01	0.01	0.00	1.	25 JUN 1245	52	0.08	0.01	0.07	746.
25 JUN 0030	3	0.01	0.01	0.00	1.	25 JUN 1300	53	0.06	0.00	0.05	593.
25 JUN 0045	4	0.01	0.01	0.00	1.	25 JUN 1315	54	0.05	0.00	0.05	460.
25 JUN 0100	5	0.01	0.01	0.00	1.	25 JUN 1330	55	0.04	0.00	0.04	335.
25 JUN 0115	6	0.01	0.01	0.00	1.	25 JUN 1345	56	0.04	0.00	0.03	246.
25 JUN 0130	7	0.01	0.01	0.00	0.	25 JUN 1400	57	0.03	0.00	0.03	189.
25 JUN 0145	8	0.01	0.01	0.00	0.	25 JUN 1415	58	0.03	0.00	0.03	153.
25 JUN 0200	9	0.01	0.01	0.00	0.	25 JUN 1430	59	0.03	0.00	0.03	127.
25 JUN 0215	10	0.01	0.01	0.00	0.	25 JUN 1445	60	0.02	0.00	0.02	108.
25 JUN 0230	11	0.01	0.01	0.00	0.	25 JUN 1500	61	0.02	0.00	0.02	93.
25 JUN 0245	12	0.01	0.01	0.00	0.	25 JUN 1515	62	0.02	0.00	0.02	82.
25 JUN 0300	13	0.01	0.01	0.00	0.	25 JUN 1530	63	0.02	0.00	0.02	73.
25 JUN 0315	14	0.01	0.01	0.00	0.	25 JUN 1545	64	0.02	0.00	0.02	66.
25 JUN 0330	15	0.01	0.01	0.00	0.	25 JUN 1600	65	0.02	0.00	0.02	60.
25 JUN 0345	16	0.01	0.01	0.00	0.	25 JUN 1615	66	0.02	0.00	0.02	55.
25 JUN 0400	17	0.01	0.01	0.00	0.	25 JUN 1630	67	0.02	0.00	0.02	51.
25 JUN 0415	18	0.01	0.01	0.00	0.	25 JUN 1645	68	0.02	0.00	0.02	48.
25 JUN 0430	19	0.01	0.01	0.00	0.	25 JUN 1700	69	0.02	0.00	0.01	45.
25 JUN 0445	20	0.01	0.01	0.00	0.	25 JUN 1715	70	0.01	0.00	0.01	42.
25 JUN 0500	21	0.01	0.01	0.00	0.	25 JUN 1730	71	0.01	0.00	0.01	40.
25 JUN 0515	22	0.01	0.01	0.00	0.	25 JUN 1745	72	0.01	0.00	0.01	38.
25 JUN 0530	23	0.01	0.01	0.00	0.	25 JUN 1800	73	0.01	0.00	0.01	36.
25 JUN 0545	24	0.01	0.01	0.00	0.	25 JUN 1815	74	0.01	0.00	0.01	35.
25 JUN 0600	25	0.01	0.01	0.00	0.	25 JUN 1830	75	0.01	0.00	0.01	33.
25 JUN 0615	26	0.01	0.01	0.00	0.	25 JUN 1845	76	0.01	0.00	0.01	31.
25 JUN 0630	27	0.01	0.01	0.00	0.	25 JUN 1900	77	0.01	0.00	0.01	30.
25 JUN 0645	28	0.01	0.01	0.00	0.	25 JUN 1915	78	0.01	0.00	0.01	29.
25 JUN 0700	29	0.01	0.01	0.00	0.	25 JUN 1930	79	0.01	0.00	0.01	27.
25 JUN 0715	30	0.02	0.01	0.00	0.	25 JUN 1945	80	0.01	0.00	0.01	26.
25 JUN 0730	31	0.02	0.01	0.00	0.	25 JUN 2000	81	0.01	0.00	0.01	25.
25 JUN 0745	32	0.02	0.01	0.00	0.	25 JUN 2015	82	0.01	0.00	0.01	24.
25 JUN 0800	33	0.02	0.01	0.00	0.	25 JUN 2030	83	0.01	0.00	0.01	23.
25 JUN 0815	34	0.02	0.01	0.00	0.	25 JUN 2045	84	0.01	0.00	0.01	22.
25 JUN 0830	35	0.02	0.02	0.00	0.	25 JUN 2100	85	0.01	0.00	0.01	22.
25 JUN 0845	36	0.02	0.02	0.00	0.	25 JUN 2115	86	0.01	0.00	0.01	21.
25 JUN 0900	37	0.02	0.02	0.01	0.	25 JUN 2130	87	0.01	0.00	0.01	20.
25 JUN 0915	38	0.02	0.02	0.01	0.	25 JUN 2145	88	0.01	0.00	0.01	20.
25 JUN 0930	39	0.02	0.02	0.01	0.	25 JUN 2200	89	0.01	0.00	0.01	19.
25 JUN 0945	40	0.03	0.02	0.01	0.	25 JUN 2215	90	0.01	0.00	0.01	19.
25 JUN 1000	41	0.03	0.02	0.01	0.	25 JUN 2230	91	0.01	0.00	0.01	18.
25 JUN 1015	42	0.03	0.02	0.01	1.	25 JUN 2245	92	0.01	0.00	0.01	18.
25 JUN 1030	43	0.03	0.02	0.01	1.	25 JUN 2300	93	0.01	0.00	0.01	17.
25 JUN 1045	44	0.04	0.02	0.02	1.	25 JUN 2315	94	0.01	0.00	0.01	17.
25 JUN 1100	45	0.05	0.02	0.02	2.	25 JUN 2330	95	0.01	0.00	0.01	16.
25 JUN 1115	46	0.05	0.03	0.03	3.	25 JUN 2345	96	0.01	0.00	0.01	16.
25 JUN 1130	47	0.07	0.03	0.04	4.	26 JUN 0000	97	0.01	0.00	0.01	16.
25 JUN 1145	48	0.22	0.09	0.13	6.	26 JUN 0015	98	0.00	0.00	0.00	15.
25 JUN 1200	49	0.47	0.13	0.34	14.	26 JUN 0030	99	0.00	0.00	0.00	15.
25 JUN 1215	50	1.27	0.18	1.08	73.	26 JUN 0045	100	0.00	0.00	0.00	14.

