Due March 15

Final
Drainage Report

For the

Rawhide Detention Basin

(Phase I)
Basin Alternatives Analysis

Final Draft

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1.0 Introduction

The purpose of this project is to alleviate flooding along Rawhide Wash, downstream of Jomax Road and to eliminate the alluvial fan flood hazard designation from this property. Two cities and two agencies are sponsoring this project. The Flood Control District of Maricopa County (District), charged with flood control in the county, and the Arizona State Land Department, the landowner, are the agency stakeholders. The Cities of Phoenix and Scottsdale are also stakeholders. The District is taking the lead for this project.

2.0 Background and Project Description

Hydrologic modeling of the Rawhide Wash drainage area has been an on-going process for more than a decade. HDR's research on this area began with a literature search of existing reports. A Water Resources Associates, Inc. report from February of 1990 summarized stormwater flows for the Rawhide Wash Alluvial Fan. Further analysis was done for the wash as a part of the City of Scottsdale's Desert Greenbelt Project. The results of this work are reported in a report by Greiner, Inc. titled Rawhide Wash Hydrologic Report. A more detailed chronology of the hydrologic history of Rawhide Wash was done by the Arizona State Land Department and is provided in Appendix.

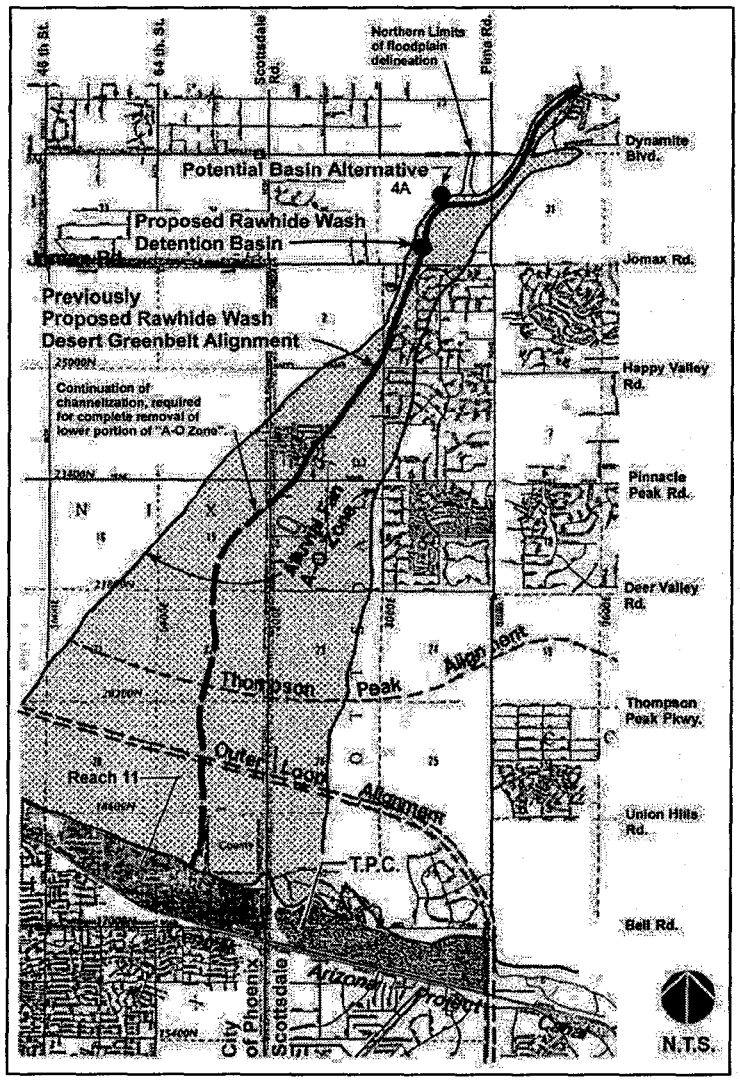


Figure 1 – Rawhide Wash & Basin Location

The baseline condition for this project is the results of the **Rawhide Wash Detention Basin Feasibility Study,** completed in March of 1995. The feasibility study, a project with some of the same stakeholders as listed above, included hydrology, hydraulics, geotechnical investigation, and an engineer's estimate of the probable costs. In the feasibility study a basin site was determined and four configurations were investigated. The study recommended a preferred alternative. The feasibility report indicated that

further refinement to the basin size, grading, and outflow conditions would be required prior to final design of the facilities.

The current **Rawhide Wash Detention Basin Project** has been scoped in two phases. Phase I is the City of Scottsdale General Plan Amendment and Basin Alternatives Analysis, and Phase II is the Basin Final Design.

Phase I is a refinement of the feasibility study (1995). The feasibility study recommended a hybrid of two alternatives in the preferred alternative. A final hydrologic model was not developed for this "hybrid" basin configuration in the feasibility study. HDR's Alternative No. 1, discussed herein, is the feasibility study preferred alternative. The Phase I effort included re-assessing the location of the Rawhide Detention Basin. Public acceptance of the basin would be enhanced if the basin were farther from development south of Jomax Road.

The other alternatives developed used the preferred alternative developed in the feasibility study as a guideline. At first the basin alternatives kept the same berm height, weir length, depth etc. as the feasibility study preferred alternative. In subsequent alternatives, however, basin characteristics were modified to meet preferences of the stakeholders. The City of Scottsdale General Plan Amendment process includes public education and involvement regarding the basin. If changes that will make the basin more acceptable are suggested through this process, and are technically feasible, they will be incorporated into Phase II design of the basin. One such suggestion is bypassing low flows to maintain sediment transport to the lower portions of the Rawhide Wash.

Phase II of this project will be the final design of the Rawhide Detention basin. The design will provide a regional detention facility to alleviate the flooding experienced downstream and eliminate the alluvial fan flood hazard designation.

3.0 Hydrology

The Phase I alternative study was based on the 100-year, 6-hour design flows on Rawhide Wash developed for the feasibility study. *The U. S. Army Corps of Engineers HEC-1* computer program is the preferred model of the Maricopa County Flood Control District and was used for this study. It is widely accepted for hydrologic assessment. A review of the feasibility study model showed that the District preferred methods (e.g. Green-Ampt infiltration, Clark Unit Hydrograph, Etc.) were used. The HEC-1 Hydrologic Model from the feasibility study was modified to evaluate the alternatives developed for Phase I Study. The Title Cards at the beginning of the each of the models define the model changes. File names were used to reflect the alternative as models were developed. The software used to execute the models was *U.S. Army Corps of Engineers Flood Hydrograph Package (HEC-1), June 09 1992, Version 4.0.3E.* This version is slightly newer that the *May 1991, Version 4.0.1E* that was used in the feasibility study. There are slight variations in the model output that are attributed to using the newer version of HEC-1 (less than 5% in peak flows).

4.0 Alternative Analysis

A hydrology model was developed for each basin alternative investigated. Model development was based on Alternative No. 1, with parameters adjusted to account for the location, configuration and size of the basin being investigated. Eight alternative basins were developed and modeled as a refinement to the feasibility study preferred alternative. The alternative basins are shown in plan view in Figures 1 through 8. They are titled as Alternative 1 through Alternative 6A and are described in the following sections.

4.1 Alternative No. 1

This alternative is a model of the feasibility study preferred basin alternative. No model was presented in the feasibility study report for the "hybrid" preferred basin. The largest portion of the storage pool for this alternative is located northeast of the powerline alignment. This alternative basin was modeled with a double barrel 36" outlet pipe and a 200-foot wide emergency spillway. The berm height is 35 feet from existing ground and is 42 feet high from the invert of the basin. The outflow from the low-level discharge is 384 cfs and the peak storage is 1179 AF. The single largest factor in the cost of constructing any of the basins is the net earthwork, or waste material to haul out. This basin has one of the lowest waste amounts of all of the basins studied. This basin is in the same location and is the same height as the feasibility study preferred basin, several hundred feet from Jomax Road and nearby development.

4.2 Alternative No. 2

This alternative is in the same location as Alternative No.1. The location of the storage pool for this alternative has been shifted to the southeast side of the power line alignment. Since the storage pool is cut into higher ground, there is less need for a berm, while the amount of earth excavation is increased, and the net earthwork nearly doubles. This alternative has a double barrel 36" outlet pipe and also employs a 200-foot weir for emergency spills. The berm is 35 feet high from existing ground and is 40 feet high from the invert of the basin. The outflow from the low-level discharge is 371 cfs and the peak storage is 1184 AF. The top of the berm elevation is the same height as the feasibility study preferred basin. The basin is several hundred feet from Jomax Road and nearby development.

4.3 Alternative No. 3

This alternative locates the basin very near the center of Section 36. It is at the confluence of two major tributaries. The majority of the storage pool is northeast of the powerline alignment in higher ground. The berm height is less but the net excavation quantities are higher than the feasibility study basin. This basin has a double barrel 36" outlet pipe and a 200-foot wide emergency spillway. The berm is 30 feet high from existing ground and is 35 feet high from the invert of the basin. The outflow from the low-level discharge is 339 cfs and the peak storage is 1196 AF. This alternative basin is farther from Jomax Road and may be less visible. The berm is shorter than the feasibility basin.

4.4 Alternative No. 4

This alternative is also located near the center of the section and equalized the land used on both sides of the powerline alignment. In quantities and areas, this basin is very

similar to Alternative No. 3. This basin has a double barrel 36" outlet pipe and a 200-foot wide emergency spillway. The berm is 30 feet high from existing ground and is 37 feet high from the invert of the basin. The outflow from the low-level discharge is 351 cfs and the peak storage is 1191 AF.

4.5 Alternative No. 4A

This alternative is a modification to Alternative No. 4 that very nearly balances the earthwork. The berm was raised and the area expanded to minimize the amount of earthwork and still be able accept the flood flows. This alternative the amount of waste or hauled out soil. This basin has a double barrel 36" outlet pipe and a 200-foot wide emergency spillway. The berm is 38 feet high from existing ground and is 38 feet high from the invert of the basin. The outflow from the low-level discharge is 339 cfs and the peak storage is 1192 AF. This alternative has only a small amount of waste material.

4.6 Alternative No. 5

Alternative No. 5 is a two basin alternative. One of the basins is located near the center of the section, at the confluence of two major tributaries, and the other basin is at the proposed feasibility basin location. This double basin system uses both basins during large events and only the upper basin during the more frequent, smaller events. Both basins have a double barrel 36" outlet pipe. The upstream basin has a 700-foot wide spillway and the lower basin has a 200-foot wide emergency spillway. The berms for these double basins are 20 feet high from existing ground. The upper basin is 40 from the top of berm to the invert of the basin, and the lower basin embankment is 32 feet high from the invert of the basin. The outflow from the low-level discharge below both basins is 299 cfs and the total peak storage is 1278 AF. The double basin alternative has significantly more net excavation over the single basin and requires more structures to provide flood protection.

4.7 Alternative No. 6

Alternative No. 6 is a two basin alternative. The large basin, identical to Alternative No. 5, is located near the center of the section, and the other basin is located immediately downstream. This double basin system uses both basins during large events and only the upper basin during the more frequent, smaller events. Both basins have a double barrel 36" outlet pipe. The upstream basin has a 700-foot wide and the lower basin has a 200-foot wide emergency spillway. The berms for these double basins are 22 and 25 feet high from existing ground. The upper basin is 40 from the top of berm to the invert of the basin, and the lower basin is 37 feet high from the invert of the basin. The outflow from the two basin system is 324 cfs and the total peak storage is 1300 AF. The double basin alternative showed a significant increase in net excavation over the single basin and requires more structures to provide flood protection.

4.8 Alternative No. 6A

Alternative No. 6A is a two basin alternative like that used in Alternative No. 6 but the footprint area was expanded in an effort to lower the amount of net excavation. The footprint area increased by approximately 17% and the earthwork decreased by only about 10%. The upstream basin has a 700-foot wide and the lower basin has a 200-foot

wide emergency spillway. The berms for these double basins are 22 and 25 feet high from existing ground. The upper basin is 40 from the top of berm to the invert of the basin, and the lower basin is 37 feet high from the invert of the basin. The outflow from the two basin system is 298 cfs and the total peak storage is 1296 AF. The double basin alternative showed a significant increase in net excavation over the single basin and requires more structures to provide flood protection.

The Table 4.1 on the following page summarizes the significant data for each of the basin alternatives studied. The table uses the information from figures 4.1 through 4.8 for the geometric data and uses the HEC-1 models information for the hydrologic data. Refer to the notes in the table for specific sources of data.

Table 4. 1 – Alternative Comparison Summary Table

After Placing the Basins.

Basin Number	Storage Volume[1] [Ac. Ft.]	Outflow Rate[2] [cfs]	Basin Depth[3] [feet]	Berm Height[4] [feet]	Spillway Height[4] [feet]
1	1,179	742	32	35	25
2	1,184	768	30	35	25
3	1,196	770	25	30	20
4	1,191	776	27	30	20
4A	1,192	808	28	38	28
5	1,278	723	30, 22	20, 20	10, 10
6	1,300	724	30, 27	20, 23	10, 13
6A	1,296	723	21, 20	22, 25	12, 15

Basin Number	Cut Volume[5] [Cu. Yd.]	Fill Volume[5] [Cu. Yd.]	Net Waste[5] [Cu. Yd.]	Power Line Area[5] [acres]	Wash Area[5] [acres]	Additional Area[5] [acres]	Total Area[5] [acres]
1	1,384,000	560,000	823,000	22.2	14.9	44.9	82.0
2	1,986,000	384,000	1,601,000	15.9	15.5	37.9	69.3
3	1,801,000	350,000	1,451,000	12.8	17.1	44.8	74.7
4	1,788,000	369,000	1,418,000	14.8	15.5	43.8	74.1
4A	1,255,683	1,109,857	145,826	15.0	24.7	67.2	107.3
5	2,939,000	219,000	2,720,000	28.4	35.1	28.0	91.5
6	2,987,000	192,000	2,795,000	31.4	26.1	28.8	86.3
6A	2,752,000	262,000	2,490,000	31.4	26.1	43.9	101.4

1. Based on "peak storage" in hydrologic model
2. Based on hydrology model at Jomax Road - after basins in ?
3. As measured from invert to spillway
4. As measured from existing ground
5. Refer to Basin Alternative Figures Appendix

4.9 Downstream Channel Capacity

The capacity of the channel downstream of the basin, downstream of Jomax Road was estimated from mapping obtained from the City of Scottsdale. Three cross sections were identified and used to determine the capacity of Rawhide Wash. These cross sections were used to determine the limiting flow for the wash downstream of the proposed

detention basin. This information provides a target flow for release from the basin. The capacity calculations for these cross sections may be found in the Appendix. The following table summarizes the results of the capacity analysis.

Table 4. 2 – Downstream Channel Capacity

Cross Section	Distance From Jomax Road	Characteristics	Approximate Capacity
Rawsec1	3500'	Surrounding area developed	9000 cfs
Rawsec2	6000'	Surrounding area undeveloped	1200 cfs
Rawsec3	10,500'	Surrounding area developed	7700 cfs

4.10 Basin Decision Analysis Matrix

The selection of an alternative to study further was made in a city/agency coordination meeting on October 6, 1998. Important criteria for an acceptable preferred alternative were:

1. The basin should be located away from existing development and roadways. The preferred basin should be away from Jomax Road.
2. The berm around the basin should not be higher than other structures in the area. It should be able to be screened using natural material and native vegetation.
3. Maximizing the use of currently "unusable" land (e.g. utility easement and washes) is also preferred.
4. Net excavation should minimize waste haul out. All the stakeholders prefer a lower cost alternative. Since net excavation is likely to be the single most costly item for the construction of the basin, the lower the quantity of waste material, the lower the cost of the basin.
5. The basin must contain the storage volume of stormwater to accomplish the goals of downstream flood control.
6. Outflow from the basin must be a low enough to be contained in the available downstream conveyance.
7. An excessively deep basin will adversely affect the aesthetics and future use of the basin.
8. The structures required to protect the basin and insure it's proper operation add to the cost of the basin. Structures would be constructed using concrete, RCC, or soil cement that are not natural materials.

An Alternative Evaluation chart was used to help visualize the positives, negatives and neutral aspects of each alternative. The chart is shown below.

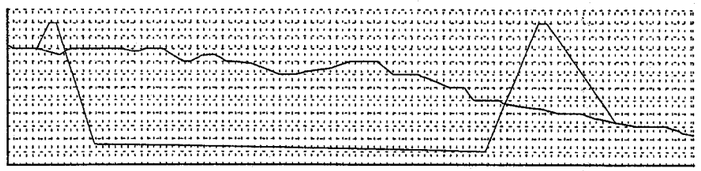
The chart helps to show whether the alternative meets or does not meet the criteria listed. A "plus" means the alternative more closely meets the criteria, while a "minus" means the alternative does not meet the criteria as well. Blanks are used if the alternative neither meets nor does not meet the criteria. The Alternatives Analysis shows that the Preferred

Basin is the Alternative No. 4A. Basin Alternative No. 4A incorporates most of the preferences listed.

Table 4.3 - Alternative Evaluation Chart

Name	Location	Storage	Outflow	Basin Depth	Berm Height	Net Excavation	Land Use	Structures
1	-	+	+	-	-	+	-	+
2	-	+	+	-	-			+
3	+	+	+			+	-	+
4	+	+	+			+	-	+
4A	+	+	+	+	+	+	-	+
5	-	+	+	-	+	-	+	-
6	+	+	+	-	+	-	+	-
6A	+	+	+	+	+	-	-	-

SECTION A-A



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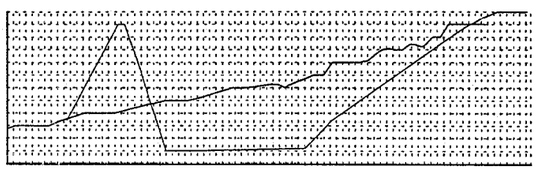


AREAS

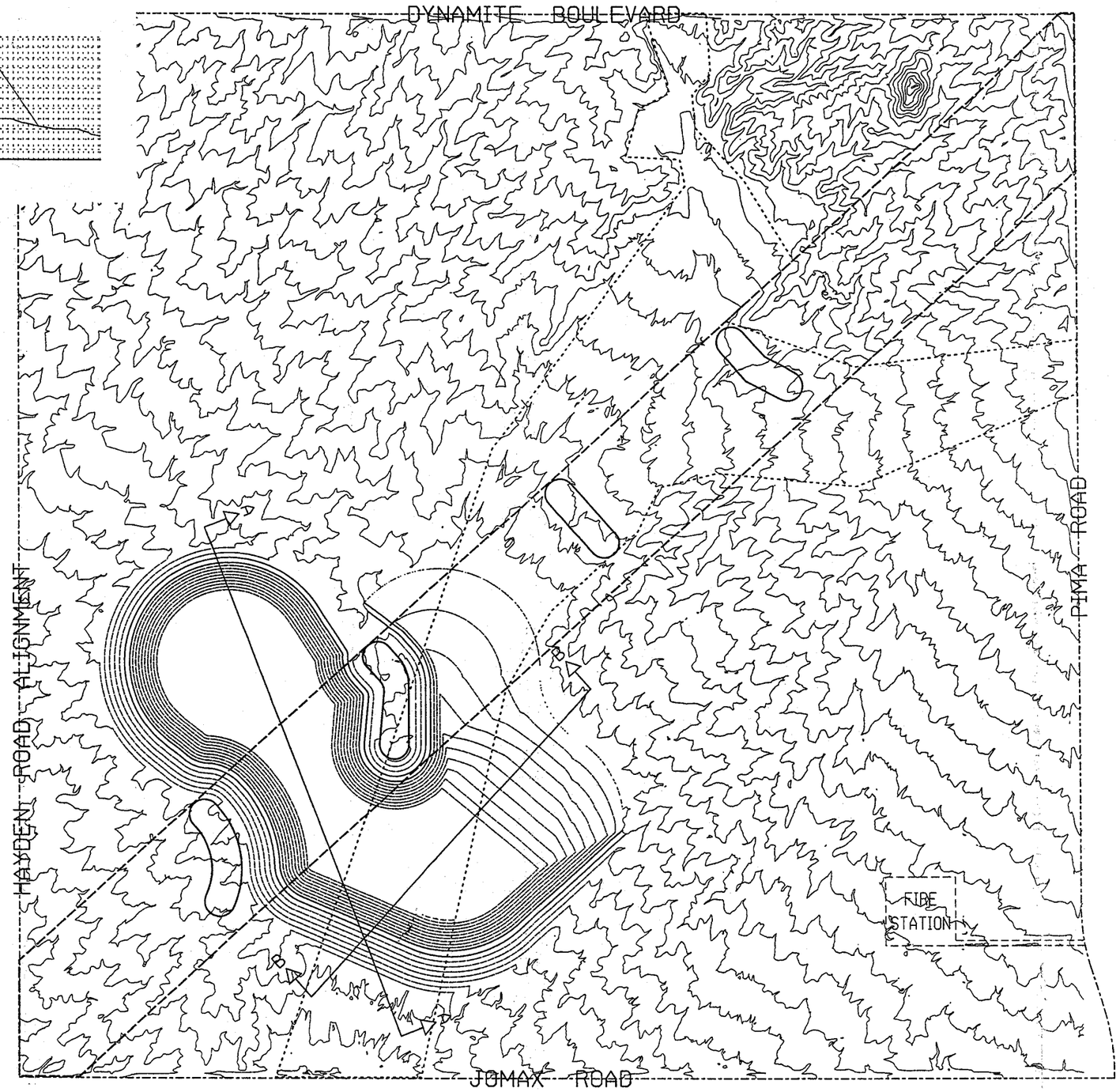
POWERLINE ESMT.	22.2 acres
WASH	14.9 acres
ADDITIONAL	44.9 acres
TOTAL AREA	82.0 acres

ELEVATIONS

TOP OF BERM	2170 ft
SPILLWAY	2160 ft
INV. ELEV.	2128 ft
EX. GROUND	2135 ft

EXCAVATION VOLUMES

CUT	1,383,633 CY
FILL	560,297 CY
NET	823,336 CY



Rawhide Wash Detention Basin

Alternative No. 1
Refine Feasibility Study
Preferred Alternative

LEGEND

- Powerline Esmt.
- Wash Boundary
- Powerline Tower Maintenance Area

N

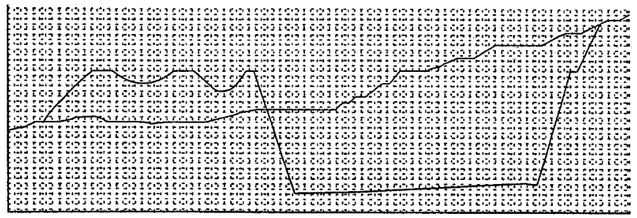
SCALE: 1 INCH = 600 FEET

300 0 600 1200

CONTOUR INTERVAL = 5 FEET

HDR
HDR Engineering, Inc.