TOTAL RAINFALL = 3.82. TOTAL LOSS = 1.07. TOTAL EXCESS = 2.75

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PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
  (CFS)       (HR)                  6-HR       24-HR       72-HR     24.75-HR
   746.      12.75        (CFS)     174.        50.         49.         49.
                         (INCHES)  1.187       1.365       1.366       1.366
                         (AC-FT)    86.        99.         99.         99.

                         CUMULATIVE AREA =    1.36 SQ MI

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
105 KK    *    SUB13   *
          *            *
          **************

107 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          1  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

            SUBBASIN RUNOFF DATA

108 BA          SUBBASIN CHARACTERISTICS
                     TAREA       0.14  SUBBASIN AREA

                PRECIPITATION DATA

 10 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....  ............... TP-40 ...............  ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN   2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 0.65    1.27    2.23   2.49    2.67    3.01    3.41    3.82    0.00    0.00    0.00    0.00

                                                STORM AREA =    0.14

109 LS          SCS LOSS RATE
                     STRTL       0.38  INITIAL ABSTRACTION
                    CRVNBR      84.00  CURVE NUMBER
                     RTIMP       0.00  PERCENT IMPERVIOUS AREA

                KINEMATIC WAVE
110 UK           OVERLAND-FLOW ELEMENT NO. 1
                         L       1460.  OVERLAND FLOW LENGTH
                         S      0.0061  SLOPE
                         N       0.060  ROUGHNESS COEFFICIENT
                        PA       100.0  PERCENT OF SUBBASIN
111 RK           MAIN CHANNEL
                         L       4000.  CHANNEL LENGTH
                         S      0.0053  SLOPE
                         N       0.016  CHANNEL ROUGHNESS COEFFICIENT
                        CA        0.14  CONTRIBUTING AREA
                     SHAPE        TRAP  CHANNEL SHAPE
                        WD       17.00  BOTTOM WIDTH OR DIAMETER
                         Z        1.00  SIDE SLOPE
                    RUPSTO         YES  ROUTE UPSTREAM HYDROGRAPH
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COMPUTED KINEMATIC PARAMETERS

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)
1	1.9395	1.667	15.00	730.00
3	1.3126	1.528	15.00	2000.00

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HYDROGRAPH AT STATION SUB13

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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	1.	25 JUN 1230	51	0.27	0.05	0.22	415.
25 JUN 0015	2	0.01	0.01	0.00	1.	25 JUN 1245	52	0.08	0.01	0.07	800.
25 JUN 0030	3	0.01	0.01	0.00	1.	25 JUN 1300	53	0.06	0.01	0.05	704.
25 JUN 0045	4	0.01	0.01	0.00	1.	25 JUN 1315	54	0.05	0.01	0.04	547.
25 JUN 0100	5	0.01	0.01	0.00	1.	25 JUN 1330	55	0.04	0.01	0.04	409.
25 JUN 0115	6	0.01	0.01	0.00	1.	25 JUN 1345	56	0.04	0.01	0.03	305.
25 JUN 0130	7	0.01	0.01	0.00	1.	25 JUN 1400	57	0.03	0.01	0.03	224.
25 JUN 0145	8	0.01	0.01	0.00	1.	25 JUN 1415	58	0.03	0.00	0.03	187.
25 JUN 0200	9	0.01	0.01	0.00	0.	25 JUN 1430	59	0.03	0.00	0.02	154.
25 JUN 0215	10	0.01	0.01	0.00	0.	25 JUN 1445	60	0.02	0.00	0.02	131.
25 JUN 0230	11	0.01	0.01	0.00	0.	25 JUN 1500	61	0.02	0.00	0.02	113.
25 JUN 0245	12	0.01	0.01	0.00	0.	25 JUN 1515	62	0.02	0.00	0.02	99.
25 JUN 0300	13	0.01	0.01	0.00	0.	25 JUN 1530	63	0.02	0.00	0.02	88.
25 JUN 0315	14	0.01	0.01	0.00	0.	25 JUN 1545	64	0.02	0.00	0.02	79.
25 JUN 0330	15	0.01	0.01	0.00	0.	25 JUN 1600	65	0.02	0.00	0.02	72.
25 JUN 0345	16	0.01	0.01	0.00	0.	25 JUN 1615	66	0.02	0.00	0.02	66.
25 JUN 0400	17	0.01	0.01	0.00	0.	25 JUN 1630	67	0.02	0.00	0.01	61.
25 JUN 0415	18	0.01	0.01	0.00	0.	25 JUN 1645	68	0.02	0.00	0.01	57.
25 JUN 0430	19	0.01	0.01	0.00	0.	25 JUN 1700	69	0.02	0.00	0.01	54.
25 JUN 0445	20	0.01	0.01	0.00	0.	25 JUN 1715	70	0.01	0.00	0.01	50.
25 JUN 0500	21	0.01	0.01	0.00	0.	25 JUN 1730	71	0.01	0.00	0.01	48.
25 JUN 0515	22	0.01	0.01	0.00	0.	25 JUN 1745	72	0.01	0.00	0.01	45.
25 JUN 0530	23	0.01	0.01	0.00	0.	25 JUN 1800	73	0.01	0.00	0.01	43.
25 JUN 0545	24	0.01	0.01	0.00	0.	25 JUN 1815	74	0.01	0.00	0.01	41.
25 JUN 0600	25	0.01	0.01	0.00	0.	25 JUN 1830	75	0.01	0.00	0.01	39.
25 JUN 0615	26	0.01	0.01	0.00	0.	25 JUN 1845	76	0.01	0.00	0.01	37.
25 JUN 0630	27	0.01	0.01	0.00	0.	25 JUN 1900	77	0.01	0.00	0.01	35.
25 JUN 0645	28	0.01	0.01	0.00	0.	25 JUN 1915	78	0.01	0.00	0.01	34.
25 JUN 0700	29	0.01	0.01	0.00	0.	25 JUN 1930	79	0.01	0.00	0.01	32.
25 JUN 0715	30	0.02	0.02	0.00	0.	25 JUN 1945	80	0.01	0.00	0.01	31.
25 JUN 0730	31	0.02	0.02	0.00	0.	25 JUN 2000	81	0.01	0.00	0.01	30.
25 JUN 0745	32	0.02	0.02	0.00	0.	25 JUN 2015	82	0.01	0.00	0.01	29.
25 JUN 0800	33	0.02	0.02	0.00	0.	25 JUN 2030	83	0.01	0.00	0.01	28.
25 JUN 0815	34	0.02	0.02	0.00	0.	25 JUN 2045	84	0.01	0.00	0.01	27.
25 JUN 0830	35	0.02	0.02	0.00	0.	25 JUN 2100	85	0.01	0.00	0.01	26.
25 JUN 0845	36	0.02	0.02	0.00	0.	25 JUN 2115	86	0.01	0.00	0.01	25.
25 JUN 0900	37	0.02	0.02	0.00	0.	25 JUN 2130	87	0.01	0.00	0.01	24.
25 JUN 0915	38	0.02	0.02	0.00	0.	25 JUN 2145	88	0.01	0.00	0.01	23.
25 JUN 0930	39	0.02	0.02	0.00	0.	25 JUN 2200	89	0.01	0.00	0.01	23.
25 JUN 0945	40	0.03	0.02	0.00	0.	25 JUN 2215	90	0.01	0.00	0.01	22.
25 JUN 1000	41	0.03	0.03	0.00	0.	25 JUN 2230	91	0.01	0.00	0.01	21.
25 JUN 1015	42	0.03	0.03	0.00	0.	25 JUN 2245	92	0.01	0.00	0.01	21.
25 JUN 1030	43	0.03	0.03	0.01	0.	25 JUN 2300	93	0.01	0.00	0.01	20.
25 JUN 1045	44	0.04	0.03	0.01	1.	25 JUN 2315	94	0.01	0.00	0.01	20.