SECTION A-A



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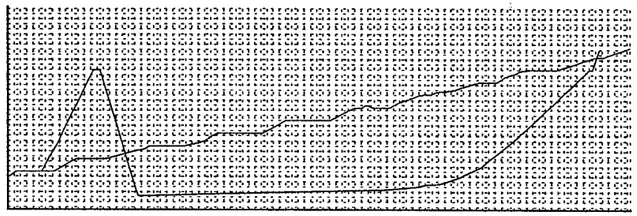


AREAS

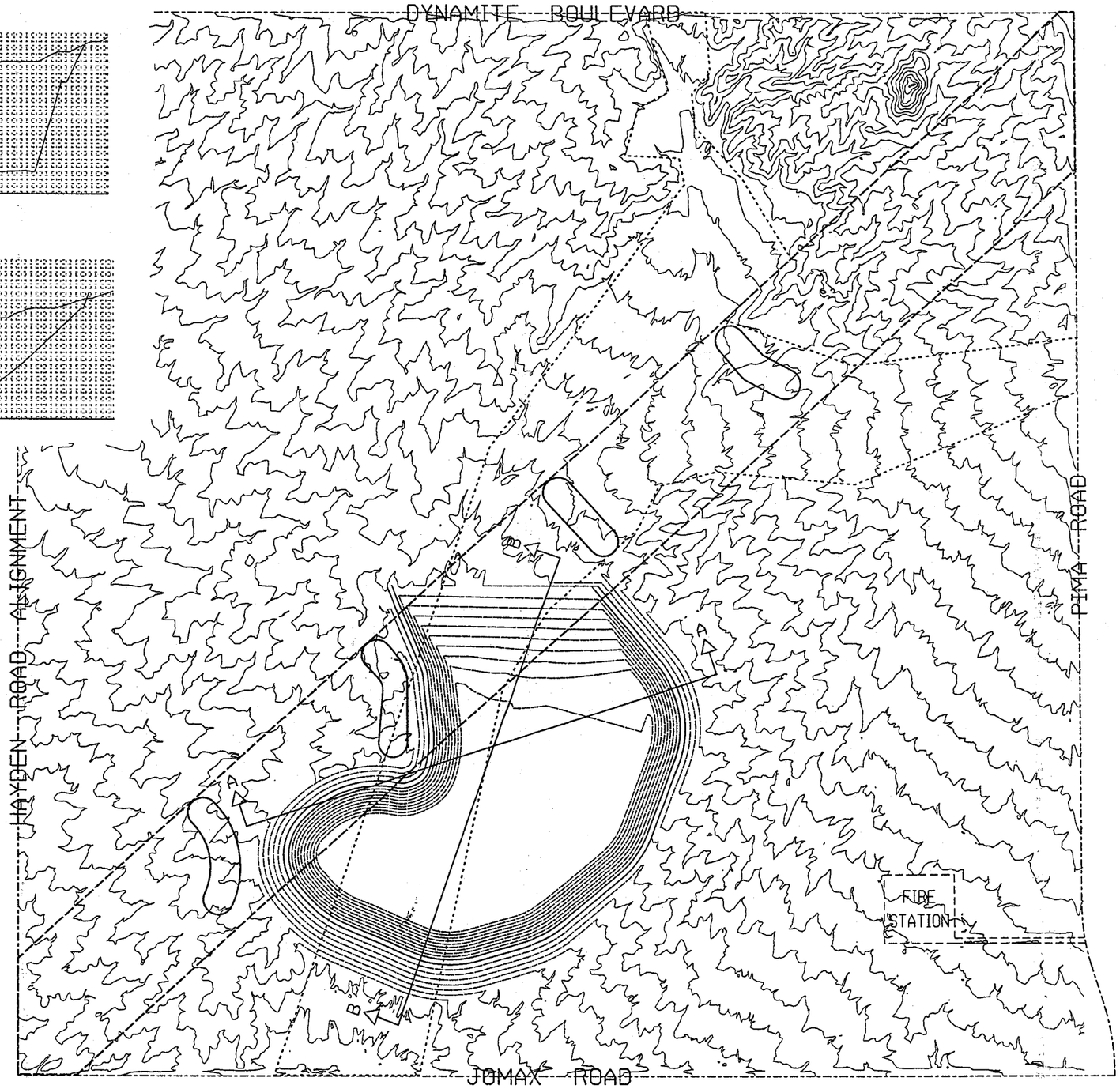
POWERLINE ESMT.	15.9 acres
WASH	15.5 acres
ADDITIONAL	37.9 acres
TOTAL AREA	69.3 acres

ELEVATIONS

TOP OF BERM	2170 ft
SPILLWAY	2160 ft
INV. ELEV.	2130 ft
EX. GROUND	2135 ft

EXCAVATION VOLUMES

CUT	1,985,548 CY
FILL	384,136 CY
NET	1,601,412 CY



Rawhide Wash Detention Basin

Alternative No. 2
Feasibility Location
w/ Pool East of
Powerlines

LEGEND

- Powerline Esmt.
- Wash Boundary
- Powerline Tower Maintenance Area

N

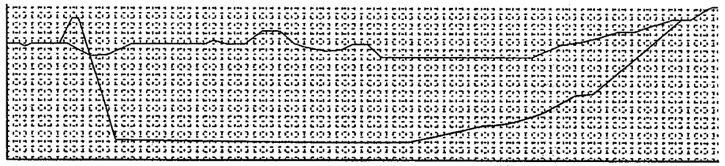
SCALE: 1 INCH = 600 FEET

300 0 600 1200

CONTOUR INTERVAL = 5 FEET

HDR
HDR Engineering, Inc.

SECTION A-A



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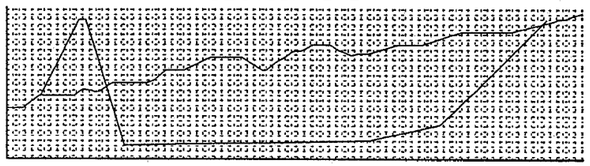

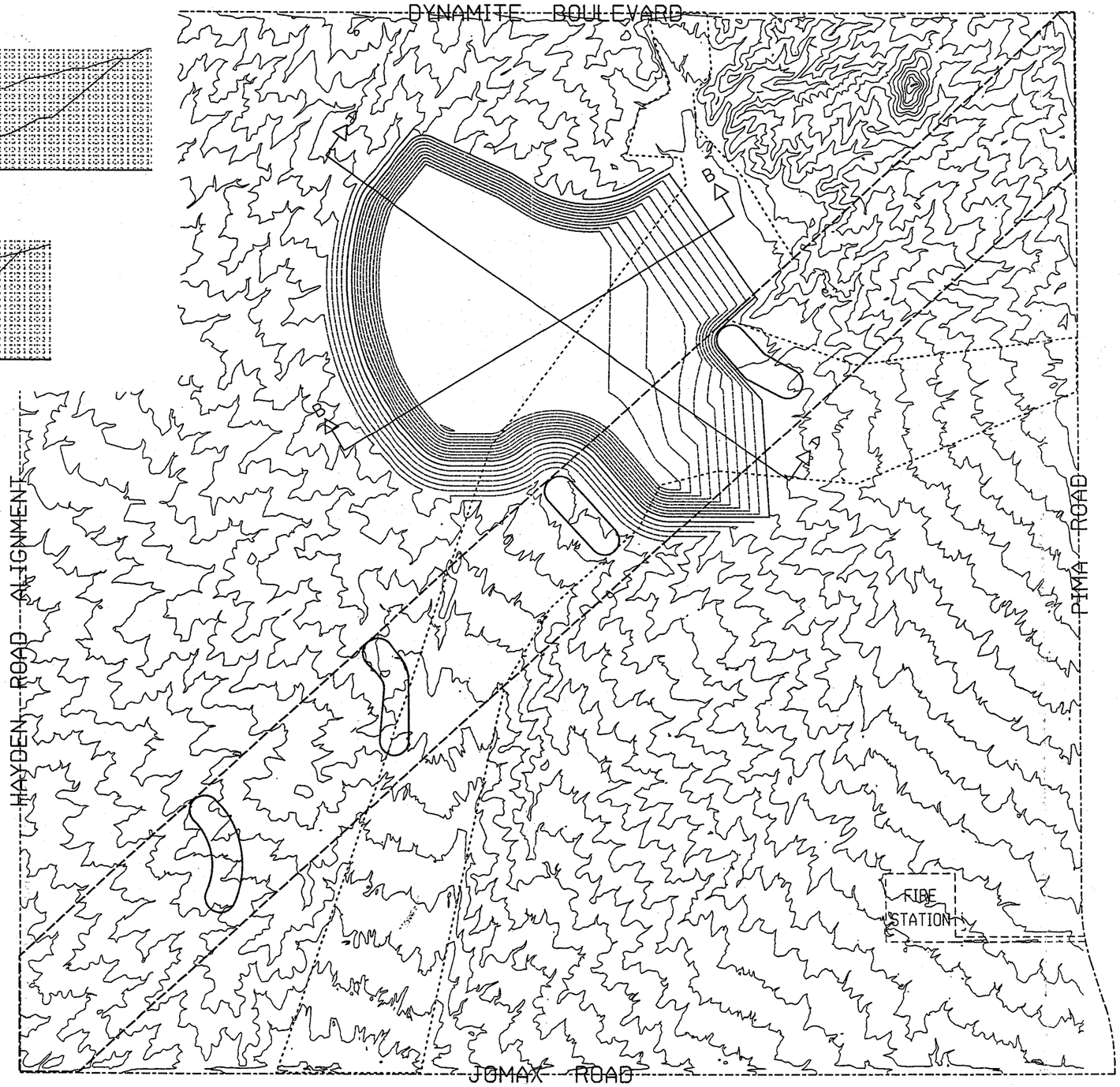

AREAS

POWERLINE ESMT.	12.8 acres
WASH	17.1 acres
ADDITIONAL	44.8 acres
TOTAL AREA	74.7 acres

ELEVATIONS

TOP OF BERM	2210 ft
SPILLWAY	2200 ft
INV. ELEV.	2175 ft
EX. GROUND	2180 ft

EXCAVATION VOLUMES

CUT	1,800,889 CY
FILL	349,737 CY
NET	1,451,152 CY

FLOOD CONTROL DISTRICT of MARICOPA COUNTY

Rawhide Wash Detention Basin

Alternative No. 3
Basin at Center
of Section - Pool
West of Powerlines

N

LEGEND

- Powerline Esmt.
- Wash Boundary
- Powerline Tower Maintenance Area

SCALE: 1 INCH = 600 FEET

300 0 600 1200

CONTOUR INTERVAL = 5 FEET

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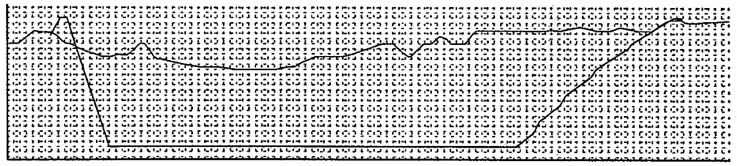
SECTION A-A



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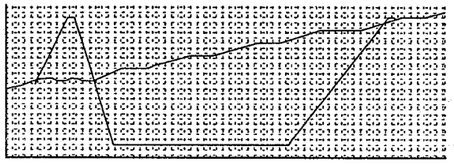


AREAS

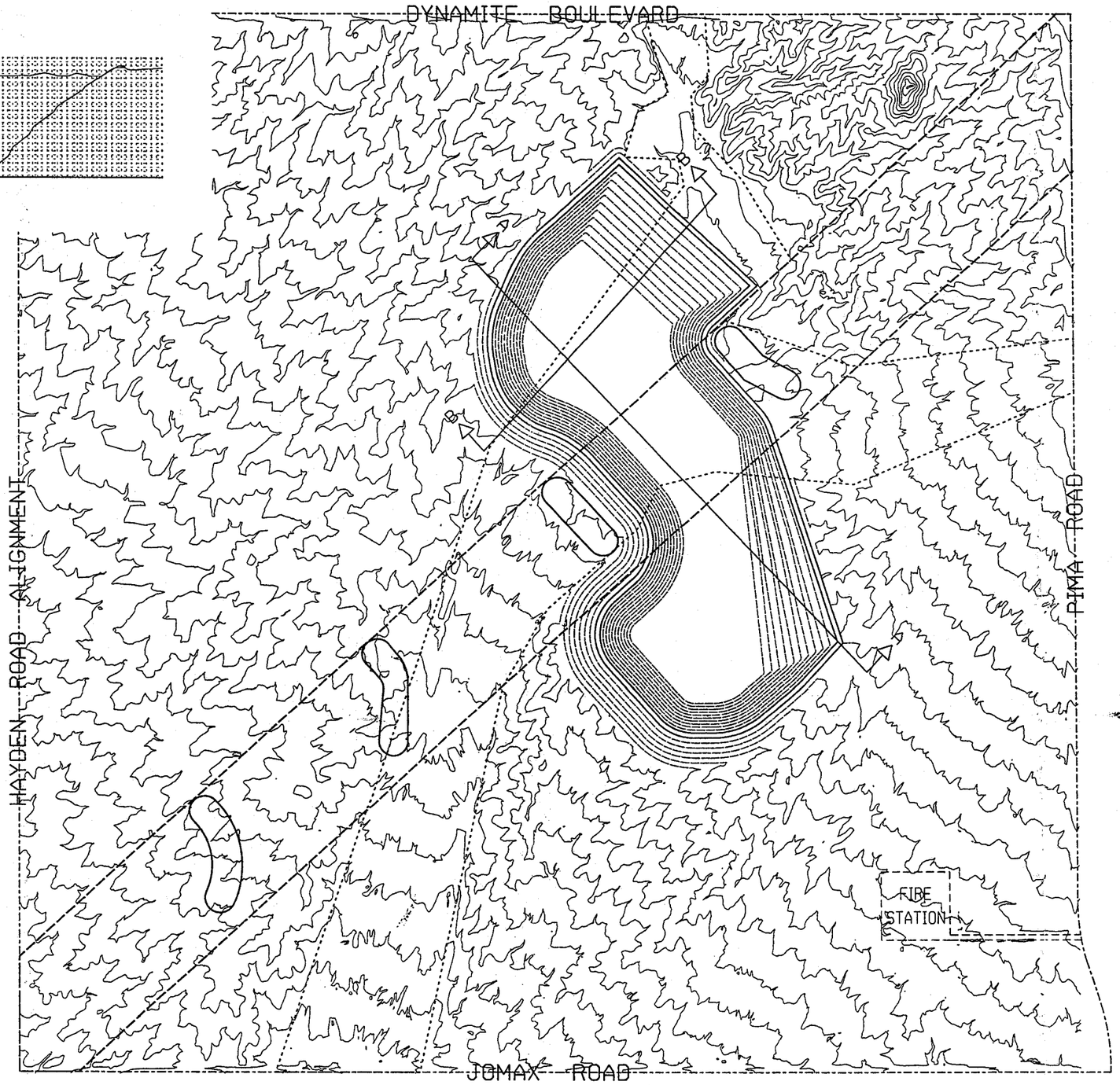
POWERLINE ESMT.	14.8 acres
WASH	15.5 acres
ADDITIONAL	43.8 acres
TOTAL AREA	74.1 acres

ELEVATIONS

TOP OF BERM	2210 ft
SPILLWAY	2200 ft
INV. ELEV.	2173 ft
EX. GROUND	2180 ft

EXCAVATION VOLUMES

CUT	1,787,681 CY
FILL	369,348 CY
NET	1,418,333 CY



Rawhide Wash Detention Basin

Alternative No. 4
Basin at Center
of Section - Pool
East of Powerlines

LEGEND

- Powerline Esmt.
- Wash Boundary
- Powerline Tower Maintenance Area

N

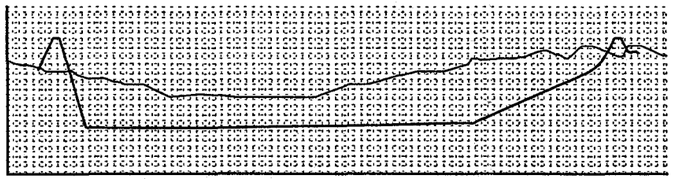
SCALE: 1 INCH = 600 FEET

300 0 600 1200

CONTOUR INTERVAL = 5 FEET

HDR Engineering, Inc.

SECTION A-A



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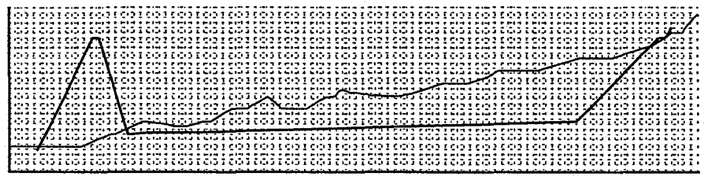
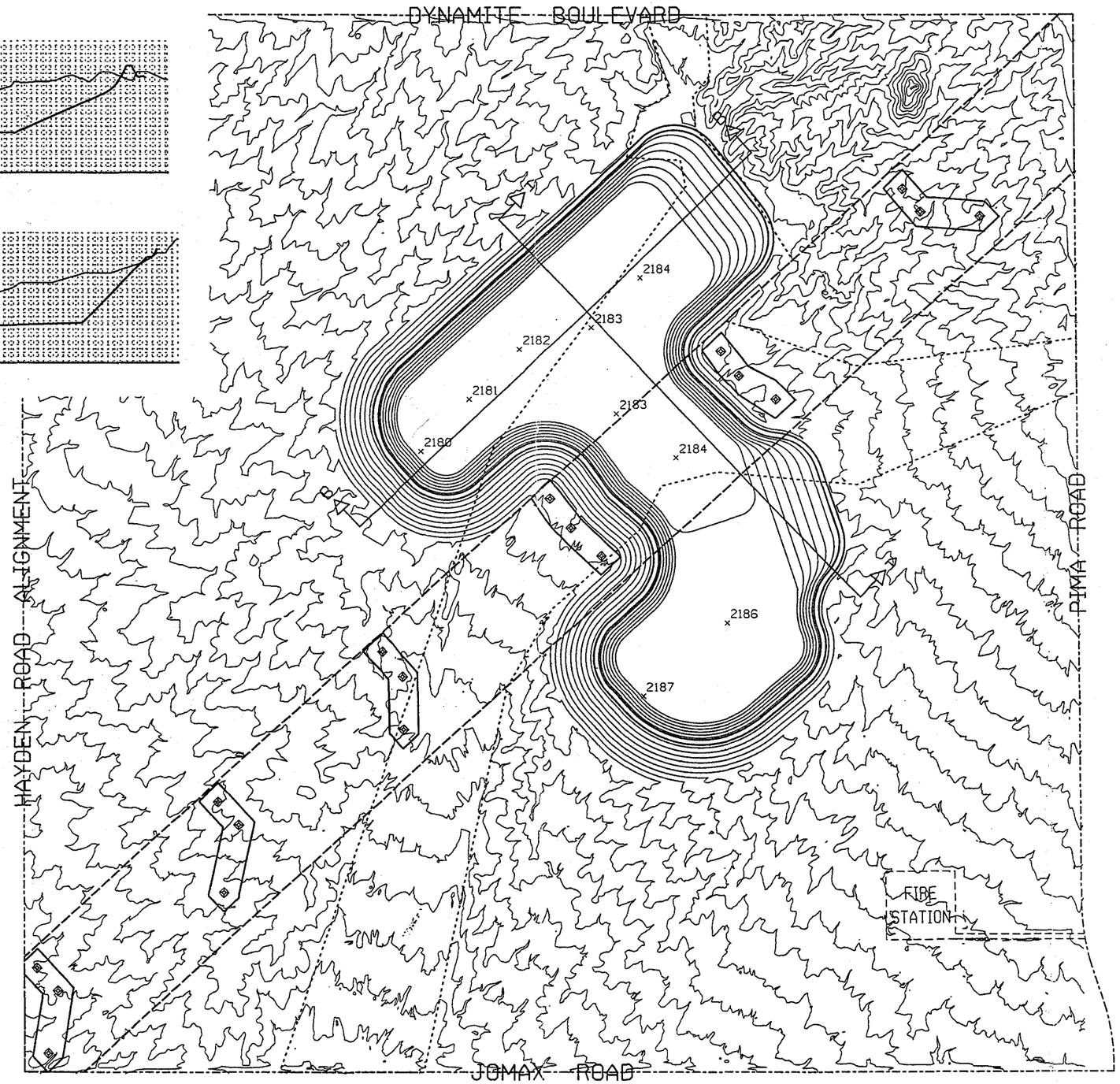




AREAS

POWERLINE ESMT.	15.4 acres
WASH	24.7 acres
ADDITIONAL	67.2 acres
TOTAL AREA	107.3 acres

ELEVATIONS

TOP OF BERM	2218 ft
SPILLWAY	2208 ft
INV. ELEV.	2180 ft
EX. GROUND	2180 ft

EXCAVATION VOLUMES

CUT	1,255,683 CY
FILL	1,109,857 CY
NET	145,826 CY

FLOOD CONTROL DISTRICT of MARICOPA COUNTY

Rawhide Wash Detention Basin

Alternative No. 4A
Basin at Center
of Section

LEGEND

- Powerline Esmt.
- Wash Boundary
- Powerline Tower Maintenance Area

N

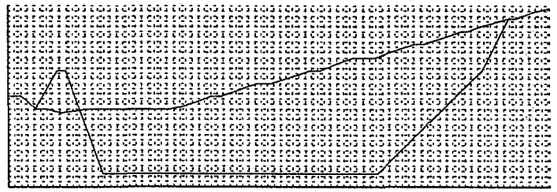
SCALE: 1 INCH = 600 FEET

300 0 600 1200

CONTOUR INTERVAL = 5 FEET

HDR
HDR Engineering, Inc.