25 JUN 1100	45	0.05	0.04	0.01	1.	*	25 JUN 2330	95	0.01	0.00	0.01	19.
25 JUN 1115	46	0.05	0.04	0.01	2.	*	25 JUN 2345	96	0.01	0.00	0.01	19.
25 JUN 1130	47	0.07	0.05	0.02	3.	*	26 JUN 0000	97	0.01	0.00	0.01	18.
25 JUN 1145	48	0.22	0.14	0.08	4.	*	26 JUN 0015	98	0.00	0.00	0.00	18.
25 JUN 1200	49	0.47	0.23	0.24	9.	*	26 JUN 0030	99	0.00	0.00	0.00	17.
25 JUN 1215	50	1.27	0.36	0.91	51.	*	26 JUN 0045	100	0.00	0.00	0.00	17.
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TOTAL RAINFALL = 3.82, TOTAL LOSS = 1.61, TOTAL EXCESS = 2.21

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
800.	12.75	(CFS)	300.	58.	56.	56.
		(INCHES)	1.240	1.426	1.427	1.427
		(AC-FT)	99.	114.	114.	114.

CUMULATIVE AREA = 1.50 SQ MI

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          *            *
244 KK    *    SUB29   *
          *            *
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246 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

SUBBASIN RUNOFF DATA

247 BA SUBBASIN CHARACTERISTICS

TAREA	0.32	SUBBASIN AREA

PRECIPITATION DATA

10 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
0.65	1.27	2.23	2.49	2.67	3.01	3.41	3.82	0.00	0.00	0.00	0.00

STORM AREA = 0.32

248 LS SCS LOSS RATE

STRTL	0.17	INITIAL ABSTRACTION
CRVNBR	92.00	CURVE NUMBER
RTIMP	0.00	PERCENT IMPERVIOUS AREA

LOSS RATE VARIABLES FOR SECOND OVERLAND FLOW ELEMENT

STRTL	0.17	INITIAL ABSTRACTION
CRVNBR	92.00	CURVE NUMBER
RTIMP	0.00	PERCENT IMPERVIOUS AREA

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                KINEMATIC WAVE
249 UK            OVERLAND-FLOW ELEMENT NO. 1
                        L        745.  OVERLAND FLOW LENGTH
                        S      0.0054  SLOPE
                        N       0.060  ROUGHNESS COEFFICIENT
                       PA        32.5  PERCENT OF SUBBASIN
250 UK            OVERLAND-FLOW ELEMENT NO. 2
                        L       1710.  OVERLAND FLOW LENGTH
                        S      0.0064  SLOPE
                        N       0.060  ROUGHNESS COEFFICIENT
                       PA        67.5  PERCENT OF SUBBASIN
251 RK            MAIN CHANNEL
                        L       5730.  CHANNEL LENGTH
                        S      0.0051  SLOPE
                        N       0.025  CHANNEL ROUGHNESS COEFFICIENT
                       CA        0.32  CONTRIBUTING AREA
                    SHAPE        TRAP  CHANNEL SHAPE
                       WD       50.00  BOTTOM WIDTH OR DIAMETER
                        Z        3.90  SIDE SLOPE
                   RUPSTQ         YES  ROUTE UPSTREAM HYDROGRAPH

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COMPUTED KINEMATIC PARAMETERS

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)
1	1.8249	1.667	15.00	372.50
2	1.9867	1.667	15.00	855.00
3	0.4577	1.535	15.00	2865.00

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HYDROGRAPH AT STATION SUB29

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DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
25 JUN 0000	1	0.00	0.00	0.00	1.	25 JUN 1230	51	0.27	0.02	0.26	1528.
25 JUN 0015	2	0.01	0.01	0.00	1.	25 JUN 1245	52	0.08	0.00	0.08	2075.
25 JUN 0030	3	0.01	0.01	0.00	1.	25 JUN 1300	53	0.06	0.00	0.06	1947.
25 JUN 0045	4	0.01	0.01	0.00	1.	25 JUN 1315	54	0.05	0.00	0.05	1548.
25 JUN 0100	5	0.01	0.01	0.00	1.	25 JUN 1330	55	0.04	0.00	0.04	1150.
25 JUN 0115	6	0.01	0.01	0.00	0.	25 JUN 1345	56	0.04	0.00	0.04	846.
25 JUN 0130	7	0.01	0.01	0.00	0.	25 JUN 1400	57	0.03	0.00	0.03	639.
25 JUN 0145	8	0.01	0.01	0.00	0.	25 JUN 1415	58	0.03	0.00	0.03	505.
25 JUN 0200	9	0.01	0.01	0.00	0.	25 JUN 1430	59	0.03	0.00	0.03	416.
25 JUN 0215	10	0.01	0.01	0.00	0.	25 JUN 1445	60	0.02	0.00	0.02	355.
25 JUN 0230	11	0.01	0.01	0.00	0.	25 JUN 1500	61	0.02	0.00	0.02	309.
25 JUN 0245	12	0.01	0.01	0.00	0.	25 JUN 1515	62	0.02	0.00	0.02	273.
25 JUN 0300	13	0.01	0.01	0.00	0.	25 JUN 1530	63	0.02	0.00	0.02	244.
25 JUN 0315	14	0.01	0.01	0.00	0.	25 JUN 1545	64	0.02	0.00	0.02	221.
25 JUN 0330	15	0.01	0.01	0.00	0.	25 JUN 1600	65	0.02	0.00	0.02	202.
25 JUN 0345	16	0.01	0.01	0.00	0.	25 JUN 1615	66	0.02	0.00	0.02	186.
25 JUN 0400	17	0.01	0.01	0.00	0.	25 JUN 1630	67	0.02	0.00	0.02	172.
25 JUN 0415	18	0.01	0.01	0.00	0.	25 JUN 1645	68	0.02	0.00	0.02	161.
25 JUN 0430	19	0.01	0.01	0.00	0.	25 JUN 1700	69	0.02	0.00	0.01	150.
25 JUN 0445	20	0.01	0.01	0.00	0.	25 JUN 1715	70	0.01	0.00	0.01	141.
25 JUN 0500	21	0.01	0.01	0.00	0.	25 JUN 1730	71	0.01	0.00	0.01	134.
25 JUN 0515	22	0.01	0.01	0.00	0.	25 JUN 1745	72	0.01	0.00	0.01	127.
25 JUN 0530	23	0.01	0.01	0.00	0.	25 JUN 1800	73	0.01	0.00	0.01	120.