SECTION A-A



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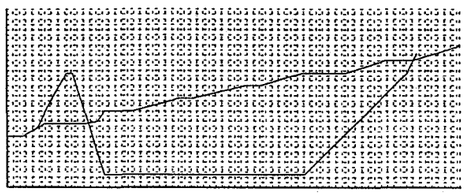
SECTION B-B



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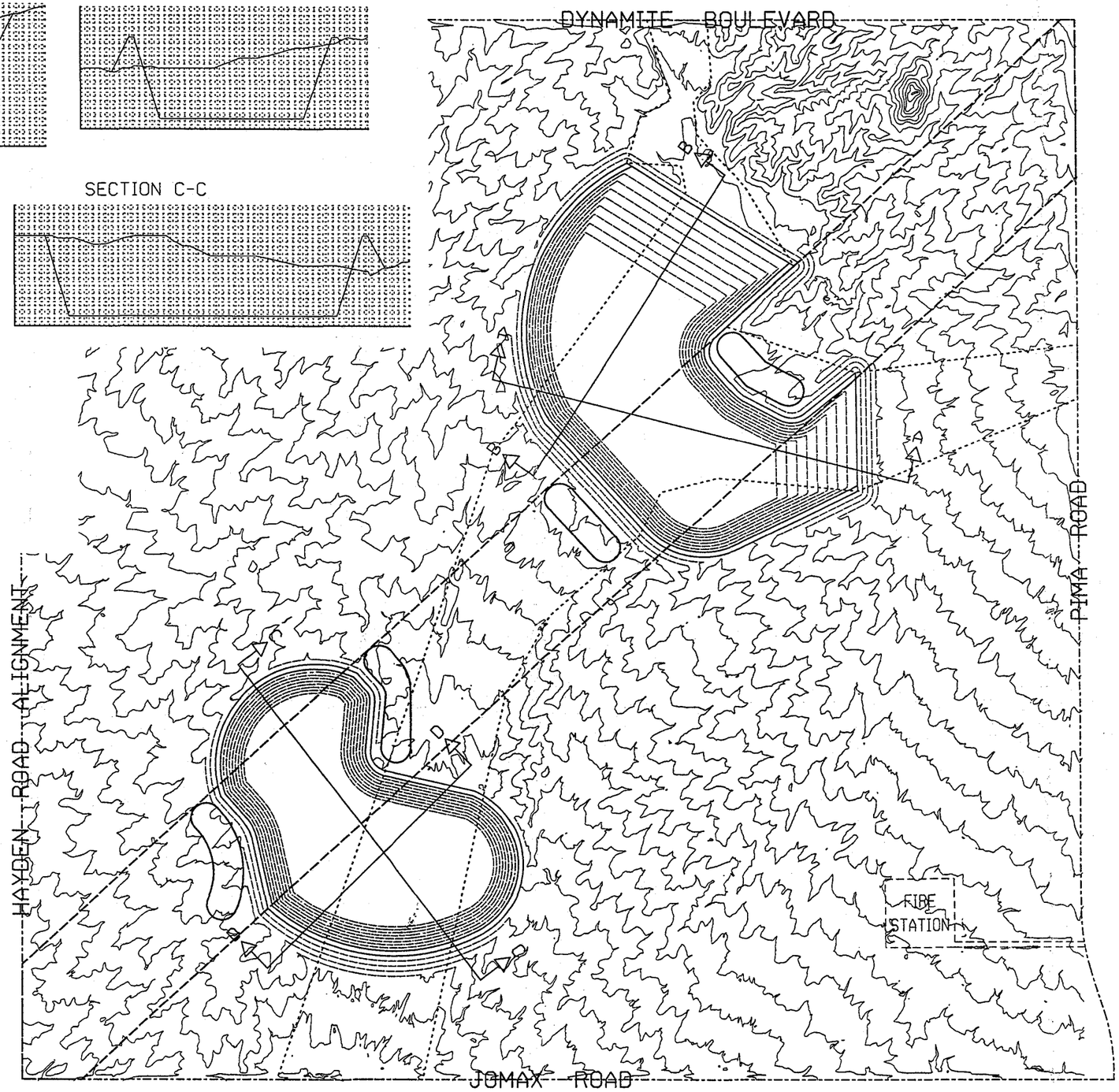


AREAS

POWERLINE ESMT.	28.4 acres
WASH	35.1 acres
ADDITIONAL	28.0 acres
TOTAL AREA	91.5 acres

UPSTREAM BASIN ELEVATIONS

TOP OF BERM	2205 ft
SPILLWAY	2195 ft
INV. ELEV.	2165 ft
EX. GROUND	2185 ft

DOWNSTREAM BASIN ELEVATIONS

TOP OF BERM	2155 ft
SPILLWAY	2145 ft
INV. ELEV.	2123 ft
EX. GROUND	2135 ft

EXCAVATION VOLUMES

CUT	2,939,021 CY
FILL	218,533 CY
NET	2,720,488 CY

FLOOD CONTROL DISTRICT of MARICOPA COUNTY

Rawhide Wash Detention Basin

Alternative No. 5
Two Basins - 1 at Center and 1 at Feasibility Location

N

LEGEND

- Powerline Esmt.
- Wash Boundary
- Powerline Tower Maintenance Area

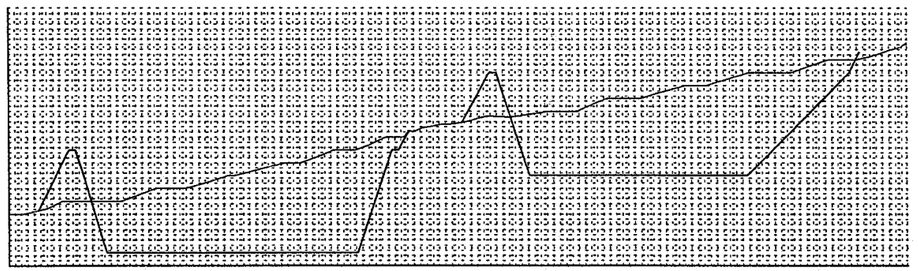
SCALE: 1 INCH = 600 FEET

300 0 600 1200

CONTOUR INTERVAL = 5 FEET

HDR
HDR Engineering, Inc.

SECTION A-A



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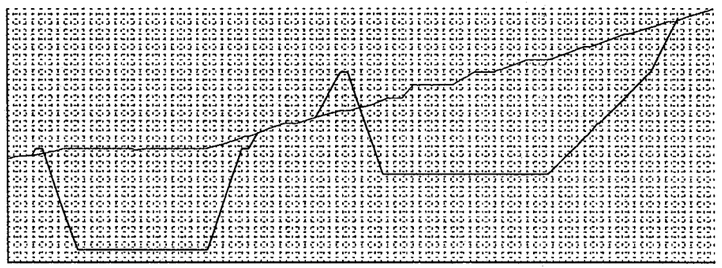


AREAS

POWERLINE ESMT.	31.4 acres
WASH	26.1 acres
ADDITIONAL	28.8 acres
TOTAL AREA	86.3 acres

UPSTREAM BASIN ELEVATIONS

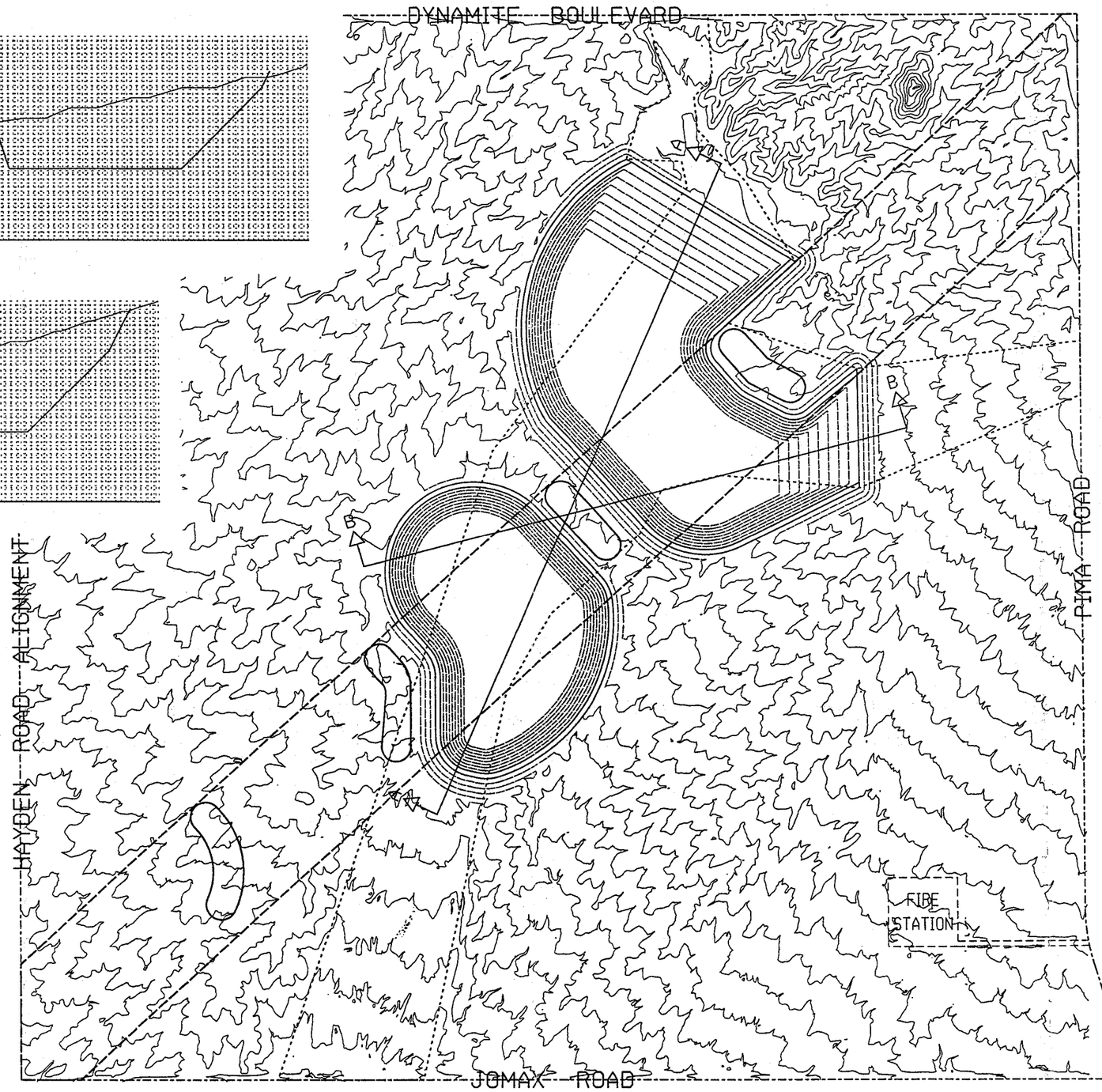
TOP OF BERM	2205 ft
SPILLWAY	2195 ft
INV. ELEV.	2165 ft
EX. GROUND	2185 ft

DOWNSTREAM BASIN ELEVATIONS

TOP OF BERM	2175 ft
SPILLWAY	2165 ft
INV. ELEV.	2138 ft
EX. GROUND	2152 ft

EXCAVATION VOLUMES

CUT	2,987,019 CY
FILL	191,590 CY
NET	2,795,429 CY



FLOOD CONTROL DISTRICT of MARICOPA COUNTY

Rawhide Wash Detention Basin

Alternative No. 6
Two Basins - Both
at Center of Section

LEGEND

- Powerline Esmt.
- Wash Boundary
- Powerline Tower Maintenance Area

N

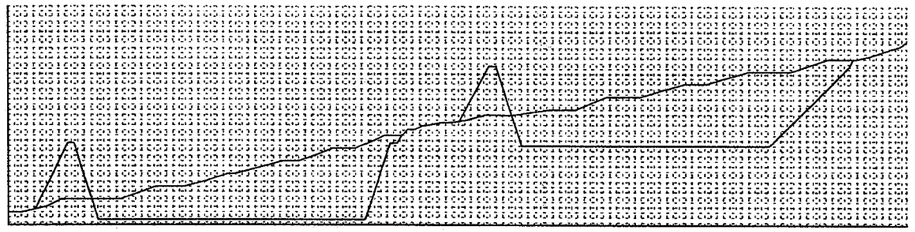
SCALE: 1 INCH = 600 FEET

300 0 600 1200

CONTOUR INTERVAL = 5 FEET

HDR
HDR Engineering, Inc.

SECTION A-A



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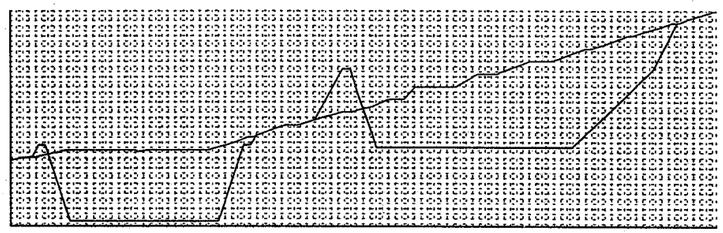
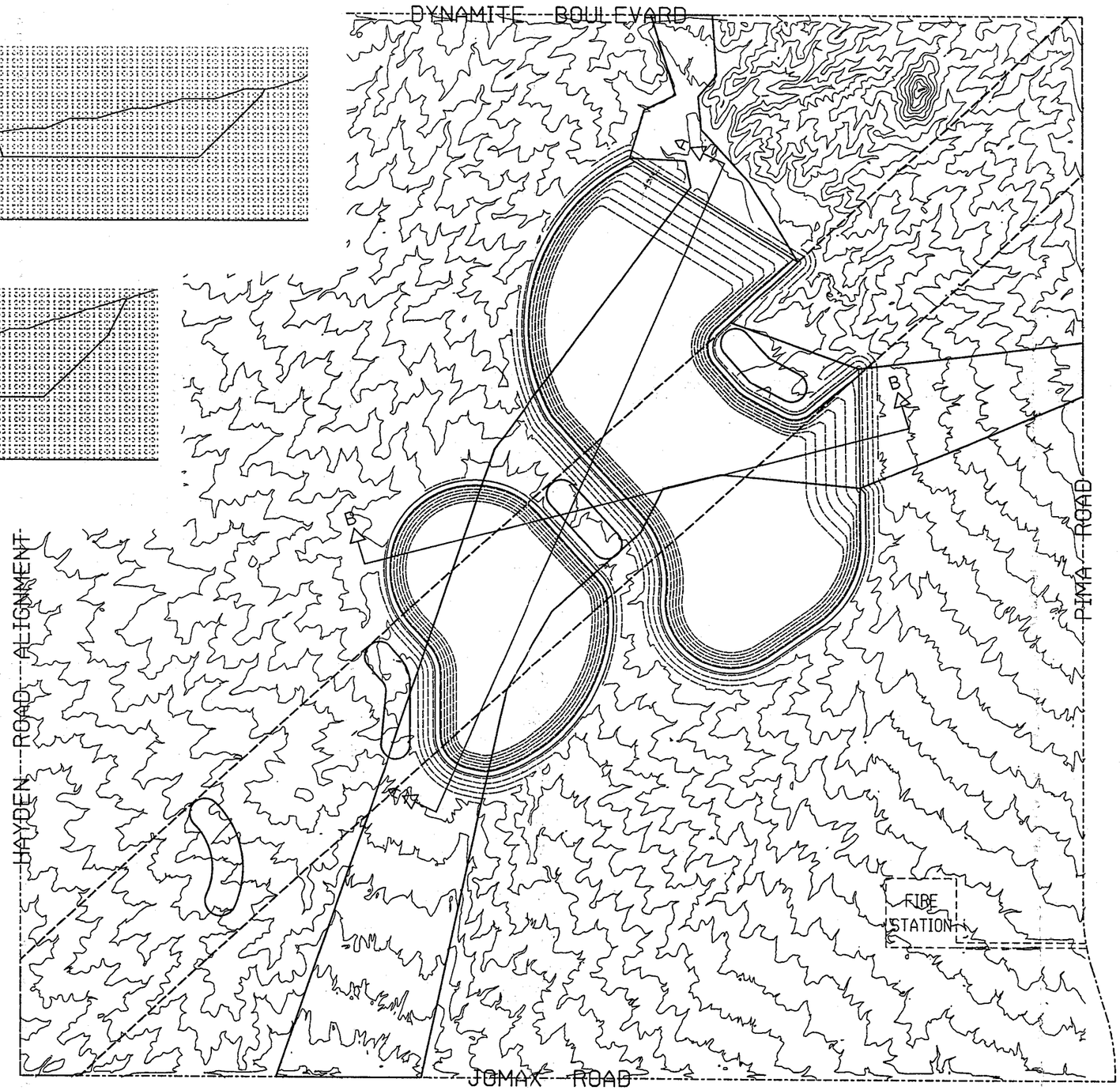




AREAS

POWERLINE ESMT.	31.4 acres
WASH	26.1 acres
ADDITIONAL	43.9 acres
TOTAL AREA	101.4 acres

UPSTREAM BASIN ELEVATIONS

TOP OF BERM	2207 ft
SPILLWAY	2197 ft
INV. ELEV.	2176 ft
EX. GROUND	2185 ft

DOWNSTREAM BASIN ELEVATIONS

TOP OF BERM	2177 ft
SPILLWAY	2167 ft
INV. ELEV.	2147 ft
EX. GROUND	2152 ft

EXCAVATION VOLUMES

CUT	2,751,824 CY
FILL	261,949 CY
NET	2,489,875 CY

FLOOD CONTROL DISTRICT of MARICOPA COUNTY

Rawhide Wash Detention Basin

Alternative No. 6A
Two Basins - Both
at Center of Section

N

LEGEND

- Powerline Esmt.
- Wash Boundary
- Powerline Tower Maintenance Area

SCALE: 1 INCH = 600 FEET

300 0 600 1200

CONTOUR INTERVAL = 5 FEET

HDR
HDR Engineering, Inc.

4.11 Other Hydrologic Models

In addition to the alternative models, several other models were created for comparison and for information:

- Existing condition model. Removing the basin data from the model used in the feasibility study created this model.
- Bypass Flow Model. This model provided information on possible bypass flows and the effect on the proposed basin.
- Spillway Design Flood Models. These models evaluated various spillway configurations for the design flood.

Each of these models is discussed in more detail in following sections of this report and applicable portions of each of these models are provided in the Appendix.

Changes made to the hydrology model for the alternative studies are based on the basin geometry and the location of the basin in the watershed. Three areas were modified for each alternative were:

1. Routed runoff from downstream subareas past the basin
2. Modified routing reach lengths
3. Adjusting the basin alternative storage-routing parameters. These include the volume, elevation, and discharge curves.

Several other hydrologic models were created to assist in the selection process for the preferred basin alternative. A short description of each model follows and the HEC-1 models are in the appendix.

4.12 Existing Conditions Model (Base Model)

An "existing conditions" model was created and flows were routed through the watershed. This is the "Do Nothing" model for the watershed and shows that the peak flow reaching the basin site, as depicted in alternative 4A (model concentration point C21.05), is 11,835 CFS and the volume passing this point is 1353-acre feet (AF).

4.13 Bypass Model

A model was created to determine the volume of stormwater that would bypass and not have to be stored by the Rawhide basin. While this may be a final design issue, bypass flows would impact the basin design. A peak of 500 cfs was diverted from each of the two major channels that would enter a basin. The results of this model show that the peak inflow for the basin was lowered by 825 CFS to a peak of 11,010 CFS and the total volume decreased by 242AF to a total of 1111 AF.

4.14 Spillway Design Flood Model (½ PMF)

State Statute requires that the emergency spillway be able to pass one-half of the probable maximum flood (½ PMF). This is required because the Rawhide Detention Basin is classified as a "High Hazard, Small to Medium" dam in the Department of Water Resources *Draft Guidelines for Design of Emergency Spillways*. Several models were

created of the feasibility ½ PMF model, to investigate the configuration of the emergency spillway. The size of the spillway influences the maximum water surface elevation in the basin and the height around the basin since it must not be overtopped. The ½ PMF reaching the confluence basin site, as shown in a model developed by the flood control district, is approximately 25,000 cfs. The table below shows the results of the spillway design flood modeling. Spillway models were done only for the preferred Alternative 4A to compare with the Feasibility Preferred Basin.

Table 4.4 - ½ PMF Spillway Variation Results

Basin	Feasibility Study Preferred Basin	Alternative Basin No. 4A	Alternative Basin No. 4A	Alternative Basin No. 4A	Alternative Basin No. 4A
Weir Length	700 Feet	200 Feet	200 Feet	400 Feet	600 Feet
Weir Coefficient	3.2*	3.2*	2.88	2.88	2.88
Low Level Outlet	2 – 60 Inch	2 – 36 Inch	2 – 36 Inch	2 – 36 Inch	2 – 36 Inch
Head On Weir	4.3 Feet	6.9 Feet	7.3 Feet	5.2 Feet	4.2 Feet

*From the feasibility study

The spillway weir breadths and flow depths influence the weir coefficient. According to Brater and Kings *Handbook of Hydraulics*, page 5-40, the breadth of a broad crested weir affects the weir efficiency and therefore a lower coefficient was justified for evaluating weir capacity. A broad crested weir spillway for this type of basin typically would have a large breadth and a lower coefficient. A lower coefficient was used based on this information.

5.0 Hydraulics and Sedimentation Analysis

Basin hydraulics were modeled using the level pool routing routine contained in HEC-1. This routine uses hydrographs routed to the basin site and area-volume rating curves developed using computer-generated models of the basin from a digital terrain model (dtm). The level pool routine also allows the modeling of the low-level outlet culverts and an emergency spillway weir flow. Sediment transport for Rawhide Basin was done by J. E. Fuller Hydrology and Geomorphology and is reported in this section.

5.1 Inlet Flows

The Rawhide Detention basin is located in the main channel of Rawhide Wash at the confluence of Rawhide Wash and a major tributary from the east crossing Pima Road. Both of these natural washes will be designed to flow into the basin. Rawhide Wash is deeply incised at its entrance to the basin enters directed into the basin. The tributary however is not as incised and will require a guide berm to contain the flows and direct them into the basin. There also are other breakout points identified by the City of Scottsdale further upstream on the tributary. All of the break out points will require some berming to guide flows to the basin and take full advantage of the storage the basin provides.

5.2 Outlet Flows

Outlets from the basin are two types. All storm events captured by the basin, up to and including the 100-year event will discharge completely from the basin through ungated culverts at the low end of the basin. The culvert outlet was modeled in HEC-1 for the Phase I work as a 2 barrel, 36-inch culvert. As the basin design progresses during Phase II, the size, type, and hydraulic characteristics of the low-level outlet will be refined.