25 JUN 0545	24	0.01	0.01	0.00	0.	*	25 JUN 1815	74	0.01	0.00	0.01	115.
25 JUN 0600	25	0.01	0.01	0.00	0.	*	25 JUN 1830	75	0.01	0.00	0.01	109.
25 JUN 0615	26	0.01	0.01	0.00	0.	*	25 JUN 1845	76	0.01	0.00	0.01	104.
25 JUN 0630	27	0.01	0.01	0.00	0.	*	25 JUN 1900	77	0.01	0.00	0.01	100.
25 JUN 0645	28	0.01	0.01	0.00	0.	*	25 JUN 1915	78	0.01	0.00	0.01	95.
25 JUN 0700	29	0.01	0.01	0.00	0.	*	25 JUN 1930	79	0.01	0.00	0.01	91.
25 JUN 0715	30	0.02	0.01	0.00	0.	*	25 JUN 1945	80	0.01	0.00	0.01	87.
25 JUN 0730	31	0.02	0.01	0.00	0.	*	25 JUN 2000	81	0.01	0.00	0.01	84.
25 JUN 0745	32	0.02	0.01	0.00	0.	*	25 JUN 2015	82	0.01	0.00	0.01	80.
25 JUN 0800	33	0.02	0.01	0.00	0.	*	25 JUN 2030	83	0.01	0.00	0.01	77.
25 JUN 0815	34	0.02	0.01	0.01	0.	*	25 JUN 2045	84	0.01	0.00	0.01	74.
25 JUN 0830	35	0.02	0.01	0.01	0.	*	25 JUN 2100	85	0.01	0.00	0.01	72.
25 JUN 0845	36	0.02	0.01	0.01	0.	*	25 JUN 2115	86	0.01	0.00	0.01	70.
25 JUN 0900	37	0.02	0.01	0.01	0.	*	25 JUN 2130	87	0.01	0.00	0.01	67.
25 JUN 0915	38	0.02	0.01	0.01	0.	*	25 JUN 2145	88	0.01	0.00	0.01	65.
25 JUN 0930	39	0.02	0.01	0.01	1.	*	25 JUN 2200	89	0.01	0.00	0.01	63.
25 JUN 0945	40	0.03	0.01	0.01	1.	*	25 JUN 2215	90	0.01	0.00	0.01	62.
25 JUN 1000	41	0.03	0.02	0.01	1.	*	25 JUN 2230	91	0.01	0.00	0.01	60.
25 JUN 1015	42	0.03	0.02	0.02	2.	*	25 JUN 2245	92	0.01	0.00	0.01	58.
25 JUN 1030	43	0.03	0.02	0.02	3.	*	25 JUN 2300	93	0.01	0.00	0.01	57.
25 JUN 1045	44	0.04	0.02	0.02	5.	*	25 JUN 2315	94	0.01	0.00	0.01	56.
25 JUN 1100	45	0.05	0.02	0.03	7.	*	25 JUN 2330	95	0.01	0.00	0.01	54.
25 JUN 1115	46	0.05	0.02	0.03	11.	*	25 JUN 2345	96	0.01	0.00	0.01	53.
25 JUN 1130	47	0.07	0.03	0.04	16.	*	26 JUN 0000	97	0.01	0.00	0.01	52.
25 JUN 1145	48	0.22	0.07	0.15	28.	*	26 JUN 0015	98	0.00	0.00	0.00	50.
25 JUN 1200	49	0.47	0.10	0.37	79.	*	26 JUN 0030	99	0.00	0.00	0.00	49.
25 JUN 1215	50	1.27	0.13	1.14	483.	*	26 JUN 0045	100	0.00	0.00	0.00	47.
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TOTAL RAINFALL = 3.82, TOTAL LOSS = 0.88, TOTAL EXCESS = 2.94

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
2075.	12.75	(CFS)	580.	167.	162.	162.
		(INCHES)	1.983	2.284	2.285	2.285
		(AC-FT)	287.	331.	331.	331.