The emergency spillway is designed to pass flows greater that the 100-year event and up to the ½ PMF event to prevent overtopping of the embankment. Sufficient freeboard is included in the embankment height to allow the entire ½ PMF to pass with freeboard through the basin and not cause major damage. The design of the spillway will comply with the Arizona Department of Water Resources (ADWR) *Draft Guidelines for Design of Emergency Spillways* (Rev. 4/98).

Phase I design of the spillway for the preferred alternate, 4A, included the analysis previously discussed in Section 4.10.3 and discussion of the design parameters with ADWR. The spillway modeled for the Alternate 4A was 200 feet wide and had a 5-foot breadth. This provided a 7.3 depth of flow over the spillway and a total of 2.7 feet of freeboard to the top of the embankment. Other spillway design configurations will be analyzed during Phase II work on this project. The spillway could be made longer, thus limiting the depth of flow over the weir and lowering the overall embankment height. Multiple spillways are another way to lengthen the weir. Multiple spillways could be used if the basin configuration permits.

Items discussed with ADWR are as follows:

- Routing of the ½ PMF through the basin can be done starting with the basin full, or empty.
- Require access to the spillway for inspections (i.e. maintenance road on top of the berm).
- Would prefer not to have fill on the spillway that would wash out with an event. This would prevent a thorough inspection.
- No plants growing in spillway or at the foot of the spillway.
- Boulders imbedded in spillway would cause a lot of questions and probably a lot of hydraulic modeling.
- Would want a full ½ PMF hydrologic model, not a single basin model for final review. Single basin acceptable for preliminary investigations.
- Prefer spillway be separate from and not on embankment if possible.
- Soil Cement not acceptable for spillway. RCC is acceptable but Concrete preferred.

During the Phase II work these will be some of the most important issues. The effort in Phase II of the project will continue to coordinate closely with the ADWR Dam Safety Section.

5.3 Sediment Flows

Phase II of the Rawhide Detention Basin design may include some provision for passing through a portion of the sediment carried into the basin site from the contributing inflow channels. Sediment conveyance is currently an issue in projects proposed for nearby watersheds. It is prudent, therefore, that the impact of trapping sediment in this basin is studied and that some type of solution developed. The solution should be acceptable to all stakeholders since the cost of this solution is additional to cost presented in the feasibility study.

5.4 Introduction to Sedimentation Analysis

This section summarizes the results of the sediment analysis performed for the Rawhide Wash Project– Phase 1. The objective of the sediment analysis was to estimate sediment yield to the proposed detention basin. The estimate of sediment yield will be used to establish the required sediment storage volume and to determine long-term sediment maintenance needs.

5.5 Methodology

Several procedures were used to estimate sediment yield to the proposed Rawhide Detention Basin. These methodologies included:

- Bureau of Reclamation Regression Curve (BUREC Curve)
- Pacific Southwest Interagency Council Method (PSIAC Method)
- Flaxman Method
- Modified Universal Soil Loss Equation (MUSLE)
- Renard Method
- Yang Bedload Transport Function
- Zeller-Fullerton Total Bed Material Transport Function
- Sediment Concentration Method

References describing the procedures and assumptions for each of the methodologies used to estimate sediment yield are listed in the bibliography. Descriptions of the each of the methodologies are provided in the following paragraphs.

BUREC Curve. The BUREC has designed and maintained numerous dams and reservoirs in the arid west. Reservoir survey data were collected from 28 reservoirs in the arid southwest, and were used to develop a regression equation relating sediment yield to drainage area. Application of this equation to the Rawhide Wash watershed resulted in a sediment yield estimate of 13.6 acre-feet/year (AF/yr).

PSIAC Method. The PSIAC Method (PSIAC, 1968) was developed for planning level assessment of sediment yield on drainage basins larger than 10 square miles in the arid southwest. Calibration tests of the PSIAC method have indicated that it generates accurate estimates of sediment yield for watersheds in Arizona (Renard and Stone, 1982).

The method consists of applying basin-specific information for nine factors: geology, soils, climate, runoff, topography, ground cover, land use, upland erosion, and channel erosion/sediment transport. Sediment yield estimates can then be made using ratings for each factor. Watershed information for the PSIAC Method were obtained from SCS Soils Maps (SCS, 1986), maps of regional geology (Wilson et. al., 1957), land use plans for Scottsdale, the HEC-1 model provided by HDR Engineering Inc. (HDR), and climatic data for Arizona (Sellers et. al., 1985). Application of the PSIAC method to the Rawhide Wash watershed resulted in a sediment yield estimate of 3.3 AF/yr.

Flaxman Method. The Flaxman Method (1972, 1974) consists of a regression equation for western rangelands that relates sediment yield to five parameters: (1) the ratio of average annual precipitation to average annual temperature, (2) average watershed slope, (3) percent soil particles greater than 1.0 mm, (4) soil aggregation index, and (5) the 50% (2-year) discharge. Watershed data required for the Flaxman Method were obtained from SCS soils maps (SCS, 1986) and Arizona climatic data (Sellers et. al., 1985). Application of the Flaxman Method to the Rawhide Wash watershed resulted in a sediment yield estimate of 1.4 AF/yr.

MUSLE. The MUSLE is an empirically derived methodology for predicting sediment yield on a per event basis. That is, the MUSLE method may be used to predict sediment yield for specific flood recurrence intervals, rather than for average annual yield. The MUSLE method relates sediment yield to the following characteristics: (1) storm runoff energy, (2) soil erodibility, (3) a slope-length factor for overland flow, (4) watershed cover and management, and (5) local erosion control practices. Watershed data required for the MUSLE were obtained from SCS soils mapping and the HEC-1 model provided by HDR. The HEC-1 model was modified by adding precipitation data for the 2-, 5-, 10-, 25-, and 50-year events. When applied to the Rawhide Wash watershed, MUSLE predicts sediment yield as summarized in Table 4.1. Average annual sediment yield from MUSLE may be estimated by probability weighting yield estimates for specific recurrence intervals. The estimated average annual sediment yield for the Rawhide Wash watershed obtained from the MUSLE method is 3.0 AF/yr.

Table 5. 1 – Sediment Yield Estimates

Sediment Yield Estimates		
Recurrence Interval	Sediment Yield Estimate (AF)	
	MUSLE	5% Sediment Conc'n
Q2	1.8	13
Q5	4.2	-
Q10	6.3	33
Q25	9.4	-
Q50	12.0	-
Q100	22.2	69
Average Annual	3.0 AF/yr	11 AF/yr

Renard Method. A method for estimating sediment yield was developed by Renard (1972; Renard & Stone, 1982) using sediment data from the NRCS Agricultural Research Station at Walnut Gulch, Arizona. The method consists of a simplified equation relating average annual sediment yield to drainage area. When applied to the Rawhide Wash watershed, the Renard Method predicts sediment yield of 5.5 AF/yr.

Yang Bedload Transport Function. Yang (1984) developed an empirical sediment transport function to predict movement of sand and gravel as bedload in alluvial streams. Yang's equation has been used extensively in the southwest, and has been tested by numerous investigators (cf. Yang, 1991). Using a hydraulic rating curve for the upstream channel, Yang's bedload function may be applied to the Rawhide Wash design hydrograph to obtain an estimate of bedload sediment transported into the basin. Since bedload consists of the coarsest sediment material transported into the basin, it may be used to estimate the material most likely to be trapped in a sedimentation basin. The Yang method represents a lower limit of total sediment yield, since it does not explicitly include the suspended and wash load. A single-section rating curve was developed from 1-foot contour interval topographic mapping provided by the City of Scottsdale (COS). When applied to Rawhide Wash, the Yang function predicts bedload delivery of 4.4 AF during the 100-year flood.

Zeller-Fullerton Equation. The Zeller-Fullerton sediment transport function was developed by integrating the Meyer-Peter, Muller bedload equation and Einstein's suspended bed-material equation to obtain a total bed-material load function (ADWR, 1985). Because the Zeller-Fullerton equation uses the hydraulic characteristics of the stream to estimate sediment transport, it is best applied to specific flood events, rather than to average annual conditions. Rating curves for the main channel and primary tributary upstream of Alternative #4a basin location were developed from the COS 1-foot contour interval topographic mapping and the HEC-RAS hydraulic program. The HEC-1 100-year hydrograph was then discretized and the sediment transport capacity was integrated over the hydrograph to estimate the total movement of sediment from each tributary into the basin. When applied to Rawhide Wash, the Zeller-Fullerton equation predicts bedload delivery of 9.0 AF during the 100-year flood (4.8 AF from the main channel, 4.2 AF from the primary tributary).

Sediment Concentration Method. No direct measurements of total sediment load for Rawhide Wash are available, and regional estimates of sediment concentration for flood events are limited. However, the limited available sediment sampling data and theoretical sediment concentration relationships can be applied to a design or flood hydrograph for a watershed to generate a sediment volume for that flow event. Sediment concentration on ephemeral streams typically ranges from 0.5 to 20 percent. Above 20 percent concentration, flow is classified as hyper-concentrated, as mud floods (approx. 20-40%), mud and debris flows (approx. 40-60%), or as landslides (> 60%).

An average sediment concentration of five percent was used to estimate potential sediment delivery volumes for Rawhide Wash based on engineering judgment and local experience. It is noted that higher sediment concentrations are more likely for the lower

recurrence interval event (10-year or less) because the less frequent (larger) events tend to become supply-limited, and therefore, less concentrated. Sediment yield estimates based on concentration were made for the 2-, 10-, and 100-year event (Table 1) and for average annual conditions. The average annual flow volume was estimated at 224 AF using the Renard equation for annual water yield (Renard and Stone, 1982). When applied to Rawhide Wash, the sediment concentration method predicts an average annual yield of 11 AF, and 69 AF during the 100-year flood

Sediment Removal Data. Unfortunately, no detailed records were available to document past rates of sediment removal from local flood control facilities from the Flood Control District of Maricopa County (FCDMC) or the cities of Scottsdale or Phoenix. Such data would be useful to calibrate the methodologies applied to Rawhide Wash, and should be obtained during Phase 2 of this project.

5.6 Results of Sedimentation Investigation

The results of application of various sediment yield methodologies to the proposed detention basin site on Rawhide Wash are summarized in Table 4.2. The recommended average annual sediment yield was estimated by averaging the remaining results of all the methodologies applied to the watershed (Table 4.3). Reservoir trapping efficiency, or the ratio of sediment delivered to sediment collected in the basin, was not considered as part of the Phase 1 study, due to uncertainty regarding the basin design or a proposed low flow bypass channel. Because trapping efficiency is generally less than 100%, it is likely that the recommended sediment storage volume is conservative.

5.2
5.3

Table 5. 2 – Single Sediment Volume Estimates

Single-Event Sediment Volume Estimates (acre-feet)			
Method	**100-Year**	**10-Year**	**2-Year**
Sediment Concentration[4] 5 % by volume	69	33	13
Zeller-Fullerton Transport Equation	9		
MUSLE	22		
RECOMMENDED VALUE	69	33	13

Table 5. 3 – Average Annual Sediment Volume Estimates

Average Annual Sediment Volume Estimates (acre-feet)	
Method	**Average Annual Yield (AF/yr)**
PSIAC	3.3
BUREC Equation	13.6
Flaxman	1.4
Renard	5.5
MUSLE	3.3
Sediment Concentration	11.2
AVERAGE	6.4

Assuming the District's typical sediment removal schedule of once every five years, on average, approximately 100 AF of additional storage should be provided in the basin for sedimentation. Sedimentation monuments should be established during final design and construction from which to monitor sediment accumulation in the basin. Annual inspection of the basin is recommended prior to the summer monsoon season, as well as after major storms.

5.7 Recommendations on Sedimentation

Based on this sediment analysis, the following are recommended for the design and operation of the proposed Rawhide Wash Detention Basin:

- Annual Sediment Inspection
- Establish Sediment Monitoring Monuments
- Preliminary Design Based on 100 AF of Sediment Storage

The estimates of sediment yield described above should be re-evaluated during Phase 2 of this project.

Additional investigations for this project have provided a better estimate of the sediment transported to the basin than that in the feasibility study. The result is a larger sediment deposition in the basin and a more costly maintenance program. During Phase 2 of the project, however, it is expected even more detailed information and designed bypass flows will show a decrease in this amount of sediment deposited in the basin.

A bibliography of the documents and methodologies used for the sediment analysis is found in Appendix I of this report

6.0 Soils Investigation

AGRA Earth & Environmental, Inc. (AEE) has completed a geotechnical engineering analysis of alternative detention basin locations for the planned Rawhide Wash Detention Basin (1994 & 1999). These investigations included exploratory test pits and borings, laboratory analysis of soil sample collection, laboratory analysis and reconnaissance level geologic mapping. Discussions of the investigation locations, the geotechnical profile at the project site, and construction considerations are presented in the following sections of this report.

6.1 Investigation Locations

The Rawhide Wash Detention Basin will be located within Section 36, T5N, R4E in Scottsdale, Arizona. The section of land is bounded by Dynamite Boulevard to the north, Pima Road to the east, Jomax Road to the south and the Hayden Road alignment to the west. The basin alternatives are located within all quadrants of the section. The basin

alternatives require excavation depths of less than 40 feet and berm heights of less than 40 feet above existing ground.

The preliminary geotechnical investigation (AEE, 1994) primarily focused on the southwest quadrant of the section, since the feasibility study detention basin was sited in that quadrant The presently preferred alternative (No. 4A) is located within the central part of the section. The earlier study identified rock outcrops within the northeast quadrant of the section. Considering the potential for buried bedrock ridges to be present at this location, the supplemental geotechnical investigation (AEE, 1999) was completed to evaluate the geotechnical profile within the area encompassed by the presently preferred alternative.

6.2 Geologic Setting & Geotechnical Profile

The project site is located in the northeastern portion of the Paradise Basin, which is flanked by the McDowell Mountains to the east, and the Phoenix Mountains and Union Hills to the west. As the mountain ranges were continuously uplifted, large volumes of sediment were deposited in the Paradise Basin. The boundary between the mountain ranges and basin floor generally is occupied by alluvial fans, which are delta-shaped deposits of silt, sand, gravel and cobbles that are carried down intermittent stream channels and deposited along the mountain flanks.

The land surface at the project site slopes gradually to the southwest at a gradient of about three-percent, with elevations varying from about 2270 feet at the northeast corner of the site to 2110 feet at the southwest corner. The land surface generally is undulatory with several subparallel stream channels trending downslope. The site is transected by Rawhide Wash, which flows in a southerly direction through the middle of the section. Rawhide Wash is characterized by a poorly defined, braided channel, particularly within the southern portion of the quadrant. Several smaller washes enter the section along Pima Road to the east.

The project site is characterized by three primary geologic units, including recent alluvium, Quaternary alluvium and Precambrian granite. The Precambrian granite is exposed at the surface in approximately the northeast quarter of the northeast quadrant of the section. The great majority of the site is underlain by Quaternary alluvium. The Quaternary alluvium predominately consists of grus deposits, which are accumulations of rock fragments resulting from the granular disintegration of granite. The grus deposits are mostly made up of sand-sized particles of quartz and feldspar. Only a small amount of gravel, typically fine grained, and virtually no cobbles or boulders were encountered outside of the area where Precambrian granite outcrops. Recent alluvium is present along active washes and also occurs as Holocene apron fan deposits having a thickness varying from about 3 to 10 feet.

The Quaternary alluvium predominately consists of silty sand and sand, with a subordinate amount of clayey sand. The sand typically is well graded and angular to subangular. The subsurface soils are un-cemented to weakly cemented, with some moderately cemented lenses increasing in frequency with depth. The soils generally are

non-plastic, although the clayey sands are low to medium in plasticity. The deposits are moderately firm to hard, with standard penetration test blow counts (N-values) below 10 feet varying from 20 to refusal (larger than 50). The upper 3 to 10 feet of soils encountered over the site appear to be Holocene alluvial fan deposits that possess a high collapse potential --- i.e., undergo large volume changes when wetted.

6.3 Alternatives Analysis

As concerns the basin alternatives considered, the only significant difference between the sites is the possible presence of Precambrian bedrock within the areas of the basins. As noted, granite outcrops at the northeast corner of the section. However, it was not encountered in any of the borings or test pits completed for the preliminary and supplemental geotechnical investigations. The preliminary investigation was focused on the southwestern quadrant of the section, where it would be expected that the soil-bedrock contact would be the deepest. The supplemental investigation focused on the preferred alternative (No. 4A) located at the center of the section. The borings advanced to a depth of 40 feet for this investigation also did not encounter bedrock. It is possible that excavation for basin alternative No. 3, and for the northern basins of alternative Nos. 5 and 6, could encounter bedrock. However, this would need to be confirmed by site specific investigations, including seismic refraction surveys.

6.4 Geotechnical Conclusions

The geotechnical profiles at the locations of all alternatives are essentially the same, with the only potential variations being related to the presence of intermittent stream beds and the variable depth of Holocene alluvial deposits. Conventional earth moving equipment should be able to excavate the soils to the depth required with minimal difficulty. The moderately cemented lenses encountered in some of the borings appear to be relatively thin and should not significantly impede the progress of excavation.

As concerns design considerations, there are not significant differences between the alternatives considered. Because of the collapse potential of the upper 3 to 10 feet of soils within the section, these materials will need to be positively treated or removed beneath the foundations of the embankments. The excavated soils will be usable as fill for the embankments, however, compacted embankments constructed using the soil types present within the section will be brittle and susceptible to cracking at low tensile strains. When compacted, the soils also may be susceptible to shrinkage cracking. Because of the uncertainties related to the potential for shrinkage and differential settlement cracking, it will be necessary for the embankments at any of the alternative basin sites to be designed to provide positive defenses against cracking.

7.0 Concept Design

This section of the report includes a description of the variables that impact the visibility of the proposed facility. These variables include setbacks/siting, berm height, revegetation and berm contouring. An overview of the three-dimensional computer photo simulations prepared to identify the visual impact of the basin is also included.

7.1 Basin Siting/Setbacks

The basin is proposed to be located generally in the northern and eastern portions of the square mile bounded by Pima Road, Jomax Road, Dynamite Boulevard and the Hayden Road alignment. The siting of the basin will result in significant setbacks from the surrounding roadways. Between the roadways and the basin will be wide buffers; 500 feet from Dynamite Boulevard, 1000 feet from Pima Road, and 1500 feet from both Jomax Road and Hayden Road. These areas should be avoided and left undisturbed during construction of the basin. After construction, the buffers should be enhanced with plantings of native trees and shrubs at locations in which the basin is visible from the surrounding roadways.

7.2 Berm Height

The height of the berm is dependent on the location, depth and footprint of the pool basin, the height of the overhead power lines and the need to minimize the off site visibility of the facility. The average height of the existing desert vegetation canopy on the project site and surrounding area is generally 28 to 35 feet. Structures, landforms, power poles and other items above this height tend to become more visible. Consequently, a conscious effort was made to keep the berm height within the range of 28 to 35 feet. The average height of the berm is 32 feet. This is the average height along 65% of the linear frontage of the berm. Only where the berm crosses the existing Rawhide Wash sandy bottom channel does the berm exceed this height. For approximately 1000 linear feet the berm is at its highest point of 38 feet. This height gradually decreases to zero where the basin meets existing grade.

Three-dimensional computer photo simulations were prepared to evaluate the visual effects of the berm at this height. The simulations were prepared by photographing the project site from various locations, modeling the proposed basin design and merging the computer model with the photographs. The computer was used to graphically depict the before, during construction and after conditions of the basin with landscaping and other aesthetic treatments. These simulations are presented on Figures 10, 11, 12, and 13. The computer simulations illustrate the basin with an average berm height of 32 feet and the highest point of 38 feet at the Rawhide Wash sandy bottom. The time frame of the after construction condition is estimated to be approximately nine months subsequent to the completion of revegetation.

7.3 Berm Contouring

Significant opportunities exist to blend the berm with the surrounding topography. Discussions were held with the Arizona Department of Water Resources (ADWR) concerning allowable aesthetic treatments for the berm and basin. ADWR indicated that a wide range of aesthetic treatments were possible as long as the structural integrity of the minimum embankment section was not impacted.

Possible techniques to blend the berm into the desert include varying the width and contouring the base of the berm to simulate naturally occurring ridges, creating "faux" ridgelines which extend parallel or even perpendicular from the berm, and varying the profile of the top of the berm using earth, rocks and other natural-appearing materials so

long as the integrity of the embankment core is not affected. All of these techniques could include the placement of rock formations and landscaping on all surfaces of the berm (including the pool basin) as long as the structural integrity of the berm is not compromised.