CUMULATIVE AREA = 2.72 SQ MI

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            *            *
252 KK      *    CPEND   *
            *            *
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254 KO          OUTPUT CONTROL VARIABLES
                     IPRNT          1  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     OSCAL         0.  HYDROGRAPH PLOT SCALE

255 HC          HYDROGRAPH COMBINATION
                     ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
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HYDROGRAPH AT STATION CPEND
SUM OF 2 HYDROGRAPHS

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
25 JUN 0000	1	2.	25 JUN 0615	26	0.	25 JUN 1230	51	1942.	25 JUN 1845	76	141.
25 JUN 0015	2	2.	25 JUN 0630	27	0.	25 JUN 1245	52	2875.	25 JUN 1900	77	135.
25 JUN 0030	3	2.	25 JUN 0645	28	0.	25 JUN 1300	53	2651.	25 JUN 1915	78	129.
25 JUN 0045	4	2.	25 JUN 0700	29	0.	25 JUN 1315	54	2095.	25 JUN 1930	79	123.
25 JUN 0100	5	2.	25 JUN 0715	30	0.	25 JUN 1330	55	1559.	25 JUN 1945	80	118.
25 JUN 0115	6	1.	25 JUN 0730	31	0.	25 JUN 1345	56	1150.	25 JUN 2000	81	113.
25 JUN 0130	7	1.	25 JUN 0745	32	0.	25 JUN 1400	57	873.	25 JUN 2015	82	109.
25 JUN 0145	8	1.	25 JUN 0800	33	0.	25 JUN 1415	58	692.	25 JUN 2030	83	105.
25 JUN 0200	9	1.	25 JUN 0815	34	0.	25 JUN 1430	59	571.	25 JUN 2045	84	101.
25 JUN 0215	10	1.	25 JUN 0830	35	0.	25 JUN 1445	60	486.	25 JUN 2100	85	98.
25 JUN 0230	11	1.	25 JUN 0845	36	0.	25 JUN 1500	61	422.	25 JUN 2115	86	94.
25 JUN 0245	12	1.	25 JUN 0900	37	0.	25 JUN 1515	62	372.	25 JUN 2130	87	91.
25 JUN 0300	13	1.	25 JUN 0915	38	1.	25 JUN 1530	63	333.	25 JUN 2145	88	89.
25 JUN 0315	14	0.	25 JUN 0930	39	1.	25 JUN 1545	64	301.	25 JUN 2200	89	86.
25 JUN 0330	15	0.	25 JUN 0945	40	1.	25 JUN 1600	65	274.	25 JUN 2215	90	84.
25 JUN 0345	16	0.	25 JUN 1000	41	2.	25 JUN 1615	66	252.	25 JUN 2230	91	81.
25 JUN 0400	17	0.	25 JUN 1015	42	2.	25 JUN 1630	67	234.	25 JUN 2245	92	79.
25 JUN 0415	18	0.	25 JUN 1030	43	4.	25 JUN 1645	68	218.	25 JUN 2300	93	77.
25 JUN 0430	19	0.	25 JUN 1045	44	5.	25 JUN 1700	69	204.	25 JUN 2315	94	75.
25 JUN 0445	20	0.	25 JUN 1100	45	8.	25 JUN 1715	70	192.	25 JUN 2330	95	74.
25 JUN 0500	21	0.	25 JUN 1115	46	13.	25 JUN 1730	71	181.	25 JUN 2345	96	72.
25 JUN 0515	22	0.	25 JUN 1130	47	19.	25 JUN 1745	72	172.	26 JUN 0000	97	70.
25 JUN 0530	23	0.	25 JUN 1145	48	32.	25 JUN 1800	73	163.	26 JUN 0015	98	68.
25 JUN 0545	24	0.	25 JUN 1200	49	88.	25 JUN 1815	74	155.	26 JUN 0030	99	66.
25 JUN 0600	25	0.	25 JUN 1215	50	534.	25 JUN 1830	75	148.	26 JUN 0045	100	64.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.75-HR
2875.	12.75	(CFS)	780.	225.	218.	218.
		(INCHES)	1.718	1.979	1.979	1.979
		(AC-FT)	387.	445.	445.	445.

CUMULATIVE AREA = 4.22 SQ MI

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	SUB1	79.	12.75	23.	7.	7.	0.12		
ROUTED TO	CP4A	78.	12.75	23.	7.	7.	0.12		
HYDROGRAPH AT	SUB2	53.	13.00	20.	6.	6.	0.11		
HYDROGRAPH AT	SUB3	154.	13.00	60.	18.	17.	0.33		
2 COMBINED AT	CP4B	224.	13.00	83.	25.	24.	0.45		
HYDROGRAPH AT	SUB4	358.	12.75	105.	31.	30.	0.54		
DIVERSION TO	DIVERT	358.	0.25	105.	31.	30.	0.54		
HYDROGRAPH AT	CP9A	0.	0.25	0.	0.	0.	0.54		
HYDROGRAPH AT	SUB5	255.	12.50	35.	10.	10.	0.16		
HYDROGRAPH AT	SUB6	285.	12.75	59.	17.	16.	0.28		
2 COMBINED AT	CP9B	285.	12.75	59.	17.	16.	0.82		
ROUTED TO	CP10A	256.	13.00	59.	17.	16.	0.82		
HYDROGRAPH AT	SUB7	92.	12.75	21.	6.	6.	0.11		
HYDROGRAPH AT	SUB8+9	249.	12.75	63.	18.	18.	0.32		
ROUTED TO	CP10B	229.	12.75	64.	18.	18.	0.32		
2 COMBINED AT	CP10C	485.	12.75	122.	35.	34.	1.14		
HYDROGRAPH AT	SUB10	556.	12.75	135.	39.	38.	1.20		
HYDROGRAPH AT	SUB11	612.	12.75	150.	43.	42.	1.26		
HYDROGRAPH AT	SUB12	746.	12.75	174.	50.	49.	1.36		
HYDROGRAPH AT	SUB13	800.	12.75	200.	58.	56.	1.50		
HYDROGRAPH AT	SUB14	185.	12.75	33.	9.	9.	0.16		
HYDROGRAPH AT	SUB15	195.	12.50	28.	8.	8.	0.14		
2 COMBINED AT	CP16	359.	12.50	61.	17.	17.	0.30		
HYDROGRAPH AT	SUB16	414.	12.50	83.	24.	23.	0.41		
HYDROGRAPH AT	SUB17	434.	12.75	97.	27.	27.	0.49		
HYDROGRAPH AT	SUB18	209.	12.75	47.	13.	13.	0.24		
2 COMBINED AT	CP19	644.	12.75	143.	41.	40.	0.73		

HYDROGRAPH AT	SUB19	739.	12.75	174.	50.	48.	0.85
HYDROGRAPH AT	SUB20	715.	12.75	179.	51.	50.	0.88
HYDROGRAPH AT	SUB21	270.	12.50	54.	15.	15.	0.28
HYDROGRAPH AT	SUB22	85.	12.50	12.	3.	3.	0.06
2 COMBINED AT	CP24	355.	12.50	66.	19.	18.	0.34
ROUTED TO	CP25A	306.	12.50	67.	19.	18.	0.34
HYDROGRAPH AT	SUB24	295.	12.50	42.	12.	11.	0.17
2 COMBINED AT	CP25A	601.	12.50	108.	31.	30.	0.51
ROUTED TO	CP25	564.	12.50	109.	31.	30.	0.51
HYDROGRAPH AT	SUB23	501.	12.75	117.	34.	33.	0.57
2 COMBINED AT	CP25	967.	12.75	225.	65.	63.	1.08
HYDROGRAPH AT	SUB25	1038.	12.75	255.	73.	71.	1.21
HYDROGRAPH AT	SUB26	1043.	12.75	274.	78.	76.	1.31
2 COMBINED AT	CP29A	1758.	12.75	452.	130.	126.	2.19
HYDROGRAPH AT	SUB27	166.	12.50	24.	7.	7.	0.09
HYDROGRAPH AT	SUB28	308.	12.50	49.	14.	13.	0.21
2 COMBINED AT	CP29	1958.	12.75	500.	144.	139.	2.39
HYDROGRAPH AT	SUB29	2075.	12.75	580.	167.	162.	2.72
2 COMBINED AT	CPEND	2875.	12.75	780.	225.	218.	4.22

```
*** NORMAL END OF HEC-1 ***
101
  SIMONS8      job terminated at 25-JUN-1986 14:44:36.00

  Accounting information:
  Buffered I/O count:          192    Peak working set size:    500
  Direct I/O count:            387    Peak page file size:     1843
  Page faults:                2387    Mounted volumes:            0
  Charged CPU time:     0 00:01:11.44  Elapsed time:    0 00:01:51.74
$
```