Rawhide Wash Detention Basin

Design Simulation

View From Dynamite Road Looking South

1

Existing Conditions
Before Construction

Computer Simulated
3d Model
During Construction

Proposed Design
Simulation
After Construction

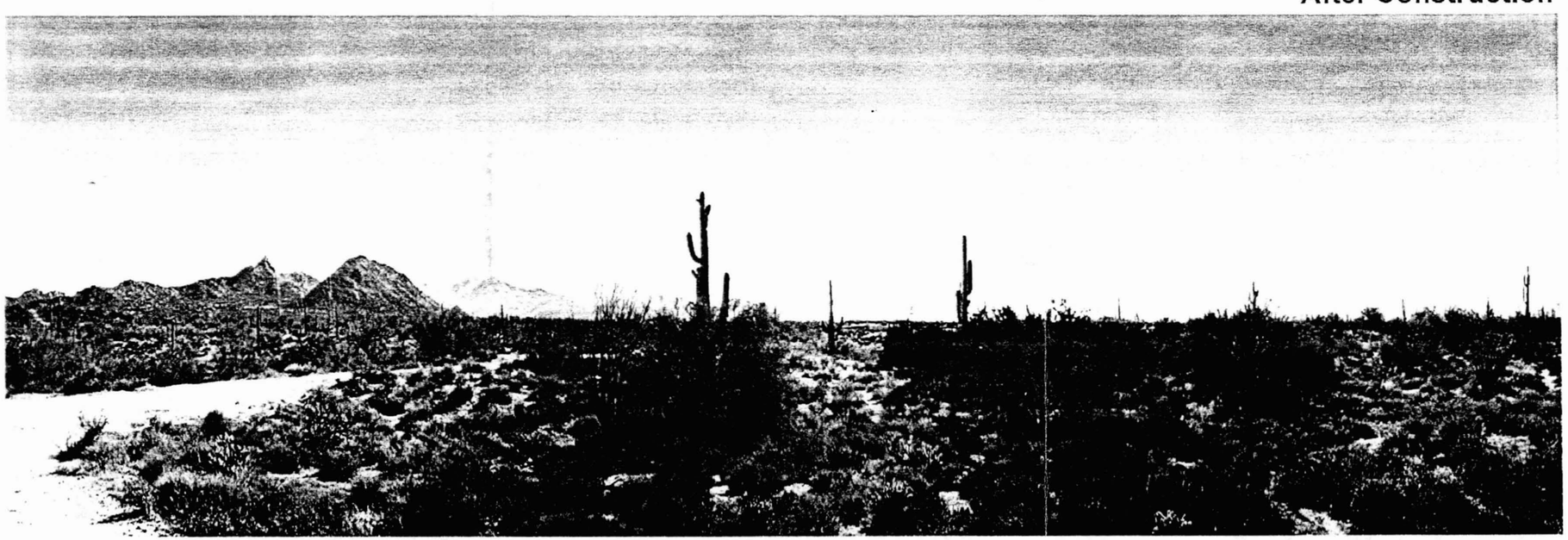
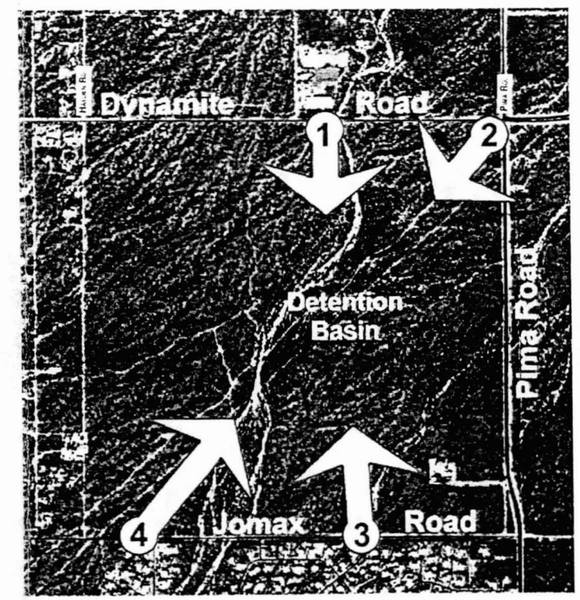


Photo Location Map



LVA
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Fax 602 994 7332
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Rawhide Wash Detention Basin

Design Simulation

View From Corner of Dynamite & Pima Roads Looking Southwest

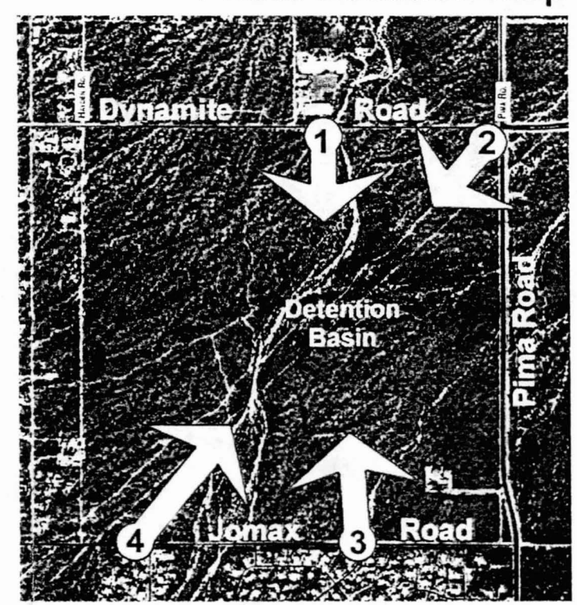
②

Existing Conditions
Before Construction

Computer Simulated
3d Model
During Construction

Proposed Design
Simulation
After Construction

Photo Location Map



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Rawhide Wash Detention Basin

Design Simulation

View From Jomax Road Looking North

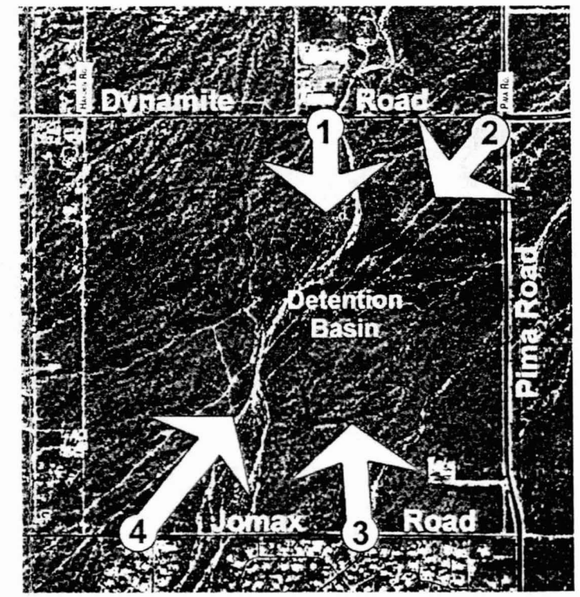
③

Existing Conditions
Before Construction

Computer Simulated
3d Model
During Construction

Proposed Design
Simulation
After Construction

Photo Location Map



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Rawhide Wash Detention Basin

Design Simulation

View From Jomax Road Looking Northeast

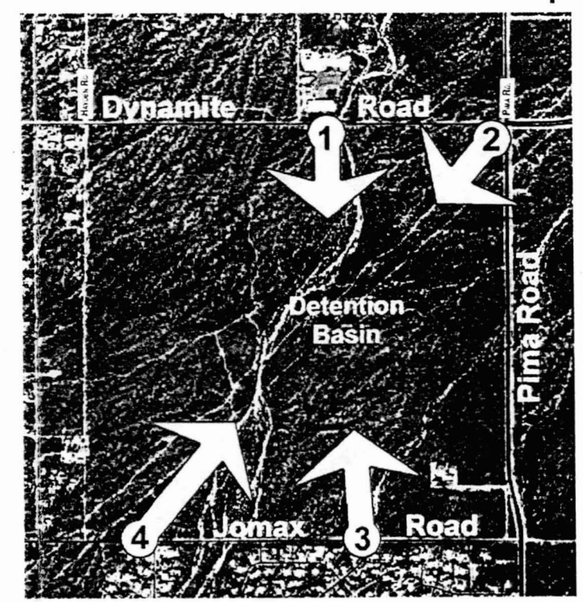
4

Existing Conditions
Before Construction

Computer Simulated
3d Model
During Construction

Proposed Design
Simulation
After Construction

Photo Location Map



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8.0 Basin Treatment

The basin treatment section provides a summary of the proposed aesthetic treatments of the proposed project. This chapter compliments the information presented in the Concept Design Chapter. Included in this chapter is a discussion of proposed treatments for landscaping, fencing, construction materials and colors.

Table 8. 1 – Revegetation Plant List

Material	Quantity Per Acre**
Palo Verde*	20
Ironwood*	5
Saguaro	3
Barrel Cactus	13
Staghorn Cholla	20
Teddy Bear Cholla	30
Ocotillo	5
Hedgehog	20
Brittlebush	30
Creosote	15
Bursage	100
Mormon Tea	5
Ratany	3
Lyceum	3
Turpentine Bush	5
Jojoba	15
Chuparosa	4

Notes To Table

*Materials with tap roots.

**Subject to change subsequent to actual conditions based on a site survey completed during design.

Revegetation/Wildflower Mix:

(Would include various combinations of the following species)

Triangle Leaf Bursage	Needle Grama
Indian Wheat	Brittlebush
Arizona Buckwheat	Catclaw Acacia
Desert Globmallow	Desert Marigold
Creosote	California Poppy
Desert Bluebells	Penstemon
Lupine	Desert Senna
Gaillardia	Others as appropriate

8.1 Revegetation Treatments

Revegetation treatments for the basin will consist of planting vegetation on the berm, within the pool basin and in other areas disturbed by construction activities. Disturbed vegetation will be salvaged and reinstalled on-site pursuant to city of Scottsdale ordinances. If required, landscaping will be installed in the buffer areas between the basin and the arterial roadways surrounding the site. Revegetation should match existing plant densities on the project site prior to construction. The plant palette will include only native species and is presented on Table 8.1. Please note that some species should not be used on the berm or in the pool basin due to potential problems with deep taproots or sensitivity to frequent moisture. An asterisk in Table 8.1 identifies these species.

8.2 Fencing and Structures

Fencing and structures will include color and finish treatments compatible with other basin components.

8.3 Construction Materials

Construction materials used on the berm will be based on structural stability and other engineering criteria, as well as aesthetic considerations. Appropriate materials for aesthetic considerations include metal, iron, textured concrete (either stained, painted or of integral color), soil cement, and dyed cement slurry (dryvet). Smooth finishes should be avoided and construction materials and techniques shall be used which reduce glare and reflectivity. Other materials may also be used only if textures, forms and colors are used to soften the appearance and to create a facility that can be sensitively blended into the desert.

8.4 Color

Construction of the basin will result in the disturbance of the existing desert. The use of darker desert colors will be important to reduce glare and reflectivity and to blend the facility into the natural Sonoran Desert environment. No colors shall be used which have a light reflecting value (LRV) greater than 40%. Paint and material colors shall not exceed a value of six (6) and a chroma of six (6) as indicated in the *Munsell Book of Color*.

Construction techniques shall be used to minimize the glare and reflectivity associated with the berm and basin earthwork. The disturbed desert will be reestablished as closely as possible to the previous undisturbed condition. Where appropriate, the use of non-reflective screening treatments, including inert materials of dark desert colors (as specified above) will be used to cover disturbed desert areas.

9.0 Public Participation

The public participation section includes an overview of the public awareness and outreach program for the project. The purpose of the program is to ensure that the public is thoroughly involved, accurately educated and given ample opportunity to express opinions concerning the project. The process will allow the project team to make

reasonable adjustments to the project (if feasible) to reflect important public issues well in advance of the formal General Plan amendment public hearing process.

The process includes identifying all public agencies and constituents affected by the project, providing continuous and frequent communications with agencies through the use of electronic mail, written status reports and an Internet web site. A comprehensive public awareness campaign is currently being completed and includes conducting numerous small group meetings, larger area-wide meetings, coordinating a broadcast on the City of Scottsdale public television channel (Channel 11), establishing, maintaining and updating an informational web site, preparing informational newsletters, preparing text for media releases, establishing a telephone hot line for questions and answers and conducting elected official study sessions. Color renderings, cross sections, plan view drawings, three-dimensional computer photo simulations and other graphics will also be prepared.

10.0 Land Use

The Land Use / General Plan / Existing Zoning Chapter of the Rawhide Wash Detention Basin Report provides a summary of the existing land use, Scottsdale General Plan and the underlying zoning affecting the project site.

10.1 Land Use

The existing land use on the project site is primarily undisturbed desert. Four parallel overhead electrical transmission lines with an unimproved service road cross the project site in a northeast to southwest alignment. Southeast of the proposed basin site and northwest of the intersection of Jomax Road and Pima Road is Scottsdale Fire Station 18 and two potable water storage reservoirs owned by the City of Scottsdale.

10.2 General Plan

The Scottsdale General Plan Land Use Element designates the basin site as single family detached residential with a density of one dwelling unit per five acres. The Parks and Schools Plan in the Public Facilities Element shows both a middle school and a high school very close to the proposed basin site. The Circulation Element identifies Pima Road and Dynamite Boulevard as parkways, which are high volume roadways with scenic easements that include desert landscaping in the adjacent parkway areas. The Circulation Element also shows trails on the project site which are intended to serve local, loop, and long distance hikers, joggers, mountain cyclists, rock climbers and horseback riders. The Open Space Element indicates the Rawhide Wash and its tributaries as major wash corridors which should retain their natural character and include pathways and trails to enhance the connection to other open spaces. The Public Facilities Element (Drainage Plan) identifies the Rawhide Wash floodplain as a special flood hazard area and designates the primary wash corridor as a Desert Greenbelt Wash.

The basin is planned only as a flood control facility. The Public Facilities Element should be amended to provide for the construction of the Rawhide Wash Detention Basin.

A General Plan Amendment application has been prepared and submitted to the City of Scottsdale.

10.3 Zoning

The underlying zoning of the project site is R1–190 with the Environmentally Sensitive Lands (ESL) overlay district. R1-190 primarily allows single-family homes on lots that are a minimum size of 190,000 square feet. Additional uses primarily residential in character are permitted as of right. Other uses are permitted subject to a conditional use permit. Municipal uses are specifically permitted and public utility buildings, structures or appurtenances for public service uses are subject to a conditional use permit. The ESL overlay district includes additional regulations that govern the density and standards to which will development must conform.

11.0 Utility Analysis

HDR met with Arizona Public Service (APS) and the U.S. Department of Energy (DOE) to discuss the project and what measures would need to be taken to use the electric corridor for storm water runoff storage. APS has two 500 kV power lines on a tower along the east side of the corridor and a 69 kV line a wood poles along the west side of the corridor. The Department of Energy has two 700 kV power lines on two towers located in the west half of the corridor. Both APS and DOE are concerned about maintenance access, maintenance area around the towers and clearance under the lines. The Occupational Safety and Health Administration (OSHA) has established minimum clearances under the lines. For a 500 kV line the clearance is at least 21.5 feet. For the 700 kV lines the clearance is 26.5 feet. This distance is from any conductive item. Essentially this means that the three towers at the southern end of the proposed basin will probably have to be raised in order for the embankment to be placed because the finished grade of the embankment will be about 27 feet below the power lines.

The access to the towers can be worked out without much difficulty as maintenance access to the basin and outlet will also be required. The design of the embankment is such that there will be a 50' clear area around each tower leg for maintenance purposes. This was acceptable to both utilities. The disposition of the 69 kV lines has not been agreed upon. There are many options to this issue. It could be re-routed along the maintenance access road, it might be able to be placed on one of the towers to span the flood pool, it could be raised on it's own tower.

Further coordination with both APS and DOE will be required in order to meet their vertical clearance requirements.

12.0 Right-of-Way

Discussion during the Phase I study concluded that the basin should be placed within Section 36 such that it would encumber the most "unusable" land possible for its' footprint. "Unusable" land has been determined to be land that is flooded by Rawhide Wash during the 100-year event, and land that is within the powerline easement. The selected basin alternative, 4A is located at the confluence of a major tributary and

Rawhide Wash. The confluence is also within the powerline easements. The footprint of Basin 4A includes 24.7 acres within the Rawhide Wash estimated floodplain; it includes 15.4 acres within the APS/DOE Utility easement, and it includes 67.2 acres of additional area required.

13.0 Cultural and Environmental Assessment

This section discusses the cultural and environmental aspects of the new location for the basin.

13.1 Cultural Assessment:

A Class III Archaeological Survey was conducted as part of the initial phase of this project. The results of the survey are recorded in a report by Logan Simpson Design, Inc. (December 1998). The results of this survey were the identification of one prehistoric archaeological site and eight isolated occurrences, which were not considered eligible for inclusion on the National Register. The identified site is not within the proposed project boundaries and should be avoided by this project.

13.2 Environmental Overview:

An Environmental Overview was performed as part of the initial phase of this project. The overview is presented in a report by Logan Simpson Design, Inc. (December 1998). The results of the overview were:

- The Sonoran desert tortoise is the only specie listed as Wildlife of Special Concern in Arizona for the vicinity of the study area. The study area is considered marginal Sonoran desert tortoise habitat.
- The USFWS lists two species; both Federally listed as endangered, that the study area might potentially provide habitat. They are the Cactus ferruginous pygmy-owl and the Lesser long-nosed bat. There are no recent records of this Cactus ferruginous pygmy-owl in the Phoenix area. The study area has marginal habitat for the Lesser long-nosed bat because the moderate density of saguaro cacti.
- During the reconnaissance survey of the study area, no wetlands were noted.
- Based on the initial site review, Rawhide Wash and several of its tributaries would be considered Waters of the US.
- There are no sensitive noise receptors in the study area.

The conclusion of this report is that study area be surveyed for the pygmy-owl. A proposal for conducting this survey is being reviewed by the Flood Control District of Maricopa County.

14.0 Maintenance Issues

It is preferred that the basin be as maintenance free as possible. Maintenance issues for the typical basin would include landscaping upkeep, operation of mechanical equipment, and sediment trapped within the ponding areas. The proposed basin will be vegetated with native plant materials. Maintenance of this type of landscaping is not as costly as a

sod basin. There will be no mechanical appurtenances (i.e. gates or valves) associated with this basin to maintain and ensure continuous operation. The only structure that may require maintenance is the emergency spillway and embankment. These will have to be maintained according to the Arizona Department of Water Resources (ADWR) *Draft Guidelines for Design of Emergency Spillways* (Rev. 4/98). The maintenance effort may include annual or biannual inspections. The maintenance issue likely to have the most expense associated with it is removal of the sediment trapped within the basin storage pool. Preliminary investigations indicate approximately 100-acre feet of sediment storage that will have to be removed on occasion. This is 5 years of sediment, so the removal cost will be amortized over a 5-year period. For more detailed information of the expected maintenance cost of the basin, see the Engineers Estimate of Costs in the Appendix.

15.0 Cost Analysis

A detailed cost estimate has been prepared for the selected alternative. This estimate is based on the current basin configuration as shown for Alternative 4A, and the unit costs used for the feasibility study cost estimate. Some unit costs however, have been updated based on current bid tabulations for projects in the Phoenix Metropolitan area and the professional judgement of team members working on this project. The detailed estimate may be found in the appendix. Also in the appendix is a cost comparison between the feasibility basin and the currently proposed basin.

The estimated cost of the Rawhide Detention Basin project excluding the cost of land is $21,756,811. This estimate is substantially higher than the Feasibility Study estimate. The increased cost of is a product of the increased size of the basin. The basin footprint increased from 66 acres to 107 acres. This accounts for most of the increase. The cost of preliminary site prepreparation work, grading, landscaping, and plant salvage work all increase proportionately. The cost of a bypass channel allowing sediment transport continuity is included in this estimate, and was not in the previous estimate. The embankment is longer and higher (including the chimney drain) and the proposed new location requires two channel inlets that have to be protected. These items are compared, line by line, in a spreadsheet in the appendix.

APPENDIX

A..... ASLD Hydrologic History for Rawhide Wash

B.....Downstream Channel Capacity Calculations

C.....Powerline, Wash, And Common Areas Figure

D..... HEC-1 Models For Alternatives

E..... Existing Conditions Model

F..... Bypass HEC-1 Model

G..... Spillway Design Flood HEC-1 Models

H..... Sedimentation Analysis Bibliography

I..... Cost Estimate

Appendix A

ASLD Hydrologic History for Rawhide Wash

Rawhide Wash Detention Basin
State Trust Land located on
Section 36, T5N, R4E
Jomax Road and Pima Road, NW corner
Project Chronology
August 26, 1998

- 1989 Simons Li & Associates retained by Arizona Department of Transportation (ADOT) to perform drainage study for proposed Outer Loop (Loop 101)
- 1989 Regional technical committee was formed to address area drainage, flood control and alluvial fan issues, both in Scottsdale and Phoenix (Bill Erikson, City of Scottsdale, is most familiar with this committee's work)
- 1990 Water Resources Associates (WRA) was retained by a number of agencies – including City of Scottsdale (COS), City of Phoenix (COP), Arizona State Land Department (ASLD), Flood Control District of Maricopa County (FCDMC) and others – to perform the Upper Indian Bend Was study; City of Scottsdale administered the contract
- 9/5/90 ***Preliminary Draft – Upper Indian Bend Wash Regional Drainage and Flood Control Plan*** was published and submitted by WRA to regional committee
- 1991 FEMA directed Flood Insurance Study (FIS)/Flood Insurance Rate Map (FIRM) panel study for Northeast Phoenix/Scottsdale, study was performed by Cella Barr & Associates, study results created conflicts between FEMA and state/local agencies due to technical criteria utilized for the study; issue continued until 1993 when FEMA adopted the FIS and FIRM panels
- 1/92 ***Rawhide Wash Drainage Basin Preliminary Feasibility Report*** prepared by PACE Engineering for ASLD

- 6/92 ***Final Report – Upper Indian Bend Wash Regional Drainage and Flood Control Plan***, submitted by Water Resources Associates to regional committee

- 7/92 City of Scottsdale alluvial fan Task Force issued draft ***Rawhide/Pinnacle Peak Wash Alignment Study***, which recommended 'Desert Green Belt' channel alignment for Rawhide Wash Drainage Area from apex above Jomax Road to Scottsdale Road city boundary, City's Desert Green Belt projects are ongoing (study was not approved by ASLD, City of Phoenix, or other agencies; study did not agree with results and recommendations of ***Upper Indian Bend Wash…Plan*** by WRA)

- 3/93 Flood Control District of Maricopa County directed FCDMC Chief Engineer and General manager to negotiate and prepare IGA with Cities of Phoenix and Scottsdale for flood control master plan projects in North Phoenix and North Scottsdale (Resolution FCD 93-02)

- 3/4/94 Representatives of ASLD, Phoenix and Scottsdale met to discuss regional drainage issues, specifically Rawhide Wash Detention Basin

- 4/5/94 RWRIC met to discuss Rawhide Wash Detention Basin, invitees included ASLD, FCDMC, City of Scottsdale (COS), City of Phoenix (COP), US Army Corps of Engineers (USACOE), Arizona Department of Water Resources (ADWR)

- 4/94 Rawhide Wash Regional Improvement Committee (RWRIC) formed; RWRIC includes ASLD, City of Phoenix, City of Scottsdale, Flood Control District of Maricopa County, Home Builders Association of Central Arizona; RWRIC awarded contract to CH2M Hill to perform feasibility study, study was directed by ASLD

- 5/17/94 RWRIC issued 'Notice of Request for Qualifications' for contractor to perform Rawhide Wash Detention Basin feasibility study

- 6/94 ***Scottsdale Desert Greenbelt – Rawhide Wash Hydrologic Report*** submitted by Greiner to City of Scottsdale (report was not accepted by ASLD and others, FCDMC revised the study)
- 6/94 ***Preliminary Design Phase I Study Report*** submitted by Greiner to City of Scottsdale
- 12/94 CH2M Hill submitted ***Rawhide Wash Detention Basin, Feasibility Study, DRAFT Report*** to RWRIC
- 3/95 CH2M Hill submitted ***Rawhide Wash Detention Basin, Feasibility Study, Final Report*** to RWRIC
- 3/20/95 ASLD Commissioner, COP City Manager, COS City Manager, HBACA Assistant Director, FCDMC designated representative, and others attended meeting review CH2M Hill ***Rawhide Wash Report***, all parties agreed project was economically feasible and less expensive than COS's proposed Greenbelt concept; COP, COS FCDMC and ASLD directed RWRIC to proceed with Funding Analysis Study
- 4/27/95 DRAFT Scope of Work for Rawhide Wash Detention Basin Funding Analysis prepared for RWRIC Funding Committee, including ASLD, HBACA, COS, COP, FCDMC; study contract was awarded to consulting team of CH2M Hill and J.R. Pooler, with anticipated completion date of 6/30/95
- Late 95 Funding Analysis Study completed behind schedule
- 1998 FCDMC designated funds for Preliminary design of Rawhide Wash Detention Basin and Amendment to COS General Plan
- 7/98 FCDMC awarded preliminary design contract to HDR Engineering, first task is coordinating COS General Plan Amendment

Appendix B

Downstream Channel Capacity Calculations

Worksheet
Worksheet for Irregular Channel

Project Description	
Project File	h:\fmw\rawsec1.fm2
Worksheet	Rawhide
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Channel Slope	0.021740	ft/ft
Water Surface Elevation	2053.00	ft

Elevation range: 2049.00 ft to 2054.50 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
23.00	2053.00	23.00	583.00	0.045
72.00	2053.00			
80.00	2052.00			
88.00	2051.00			
94.00	2050.00			
100.00	2049.00			
160.00	2049.00			
168.00	2050.00			
176.00	2051.00			
260.00	2051.00			
280.00	2051.00			
345.00	2051.00			
374.00	2050.00			
425.00	2050.00			
449.00	2051.00			
463.00	2051.00			
480.00	2052.00			
496.00	2053.00			
502.00	2054.00			
583.00	2054.50			

Results		
Wtd. Mannings Coefficient	0.045	
Discharge	8981.69	ft^3/s
Flow Area	1025.00	ft^2
Wetted Perimeter	424.51	ft
Top Width	424.00	ft
Depth	4.00	ft
Critical Water Elev.	2052.99	ft
Critical Slope	0.022050	ft/ft
Velocity	8.76	ft/s
Velocity Head	1.19	ft
Specific Energy	2054.19	ft
Froude Number	0.99	

Worksheet

Worksheet for Irregular Channel

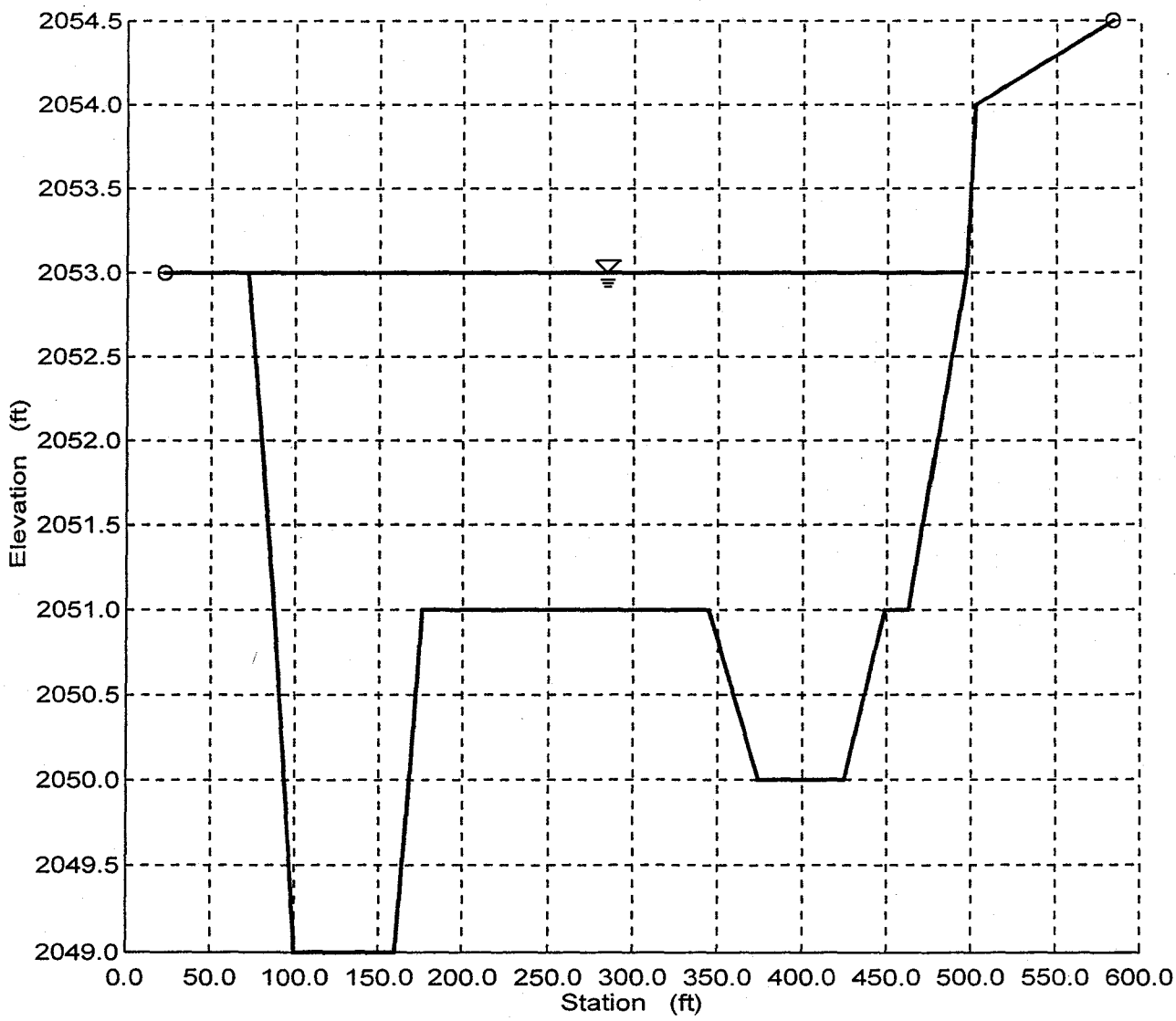
Full Flow Capacity 18352.73 ft^3/s

Flow is subcritical.

Cross Section
Cross Section for Irregular Channel

Project Description	
Project File	h:\fmw\rawsec1.fm2
Worksheet	Rawhide
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Wtd. Mannings Coefficient	0.045	
Channel Slope	0.021740	ft/ft
Water Surface Elevation	2053.00	ft
Discharge	8981.69	ft^3/s



Worksheet
Worksheet for Irregular Channel

Project Description	
Project File	h:\fmw\rawsec2.fm2
Worksheet	Rawhide
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Channel Slope	0.021740	ft/ft
Water Surface Elevation	1999.00	ft

Elevation range: 1998.00 ft to 1999.00 ft.

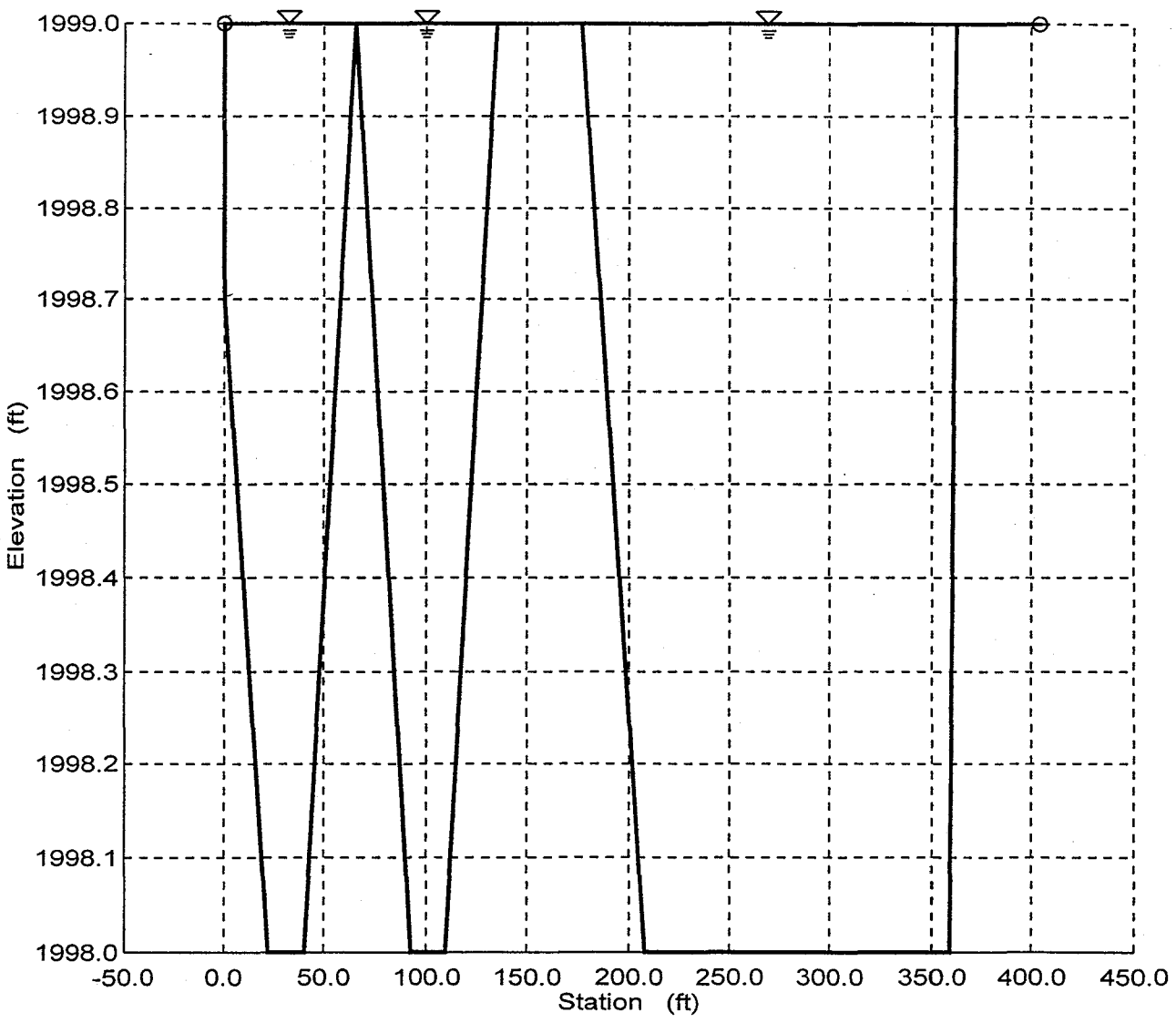
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
-0.10	1999.00	-0.10	404.00	0.040
0.00	1998.70			
22.00	1998.00			
40.00	1998.00			
65.00	1999.00			
92.00	1998.00			
110.00	1998.00			
135.00	1999.00			
177.00	1999.00			
208.00	1998.00			
300.00	1998.00			
359.00	1998.00			
362.00	1999.00			
404.00	1999.00			

Results		
Wtd. Mannings Coefficient	0.040	
Discharge	1213.36	ft^3/s
Flow Area	256.81	ft^2
Wetted Perimeter	320.56	ft
Top Width	320.10	ft
Depth	1.00	ft
Critical Water Elev.	1998.96	ft
Critical Slope	0.025461	ft/ft
Velocity	4.72	ft/s
Velocity Head	0.35	ft
Specific Energy	1999.35	ft
Froude Number	0.93	
Full Flow Capacity	1038.98	ft^3/s
Flow is subcritical.		
Flow is divided.		

Cross Section
Cross Section for Irregular Channel

Project Description	
Project File	h:\fmw\rawsec2.fm2
Worksheet	Rawhide
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Wtd. Mannings Coefficient	0.040	
Channel Slope	0.021740	ft/ft
Water Surface Elevation	1999.00	ft
Discharge	1213.36	ft^3/s



Worksheet
Worksheet for Irregular Channel

Project Description	
Project File	h:\fmw\rawsec3.fm2
Worksheet	Rawhide
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Channel Slope	0.023900	ft/ft
Water Surface Elevation	1889.00	ft

Elevation range: 1886.00 ft to 1889.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	1889.00	0.00	430.00	0.047
7.00	1888.00			
12.00	1887.00			
43.00	1887.00			
90.00	1887.00			
160.00	1886.00			
320.00	1886.00			
340.00	1887.00			
360.00	1888.00			
430.00	1889.00			

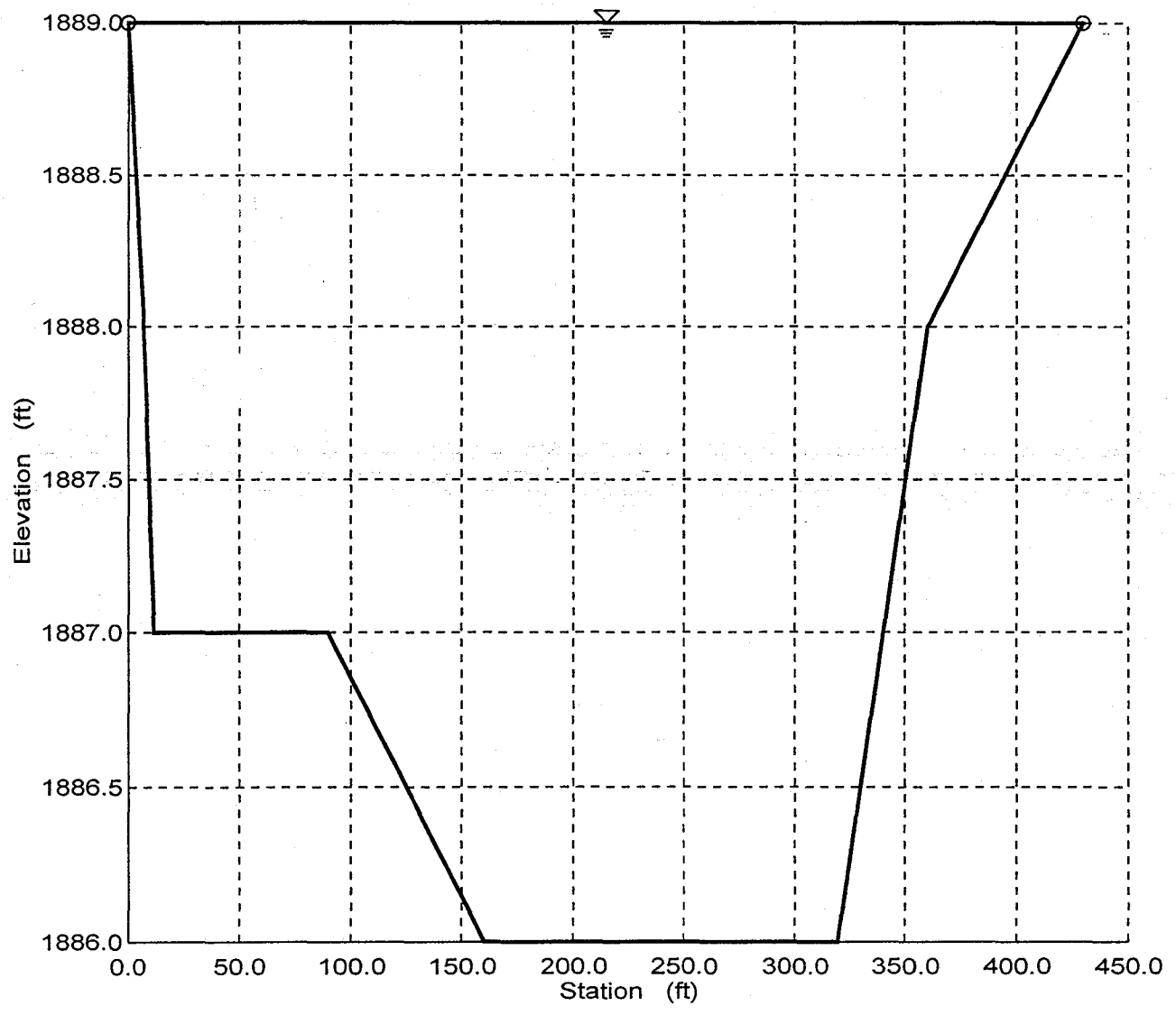
Results		
Wtd. Mannings Coefficient	0.047	
Discharge	7694.71	ft^3/s
Flow Area	937.00	ft^2
Wetted Perimeter	430.23	ft
Top Width	430.00	ft
Depth	3.00	ft
Critical Water Elev.	1888.97	ft
Critical Slope	0.024922	ft/ft
Velocity	8.21	ft/s
Velocity Head	1.05	ft
Specific Energy	1890.05	ft
Froude Number	0.98	
Full Flow Capacity	7694.71	ft^3/s

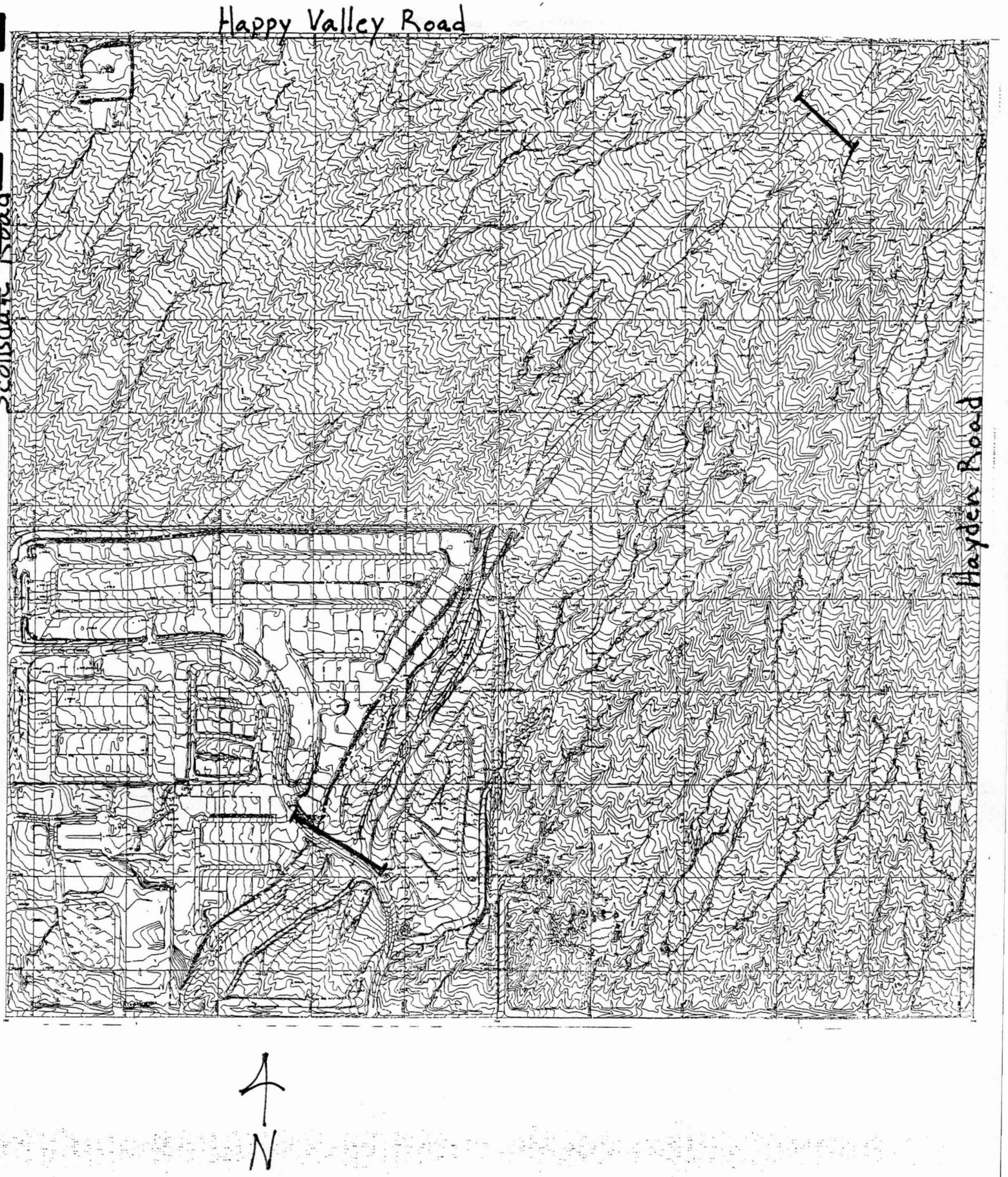
Flow is subcritical.

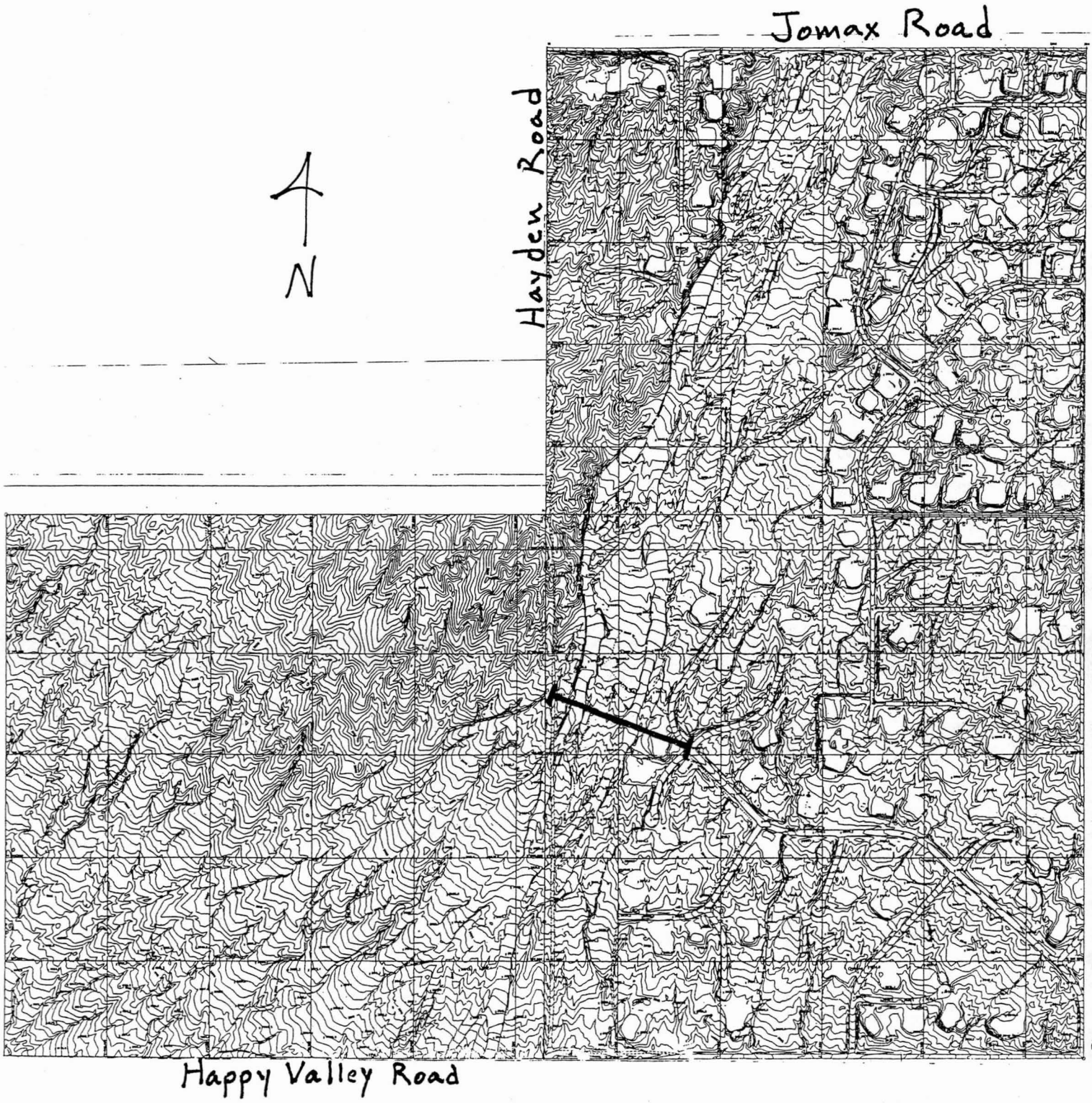
Cross Section
Cross Section for Irregular Channel

Project Description	
Project File	h:\fmw\rawsec3.fm2
Worksheet	Rawhide
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Wtd. Mannings Coefficient	0.047	
Channel Slope	0.023900	ft/ft
Water Surface Elevation	1889.00	ft
Discharge	7694.71	ft^3/s

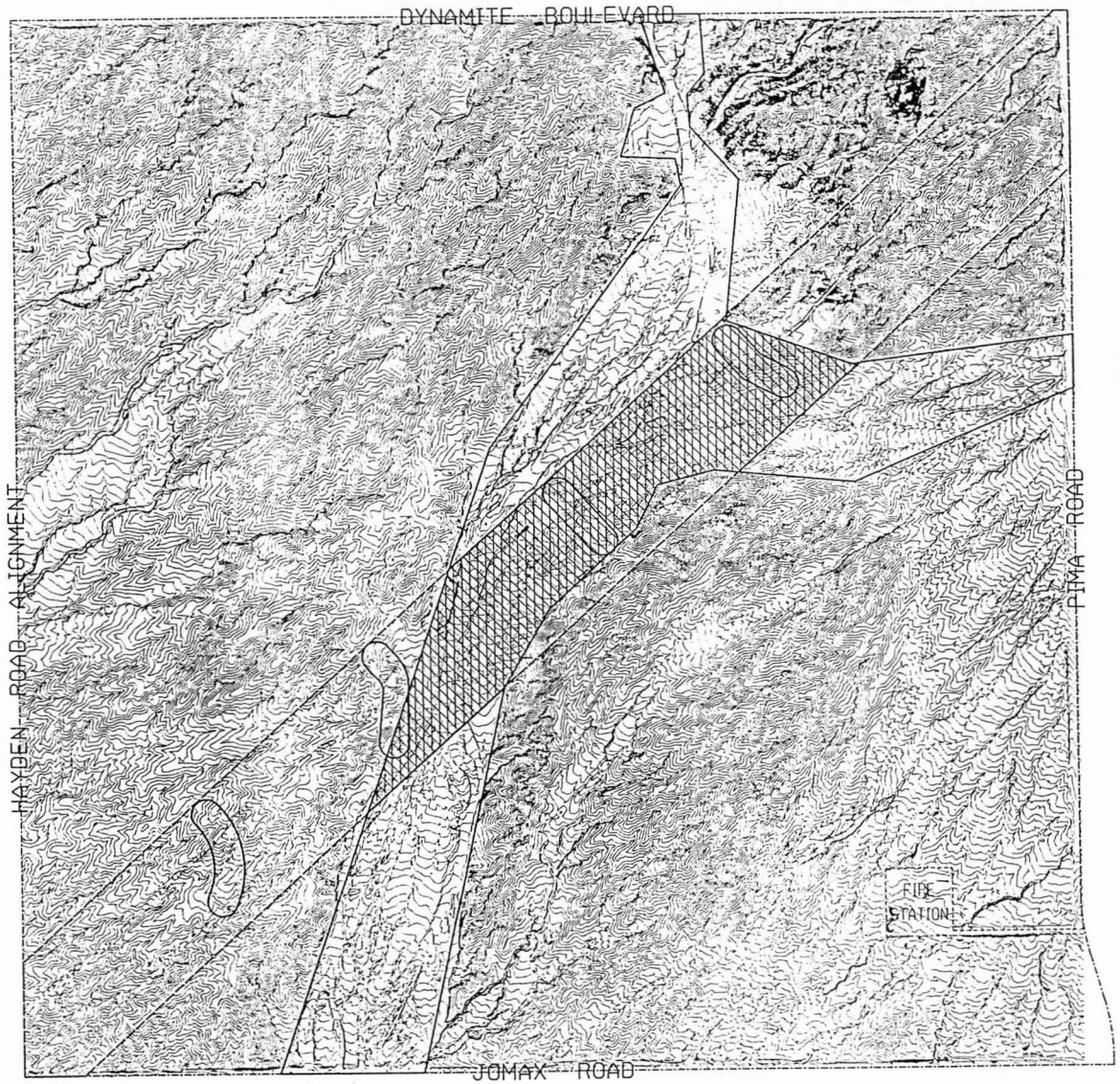



Happy Valley Road
Scottsdale Road
Hayden Road
N


Jomax Road
Hayden Road
N
Happy Valley Road

Appendix C

Powerline, Wash, And Common Areas Figure



Rawhide Wash Detention Basin

Powerline, Wash and Common Areas

AREAS

WASH	94.8 acres
POWERLINES	100.4 acres
COMMON	32.3 acres

N

SCALE: 1 INCH = 600 FEET

300 0 600 1200

CONTOUR INTERVAL = 5 FEET

HDR
HDR Engineering, Inc.

Appendix D

HEC-1 Models For Alternatives

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN 09 1992              *
*           VERSION 4.0.3E             *
*                                      *
*  RUN DATE  01/21/99  TIME  16:22:26  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748             *
*                                      *
****************************************
```

```
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. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                        HEC-1 INPUT                                                PAGE  1

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

         1          ID        FILE <RWDAM21F.DAT>
         2          ID        THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
         3          ID        THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
         4          ID
         5          ID        THE MODIFICIATION INCLUDE THE FOLLOWING:
         6          ID        1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
         7          ID           TO CONCENTRATION POINT AT THE APEX OF 21F
         8          ID        2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE
         9          ID
        10          ID        NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
        11          ID        1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
        12          ID        MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
        13          ID        25S.
        14          ID
        15          ID        100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
        16          ID        RAINFALL FROM NOAA ATLAS
        17          ID
        18          ID        FILE RAW4A.DAT
        19          ID        WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
        20          ID        FOR 22, 23, 24, 25N, AND 25S.  ROUTE COMBINED HYDROGRAPHS
        21          ID        22, 23, 24, 25N AND 25S TO 21G.  SUN-BASIN 26 COMBINED AT
        22          ID        THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
        23          ID        ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
        24          ID        INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
        25          ID        PROPOSED ROAD CROSSINGS.
        26          ID
        27          ID        REVISED BY GREINER 12-9-93 BY RON FERGUSON
        28          ID        REVISED BY C. J. LOVELY, COS, 3-9-94
        29          ID        Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
        30          ID           *Eliminate DSS Records
```

```
 31          ID          *Divide #26 into 26N & 26S; 26N is portion north of Jomax
 32          ID          *Add 26N @ CP21H and route with 21H to apex
 33          ID          *Add 26S @ apex
 34          ID          *Modify reach length in 26S & 26N to reflect division
 35          ID
 36          ID        ****************************************************************
 37          ID        * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
 38          ID        * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.      *
 39          ID        ****************************************************************
 40          ID
 41          ID    September 1998 - HDR Engineering Modified by adding basin south of the
 42          ID    September 1998 - center of Section 36 (Alternative No. 1)
 43          ID    September 1998 - Filename <RAWALT1.DAT>
 44          ID
 45          ID
 46          ID   ***************************************************************************
             *DIAGRAM
 47          IT       5 03MAR94       0     500
 48          IO       5       0       0       0
             *
1                                        HEC-1 INPUT                                    PAGE  2

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

 49          KK      16     SUB
 50          KM        RUNOFF FROM SUB-BASIN 16
 51          BA  1.4570
 52          PH       0      13    0.77    1.51    2.65    3.00    3.23    3.66
 53          LS       0      83     9.8       0       0       0       0       0
 54          UK     217   .0581     .20     100
 55          RK   14800   .0216    .045       0    TRAP      25       3
             *

 56          KK      17     SUB
 57          KM        RUNOFF FROM SUB-BASIN 17
 58          BA  1.1851       0       0
 59          LS       0      83     9.8
 60          UK     285   .0421     .20     100       0       0       0
 61          RK   12200   .0254    .045       0    TRAP      25       3
             *

 62          KK      18     SUB
 63          KM        RUNOFF FROM SUB-BASIN 18
 64          BA  1.2641
 65          LS       0      83     6.5       0
 66          UK     285   .0421     .20     100       0       0       0
 67          RK   10840   .0259    .045       0    TRAP      25       3
             *

 68          KK     19A      CP
 69          KM        COMBINE HYDROGRAPHS SUB16, SUB17 AND SUB18
 70          HC       3
             *

 71          KK     19B      CP
 72          KM        ROUTE CP19A TO CP19B
 73          RS       1    FLOW      -1       0       0
 74          RC    .055    .040    .055    1100   .0155       0       0       0
 75          RX       0       1     126     132     167     173     298     299
 76          RY      10       8       3       0       0       3       8      10
             *

 77          KK      15     SUB
 78          KM        RUNOFF FROM SUBBASIN 15
 79          BA  1.3702       0       0
 80          LS       0      82     5.4       0
```

```
 81          UK     217   .0581     .20     100       0       0       0
 82          RK   21200   .0236    .045       0    TRAP      25       3
             *

 83          KK     19C      CP
 84          KM        COMBINE HYDROGRAPHS SUB15 & CP19B
 85          HC       2
             *
1                                          HEC-1 INPUT                                          PAGE  3

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

 86          KK    19.1      CP
 87          KM        ROUTE CP 19C TO 19.1
 88          RS       1    FLOW      -1       0       0
 89          RC    .055    .040    .055    1800   .0200       0       0
 90          RX       0       1     151     166     216     231     381     382
 91          RY      10       9       3       0       0       3       9      10
             *

 92          KK      19     SUB
 93          KM        RUNOFF FROM SUB-BASIN 19
 94          BA  0.1872
 95          LS       0      84     7.2       0
 96          UK     275   .0800     .20     100       0       0       0
 97          RK    3730   .0352    .045    .160    TRAP      15       3
 98          RK    1800   .0200    .045       0    TRAP      50      30
             *

 99          KK      20     SUB
100          KM        RUNOFF FROM SUB-BASIN 20
101          BA  0.5698       0       0
102          LS       0      84     3.6       0
103          UK     300   .0750     .20     100       0       0       0
104          RK    9640   .0197    .045       0    TRAP      15       3
             *

105          KK    CP20      CP
106          KM        COMBINE SUB 19, SUB 20 AND CP 19.1
107          HC       3
             *
108          KM    *******BEGIN SUBAREA 21 BREAKDOWN-3/94 REVISIONS*****

109          KK  RRCP20      CP
110          KM        ROUTE CP20 TO CP 21A, WHICH IS 4600'
111          RS       1    FLOW      -1       0       0
112          RC    .055    .040    .055    4600   .0217       0       0       0
113          RX       0      30      60      85     195     220     250     280
114          RY      10       4       1       0       0       1       4      10
             *

115          KK     21A     SUB
116          KM        RUNOFF FROM SUB-BASIN 21A
117          BA     .42       0       0
118          LS       0      80     6.4       0       0       0
119          UK     297   .0558     .20     100       0       0       0
120          RK    6400   .0344    .045       0    TRAP      10       3
             *

121          KK   CP21A
122          HC       2
             *
1                                          HEC-1 INPUT                                          PAGE  4

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

```
 123          KK   RR21A      CP
 124          KM        ROUTE CP21A TO 21B    WHICH IS 960'
 125          RS       1    FLOW      -1       0       0
 126          RC    .055    .040    .055     960   .0156       0       0       0
 127          RX       0      10      60     205     295     440     490     500
 128          RY       6       4       2       0       0       2       4       6
              *

 129          KK     21B     SUB
 130          KM        RUNOFF FROM SUB-BASIN 21B
 131          BA   0.276       0       0
 132          LS       0      80     6.4       0       0       0
 133          UK     297   .0558     .20     100       0       0       0
 134          RK    6300   .0381    .045       0    TRAP      10       3
              *

 135          KK   CP21B
 136          HC       2
              *

 137          KK   RR21B      CP
 138          KM        ROUTE CP21B TO 21C    WHICH IS 4400'
 139          RS       1    FLOW      -1       0       0
 140          RC    .055    .040    .055    4400   .0205       0       0       0
 141          RX       0      10      60     205     295     440     490     500
 142          RY       6       4       2       0       0       2       4       6
              *

 143          KK     21C     SUB
 144          KM        RUNOFF FROM SUB-BASIN 21C
 145          BA    .748       0       0
 146          LS       0      80     6.4       0       0       0
 147          UK     297   .0558     .20     100       0       0       0
 148          RK    9900   .0328    .045       0    TRAP      20       3
              *

 149          KK   CP21C
 150          HC       2
              *

 151          KK   RR21C      CP
 152          KM        ROUTE CP21C TO 21D    WHICH IS 5700'
 153          RS       1    FLOW      -1       0       0
 154          RC    .055    .040    .055    5700   .0181       0       0       0
 155          RX       0      20     175     210     300     335     490     510
 156          RY     5.5     3.5     2.5       0       0     2.5     3.5     5.5
              *

 157          KK     21D     SUB
 158          KM        RUNOFF FROM SUB-BASIN 21D
 159          BA   1.059       0       0
 160          LS       0      80     6.4       0       0       0
 161          UK     297   .0558     .20     100       0       0       0
 162          RK   14500   .0252    .045       0    TRAP      30       3
              *
```



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

 163          KK   CP21D
 164          HC       2
              *

 165          KK   RR21D      CP
 166          KM        ROUTE CP21D TO 21E    WHICH IS 1100'
```

```
167          RS       1    FLOW      -1       0       0
168          RC    .055    .040    .055    1100   .0200       0       0       0
169          RX       0      20     175     210     300     335     490     510
170          RY     5.5     3.5     2.5       0       0     2.5     3.5     5.5
             *

171          KK     21E     SUB
172          KM         RUNOFF FROM SUB-BASIN 21E
173          BA   0.257       0       0
174          LS       0      80     6.4       0       0       0
175          UK     297   .0333     .20     100       0       0       0
176          RK    6600   .0288    .045       0    TRAP      15       3
             *

177          KK   CP21E
178          HC       2
             *

179          KK   RR21E      CP
180          KM         ROUTE CP21E TO 21F    WHICH IS 2800'
181          RS       1    FLOW      -1       0       0
182          RC    .055    .040    .055    2800   .0143       0       0       0
183          RX       0      70     170     180     230     240     340     410
184          RY    10.5     4.5     3.5       0       0     3.5     4.5    10.5
             *

185          KK     21F     SUB
186          KM         RUNOFF FROM SUB-BASIN 21F
187          BA   0.469       0       0
188          LS       0      80     6.4       0       0       0
189          UK     297   .0333     .20     100       0       0       0
190          RK   10400   .0279    .045       0    TRAP      20       3
             *

191          KK   CP21F
192          HC       2
             *

193          KK   RR21F      CP
194          KM   ROUTE CP21F TO 21G (1900' DOWNSTREAM)
195          RS       1    FLOW      -1       0       0
196          RC    .055    .040    .055    1900   .0158       0       0       0
197          RX       0      20      70     345     455     730     780     800
198          RY      10       8       2       0       0       2       8      10
             *
```

1 HEC-1 INPUT PAGE 6

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

199          KK     21G     SUB
200          KM   RUNOFF FROM SUB-BASIN 21G
201          BA   .0172       0       0
202          LS       0      80     6.4       0       0       0
203          UK     297   .0333     .20     100       0       0       0
204          RK    4000   .0300    .045       0    TRAP      10       3
             *

205          KK   CP21G
206          HC       2
             *

207          KK      22     SUB
208          KM       RUNOFF FROM SUB-BASIN 22
209          BA  1.3860
210          LS       0      84     5.1       0
211          UK     225   .0590     .20     100       0       0       0       0
```

```
212          RK   13000   .0238    .045       0    TRAP      25       3
             *

213          KK      23     SUB
214          KM         RUNOFF FROM SUB-BASIN 23
215          BA  0.3945       0       0
216          LS       0      84     6.3       0
217          UK     225   .0590     .20     100       0       0       0
218          RK   10200   .0304    .045       0    TRAP      20       3
             *

219          KK     24A      CP
220          KM         COMBINE HYDROGRAPHS FOR SUB 22 AND SUB 23
221          HC       2
             *

222          KK    24.1      CP
223          KM         ROUTE CP 24A TO CP 24.1
224          RS       3    FLOW      -1       0       0
225          RC    .055    .040    .055    6800   .0257       0       0       0
226          RX       0       1     101     107     122     128     228     229
227          RY      10       8       3       0       0       3       8      10
             *

228          KK      24     SUB
229          KM         RUNOFF FROM SUB-BASIN 24
230          KM         DRAINAGE AREA CHANGED TO MATCH VALUE USED BY MICHAEL BAKER
231          KM         Jr., INC.
232          BA  0.4907       0       0
233          LS       0      77     6.8       0
234          UK     295   .0438     .20     100       0       0       0
235          RK    6800   .0257    .045       0    TRAP      15       3
             *
1                                          HEC-1 INPUT                                          PAGE  7

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

236          KK   24.2A      CP
237          KM         COMBINE SUB 24 & CP 24.1 - APEX
238          HC       2
             *

239          KK     25N       SUB
240          KM         RUNOFF FROM SUB-BASIN 25N - APEX
241          BA  0.7834       0       0       0       0       0       0       0
242          LS       0      84     9.0       0
243          UK     295   .0438     .20     100       0       0       0
244          RK   16700   .0302    .045       0    TRAP      25       3
             *

245          KK     25S     SUB
246          KM         RUNOFF FROM SUB-BASIN 25S - APEX
247          BA  0.6256       0       0       0       0       0       0       0
248          LS       0      86     9.0       0
249          UK     295   .0438     .20     100       0       0       0
250          RK    8900   .0278    .045       0    TRAP      25       3
             *

251          KK    25.1      CP
252          KM         COMBINE HYDROGRAPHS FOR SUB-BASINS 25N AND 25S
253          HC       2
             *

254          KK   24.2B      CP
255          KM         COMBINE TOTAL HYDROGRAPH 24.2A WITH 25.1
256          HC       2
```

```
                 *
257              KK  PIMARD      CP
258              KM   ROUTE THE TOTAL HYDROGRAPH AT THE CONCENTRATION POINT
259              KM   24.2B TO THE CULVERT AT THE PIMA ROAD. THERE IS NO
260              KM   CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
261              RS       1    FLOW      -1       0       0
262              RC    .055    .040    .055    2000   .0287       0       0       0
263              RX       0       1     101     107     122     128     228     229
264              RY      10       8       3       0       0       3       8      10
                 *

265              KK  RR24.2      CP
266              KM   ROUTE THE TOTAL HYDROGRAPH AT CONCENTRATION POINT
267              KM   24.2B FROM THE CULVERT UNDER PIMA ROAD TO CONCENTRATION
268              KM   POINT 21.05.
269              RS       1    FLOW      -1       0       0
270              RC    .055    .040    .055    3050   .0238       0       0       0
271              RX       0       1     101     107     122     128     228     229
272              RY      10       8       3       0       0       3       8      10
                 *
1                                                HEC-1 INPUT                                                PAGE  8

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

273              KK  C21.05 CONFLUENCE OF DGB CHANNELS NEAR MID-SECTION 36
274              KM         COMBINE HYDROGRAPH CP21G WITH HYDROGRAPH RR24.2
275              KM         (FROM THE PIMA ROAD CULVERT)
276              HC       2
                 *

277              KK  RR24.3      CP
278              KM   ROUTE THE TOTAL HYDROGRAPH FROM THE CONVLUENCE IN THE CENTER OF SECTION 36
279              KM   24.2B TO THE BASIN AND DAM JUST SOUTH OF THE CENTER OF THE SECTION
280              RS       1    FLOW      -1       0       0
281              RC    .055    .040    .055    1600   .0238       0       0       0
282              RX       0       1     101     107     122     128     228     229
283              RY      10       8       3       0       0       3       8      10
                 *  ******************************************************************************

284              KK     DAM
285              KO       3
286              RS       1    FLOW       0
287              SV       0      54     202     364     541     734     945    1179    1453    1781
288              SE    2128    2130    2135    2140    2145    2150    2155    2160    2165    2170
289              SS    2160     200     3.2     1.5
                 *  2 - 36" RCP Culverts for outlet
290              SL    2128    14.1      .6      .5
                 *  ******************************************************************************
                 *

291              KK    R21G      CP
292              KM         ROUTE CP21G(21.05)TO 21H WHICH IS 3100'
293              RS       1    FLOW      -1       0       0
294              RC    .055    .040    .055    3100   .0194       0       0       0
295              RX       0      90     120     355     585     820     850     940
296              RY       9       4     1.5       0       0     1.5       4       9
                 *

297              KK     21H     SUB
298              KM         RUNOFF FROM SUB-BASIN 21H
299              BA   .0431       0       0
300              LS       0      80     6.4       0       0       0
301              UK     297   .0333     .20     100       0       0       0
302              RK    4600   .0278    .045       0    TRAP      20       3
                 *
```

```
 303          KK     26N
 304          KM       Runoff from sub-basin 26N
 305          BA   .6376       0       0
 306          LS       0      75    12.7       0
 307          UK     200   .0250     .20     100       0
 308          RK   12000   .0263    .045       0    TRAP      35      10
              *
1                                        HEC-1 INPUT                                                    PAGE  9

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

 309          KK   CP21H   JOMAX RD
 310          KO       3
 311          HC       3
              *

 312          KK   RR21H      CP
 313          KM        ROUTE HYDROGRAPH AT CONCENTRATION POINT 21H   DOWNSTREAM FROM
 314          KM        JOMAX ROAD          THERE IS NO ADDITIONAL CONTRIBUTING
 315          KM        DRAINAGE AREA AT THIS CONCENTRATION POINT.  USED CHANNEL
 316          KM        GEOMETRY                          FROM REACH SIX
 317          KM             DEVELOPED BY C. LOVELY
 318          RS       1    FLOW      -1       0       0
 319          RC    .055    .040    .055    2390   .0188       0       0       0
 320          RX       0      90     120     355     585     820     850     940
 321          RY       9       4     1.5       0       0     1.5       4       9
              *

 322          KK     26S     SUB
 323          KM       RUNOFF FROM SUB-BASIN 26S
 324          BA  0.1672       0       0
 325          LS       0      75    12.7       0
 326          UK     200   .0250     .20     100       0       0       0
 327          RK    4000   .0263    .045       0    TRAP      35      10
              *

 328          KK  *APEX*      CP
 329          KM        COMBINE FLOW FROM SUB-BASIN 26 ,
 330          KM           AND ROUTED HYDROGRAPH FROM JOMAX ROAD.
 331          HC       2
              *
 332          KM        *********END SUBAREA 21 REVISIONS************

 333          KK   CP27A      CP AT HAPPY VALLEY RD
 334          KM        ROUTE FLOW FROM CONCENTRATION POINT APEX  TO 27A (HAPPY VALLEY
 335          KM        ROAD).  THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION PT.
 336          KM
 337          RS       1    FLOW      -1       0       0
 338          RC    .055    .040    .055    1600   .0196       0       0       0
 339          RX       0       1     201     211     261     271     471     472
 340          RY      10       4       2       0       0       2       4      10
              *

 341          KK   CP27B      CP AT MILLER RD
 342          KM        ROUTE FLOW FROM CONCENTRATION POINT 27B TO 27C (MILLER ROAD).
 343          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
 344          RS       1    FLOW      -1       0       0
 345          RC    .055    .040    .055    3300   .0196       0       0       0
 346          RX       0       1     201     211     261     271     471     472
 347          RY      10       4       2       0       0       2       4      10
              *
1                                        HEC-1 INPUT                                                    PAGE 10

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

```
348          KK   CP27C      CP AT PINNACLE PEAK RD
349          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (PINNACLE PK ROAD).
350          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
351          RS       1    FLOW      -1       0       0
352          RC    .055    .040    .055    3300   .0196       0       0       0
353          RX       0       1     201     211     261     271     471     472
354          RY      10       4       2       0       0       2       4      10
             *

355          KK   CP27D      CP AT SCOTTSDALE RD
356          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (SCOTTSDALE ROAD)
357          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
358          RS       1    FLOW      -1       0       0
359          RC    .055    .040    .055    1000   .0196       0       0       0
360          RX       0       1     201     211     261     271     471     472
361          RY      10       4       2       0       0       2       4      10
             *

362          KK      27     SUB
363          KM        RUNOFF FROM SUB-BASIN 27
364          BA  1.1913       0       0
365          LS       0      75    12.7       0
366          UK     200   .0250     .20     100       0       0       0
367          RK    1500   .0263    .045       0    TRAP      35      10
             *

368          KK    CP27      CP AT SCOTTSDALE RD
369          KO       3
370          KM        COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
371          KM        POINT 27D WITH SUB 27 .  TOTAL FLOW AT
372          KM        SCOTTSDALE ROAD FOR FAN 4.
373          HC       2
             *
374          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   49          16
               .
               .
   56          .          17
               .           .
               .           .
   62          .           .          18
               .           .           .
               .           .           .
   68        19A.......................
               V
               V
   71        19B
               .
               .
   77          .          15
               .           .
               .           .
   83        19C............
               V
               V
   86       19.1
               .
               .
   92          .          19
```

```
                .          .
 99             .          .          20
                .          .           .
105          CP20.......................
                V
                V
109        RRCP20
                .
                .
115             .         21A
                .           .
                .           .
121          CP21A............
                V
                V
123          RR21A
                .
                .
129             .         21B
                .           .
                .           .
135          CP21B............
                V
                V
137          RR21B
                .
                .
143             .         21C
                .           .
                .           .
149          CP21C............
                V
                V
151          RR21C
                .
                .
157             .         21D
                .           .
                .           .
163          CP21D............
                V
                V
165          RR21D
                .
                .
171             .         21E
                .           .
                .           .
177          CP21E............
                V
                V
179          RR21E
                .
                .
185             .         21F
                .           .
                .           .
191          CP21F............
                V
                V
193          RR21F
                .
                .
199             .         21G
                .           .
```

```
205      CP21G............
                 .
207              22
                 .
213              .          23
                 .          .
219              24A.........
                 V
                 V
222            24.1
                 .
228              .          24
                 .          .
236            24.2A.........
                 .
239              .         25N
                 .          .
245              .          .        25S
                 .          .         .
251              .       25.1.........
                 .          .
254            24.2B.........
                 V
                 V
257           PIMARD
                 V
                 V
265           RR24.2
                 .
273      C21.05...........
              V
              V
277      RR24.3
              V
              V
284         DAM
              V
              V
291        R21G
                 .
297              21H
                 .
303              .         26N
                 .          .
309      CP21H......................
              V
              V
312      RR21H
                 .
322              26S
                 .
```

```
  328      *APEX*............
                V
                V
  333       CP27A
                V
                V
  341       CP27B
                V
                V
  348       CP27C
                V
                V
  355       CP27D
                .
                .
  362           .          27
                .           .
                .           .
  368        CP27............
 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN 09 1992              *
*            VERSION 4.0.3E            *
*                                      *
*  RUN DATE  01/21/99  TIME  16:22:26  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748             *
*                                      *
****************************************
```

FILE <RWDAM21F.DAT>
THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.

THE MODIFICIATION INCLUDE THE FOLLOWING:
1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
   TO CONCENTRATION POINT AT THE APEX OF 21F
2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE

NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
25S.

100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
RAINFALL FROM NOAA ATLAS

FILE RAW4A.DAT
WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
FOR 22, 23, 24, 25N, AND 25S. ROUTE COMBINED HYDROGRAPHS
22, 23, 24, 25N AND 25S TO 21G. SUN-BASIN 26 COMBINED AT
THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
PROPOSED ROAD CROSSINGS.

REVISED BY GREINER 12-9-93 BY RON FERGUSON
REVISED BY C. J. LOVELY, COS, 3-9-94
Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
   *Eliminate DSS Records
   *Divide #26 into 26N & 26S; 26N is portion north of Jomax
   *Add 26N @ CP21H and route with 21H to apex

```
                                  *Add 26S @ apex
                                  *Modify reach length in 26S & 26N to reflect division

                                 ****************************************************************
                                 * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
                                 * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.      *
                                 ****************************************************************

                              September 1998 - HDR Engineering Modified by adding basin south of the
                              September 1998 - center of Section 36 (Alternative No. 1)
                              September 1998 - Filename <RAWALT1.DAT>

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

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

     IT          HYDROGRAPH TIME DATA
                        NMIN           5  MINUTES IN COMPUTATION INTERVAL
                       IDATE      3MAR94  STARTING DATE
                       ITIME        0000  STARTING TIME
                          NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      4MAR94  ENDING DATE
                      NDTIME        1735  ENDING TIME
                       ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL    0.08 HOURS
                       TOTAL TIME BASE   41.58 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
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0

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

            **************
            *            *
  284 KK    *       DAM  *
            *            *
```

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

285 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           3  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

              HYDROGRAPH ROUTING DATA

286 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC        0.00  INITIAL CONDITION
                          X        0.00 WORKING R AND D COEFFICIENT

287 SV            STORAGE         0.0      54.0     202.0     364.0     541.0     734.0     945.0    1179.0    1453.0    1781.0

288 SE          ELEVATION     2128.00   2130.00   2135.00   2140.00   2145.00   2150.00   2155.00   2160.00   2165.00   2170.00

290 SL          LOW-LEVEL OUTLET
                      ELEVL     2128.00  ELEVATION AT CENTER OF OUTLET
                      CAREA       14.10  CROSS-SECTIONAL AREA
                       COQL        0.60  COEFFICIENT
                       EXPL        0.50  EXPONENT OF HEAD

289 SS          SPILLWAY
                       CREL     2160.00  SPILLWAY CREST ELEVATION
                      SPWID      200.00  SPILLWAY WIDTH
                       COQW        3.20  WEIR COEFFICIENT
                       EXPW        1.50  EXPONENT OF HEAD
                                                    ***
                                          COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW       0.00     99.22    109.36    121.80    137.44    157.68    184.92    223.53    282.52    383.81
        ELEVATION    2128.00   2130.14   2130.60   2131.22   2132.10   2133.40   2135.43   2138.85   2145.34   2160.00

          OUTFLOW     405.77    552.02    943.25   1700.16   2943.43   4793.71   7371.68  10797.99  15193.32  20678.30
        ELEVATION    2160.10   2160.41   2160.91   2161.61   2162.51   2163.61   2164.91   2166.41   2168.10   2170.00

                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00     54.00     58.10     71.70     90.19    116.25    154.67    202.00    215.87    326.86
          OUTFLOW       0.00     95.95     99.22    109.36    121.80    137.43    157.68    179.51    184.92    223.53
        ELEVATION    2128.00   2130.00   2130.14   2130.60   2131.22   2132.10   2133.40   2135.00   2135.43   2138.85

          STORAGE     364.00    541.00    554.06    734.00    945.00   1179.00   1184.67   1201.26   1228.77   1267.19
          OUTFLOW     235.04    279.75    282.52    318.24    352.55    383.81    405.75    551.96    943.15   1700.02
        ELEVATION    2140.00   2145.00   2145.34   2150.00   2155.00   2160.00   2160.10   2160.41   2160.91   2161.61

          STORAGE    1316.54   1376.79   1447.97   1453.00   1545.25   1656.59   1781.00
          OUTFLOW    2943.24   4793.50   7371.47   7568.13  10797.81  15193.20  20678.29
        ELEVATION    2162.51   2163.61   2164.91   2165.00   2166.41   2168.10   2170.00

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

                    HYDROGRAPH AT STATION      DAM

  PEAK FLOW     TIME                      MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    384.       7.92                380.        350.        292.        292.
```

```
                    (INCHES)     0.272       1.004       1.454       1.454
                     (AC-FT)      188.        694.       1005.       1005.

 PEAK STORAGE   TIME                      MAXIMUM AVERAGE STORAGE
                                    6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
    1179.       7.92                1148.        943.        710.        710.

  PEAK STAGE    TIME                       MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
   2159.99      7.92              2159.34     2154.77     2148.70     2148.70

                     CUMULATIVE AREA =   12.96 SQ MI


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


            **************
            *            *
  309 KK    *     CP21H  *        JOMAX RD
            *            *
            **************

  310 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           3  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

  311 HC          HYDROGRAPH COMBINATION
                       ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0

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

                     HYDROGRAPH AT STATION    CP21H

  PEAK FLOW     TIME                       MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                      (CFS)
+    742.       3.50                433.        369.        308.        308.
                    (INCHES)     0.295       1.007       1.454       1.454
                     (AC-FT)      215.        732.       1058.       1058.

                     CUMULATIVE AREA =   13.64 SQ MI

MANE2 NPLAN,NSTM       1      0


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


            **************
            *            *
  368 KK    *      CP27  *          CP AT SCOTTSDALE RD
            *            *
            **************

  369 KO          OUTPUT CONTROL VARIABLES
```

```
                    IPRNT          3  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE
                            COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
                            POINT 27D WITH SUB 27 .  TOTAL FLOW AT
                            SCOTTSDALE ROAD FOR FAN 4.

 373 HC          HYDROGRAPH COMBINATION
                    ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
MANE2 NPLAN,NSTM      1      0
      ***           ***           ***           ***           ***

                      HYDROGRAPH AT STATION     CP27

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    1993.      3.17                606.        415.        337.        337.
                        (INCHES)   0.376       1.029       1.449       1.449
                         (AC-FT)    301.        823.       1159.       1159.

                       CUMULATIVE AREA =   15.00 SQ MI

1
                                          RUNOFF SUMMARY
                                     FLOW IN CUBIC FEET PER SECOND
                                  TIME IN HOURS,  AREA IN SQUARE MILES

                                   PEAK   TIME OF    AVERAGE FLOW FOR MAXIMUM PERIOD     BASIN    MAXIMUM    TIME OF
          OPERATION      STATION   FLOW    PEAK                                         AREA     STAGE    MAX STAGE
+                                                      6-HOUR     24-HOUR     72-HOUR
          HYDROGRAPH AT
+                          16     2595.    3.25        319.        81.         47.      1.46
          HYDROGRAPH AT
+                          17     2114.    3.25        259.        65.         38.      1.19
          HYDROGRAPH AT
+                          18     2357.    3.25        270.        68.         39.      1.26
          3 COMBINED AT
+                         19A     7066.    3.25        848.       214.        124.      3.91
          ROUTED TO
+                         19B     7034.    3.33        848.       214.        124.      3.91
+                                                                                        6.96       3.33
          HYDROGRAPH AT
+                          15     1848.    3.42        278.        70.         41.      1.37
          2 COMBINED AT
+                         19C     8679.    3.33       1125.       284.        164.      5.28
          ROUTED TO
+                        19.1     8266.    3.33       1125.       284.        164.      5.28
+                                                                                        6.02       3.33
          HYDROGRAPH AT
+                          19      431.    3.25         42.        11.          6.      0.19
          HYDROGRAPH AT
+                          20     1052.    3.25        123.        31.         18.      0.57
```

```
+          3 COMBINED AT
                                CP20     9603.   3.33     1290.     326.     188.     6.03
           ROUTED TO
+                               RRCP20   8867.   3.42     1289.     326.     188.     6.03
+                                                                                   4.02     3.42
           HYDROGRAPH AT
+                                21A      763.   3.25       80.      20.      12.     0.42
           2 COMBINED AT
+                               CP21A     9325.   3.42     1368.     346.     200.     6.45
           ROUTED TO
+                               RR21A     9163.   3.50     1368.     346.     200.     6.45
+                                                                                   3.42     3.50
           HYDROGRAPH AT
+                                21B      497.   3.25       53.      13.       8.     0.28
           2 COMBINED AT
+                               CP21B     9404.   3.50     1420.     359.     207.     6.73
           ROUTED TO
+                               RR21B     8768.   3.58     1419.     359.     207.     6.73
+                                                                                   3.69     3.58
           HYDROGRAPH AT
+                                21C     1207.   3.25      142.      36.      21.     0.75
           2 COMBINED AT
+                               CP21C     9344.   3.58     1560.     395.     228.     7.48
           ROUTED TO
+                               RR21C     7778.   3.75     1554.     395.     228.     7.48
+                                                                                   4.07     3.75
           HYDROGRAPH AT
+                                21D     1447.   3.33      201.      51.      29.     1.06
           2 COMBINED AT
+                               CP21D     8537.   3.67     1754.     446.     257.     8.54
           ROUTED TO
+                               RR21D     8506.   3.75     1753.     446.     257.     8.54
+                                                                                   4.13     3.75
           HYDROGRAPH AT
+                                21E      392.   3.33       49.      12.       7.     0.26
           2 COMBINED AT
+                               CP21E     8645.   3.75     1801.     458.     265.     8.79
           ROUTED TO
+                               RR21E     8393.   3.83     1799.     458.     265.     8.79
+                                                                                   6.30     3.83
           HYDROGRAPH AT
+                                21F      644.   3.33       89.      22.      13.     0.47
           2 COMBINED AT
+                               CP21F     8636.   3.75     1886.     481.     278.     9.26
           ROUTED TO
+                               RR21F     8620.   3.83     1883.     481.     278.     9.26
+                                                                                   2.68     3.83
```

+	HYDROGRAPH AT	21G	25.	3.33	3.	1.	0.	0.02	
+	2 COMBINED AT	CP21G	8629.	3.83	1887.	482.	278.	9.28	
+	HYDROGRAPH AT	22	2753.	3.25	304.	76.	44.	1.39	
+	HYDROGRAPH AT	23	756.	3.25	87.	22.	13.	0.39	
+	2 COMBINED AT	24A	3509.	3.25	391.	98.	57.	1.78	
+	ROUTED TO	24.1	2849.	3.42	391.	98.	57.	1.78	
+									5.53 3.42
+	HYDROGRAPH AT	24	683.	3.25	84.	21.	12.	0.49	
+	2 COMBINED AT	24.2A	3382.	3.42	474.	120.	69.	2.27	
+	HYDROGRAPH AT	25N	1217.	3.42	175.	44.	26.	0.78	
+	HYDROGRAPH AT	25S	1382.	3.25	151.	38.	22.	0.63	
+	2 COMBINED AT	25.1	2363.	3.33	326.	82.	48.	1.41	
+	2 COMBINED AT	24.2B	5490.	3.42	800.	202.	117.	3.68	
+	ROUTED TO	PIMARD	5410.	3.42	800.	202.	117.	3.68	
+									6.79 3.42
+	ROUTED TO	RR24.2	5164.	3.50	799.	202.	117.	3.68	
+									6.90 3.50
+	2 COMBINED AT	C21.05	11894.	3.75	2683.	683.	395.	12.96	
+	ROUTED TO	RR24.3	11824.	3.75	2683.	683.	395.	12.96	
+									9.00 3.75
+	ROUTED TO	DAM	384.	7.92	380.	350.	292.	12.96	
+									2159.99 7.92
+	ROUTED TO	R21G	384.	8.25	380.	350.	291.	12.96	
+									0.46 8.25
+	HYDROGRAPH AT	21H	62.	3.33	8.	2.	1.	0.04	
+	HYDROGRAPH AT	26N	674.	3.50	109.	28.	16.	0.64	

```
          3 COMBINED AT
+                        CP21H      742.   3.50       433.       369.       308.     13.64
          ROUTED TO
+                        RR21H      626.   3.67       427.       368.       306.     13.64
+                                                                                     0.58       3.67
          HYDROGRAPH AT
+                          26S      230.   3.25        29.         7.         4.      0.17
          2 COMBINED AT
+                       *APEX*      738.   3.58       447.       373.       311.     13.81
          ROUTED TO
+                        CP27A      729.   3.67       447.       373.       310.     13.81
+                                                                                     1.76       3.67
          ROUTED TO
+                        CP27B      699.   3.75       444.       373.       309.     13.81
+                                                                                     1.72       3.75
          ROUTED TO
+                        CP27C      668.   3.83       442.       372.       308.     13.81
+                                                                                     1.68       3.83
          ROUTED TO
+                        CP27D      669.   3.92       442.       372.       307.     13.81
+                                                                                     1.68       3.92
          HYDROGRAPH AT
+                           27     1984.   3.17       205.        52.        30.      1.19
          2 COMBINED AT
+                         CP27     1993.   3.17       606.       415.       337.     15.00
1
                                   SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                       (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                          INTERPOLATED TO
                                                                       COMPUTATION INTERVAL
          ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                    PEAK                                    PEAK

                              (MIN)     (CFS)     (MIN)     (IN)     (MIN)     (CFS)     (MIN)      (IN)
             16    MANE        3.31   2714.57    197.99      2.05      5.00   2595.35    195.00       2.06

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1602E+03 OUTFLOW=0.1596E+03 BASIN STORAGE=0.1487E-01 PERCENT ERROR=   0.4

             17    MANE        3.72   2179.71    195.53      2.05      5.00   2113.93    195.00       2.05

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1303E+03 OUTFLOW=0.1296E+03 BASIN STORAGE=0.1813E-01 PERCENT ERROR=   0.6

             18    MANE        3.06   2403.41    196.84      2.00      5.00   2357.00    195.00       2.00

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1353E+03 OUTFLOW=0.1346E+03 BASIN STORAGE=0.1762E-01 PERCENT ERROR=   0.5

             15    MANE        3.60   1852.02    207.71      1.91      5.00   1847.60    205.00       1.91

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1401E+03 OUTFLOW=0.1393E+03 BASIN STORAGE=0.1918E-01 PERCENT ERROR=   0.5
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                19  MANE        1.73    440.63    193.75      2.09      5.00    430.55    195.00        2.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2089E+02 OUTFLOW=0.2083E+02 BASIN STORAGE=0.1376E-02 PERCENT ERROR=   0.3

                20  MANE        3.79   1104.65    196.23      2.02      5.00   1052.10    195.00        2.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6186E+02 OUTFLOW=0.6151E+02 BASIN STORAGE=0.5950E-02 PERCENT ERROR=   0.6

               21A  MANE        2.39    781.28    193.64      1.79      5.00    762.73    195.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4022E+02 OUTFLOW=0.4006E+02 BASIN STORAGE=0.4421E-02 PERCENT ERROR=   0.4

               21B  MANE        2.59    504.98    194.27      1.79      5.00    497.48    195.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2643E+02 OUTFLOW=0.2632E+02 BASIN STORAGE=0.2952E-02 PERCENT ERROR=   0.4

               21C  MANE        3.26   1262.50    196.65      1.79      5.00   1206.94    195.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7164E+02 OUTFLOW=0.7124E+02 BASIN STORAGE=0.9548E-02 PERCENT ERROR=   0.5

               21D  MANE        3.13   1492.11    200.84      1.79      5.00   1447.37    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1014E+03 OUTFLOW=0.1009E+03 BASIN STORAGE=0.1927E-01 PERCENT ERROR=   0.5

               21E  MANE        3.07    409.14    198.46      1.79      5.00    391.91    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2461E+02 OUTFLOW=0.2448E+02 BASIN STORAGE=0.4121E-02 PERCENT ERROR=   0.5

               21F  MANE        4.37    667.83    201.44      1.78      5.00    644.11    200.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4492E+02 OUTFLOW=0.4457E+02 BASIN STORAGE=0.8835E-02 PERCENT ERROR=   0.8

               21G  MANE        4.21     25.33    199.36      1.78      5.00     25.13    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1647E+01 OUTFLOW=0.1637E+01 BASIN STORAGE=0.2774E-03 PERCENT ERROR=   0.6

                22  MANE        3.74   2772.23    194.54      2.05      5.00   2752.96    195.00        2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1522E+03 OUTFLOW=0.1514E+03 BASIN STORAGE=0.1237E-01 PERCENT ERROR=   0.5

                23  MANE        4.00    758.21    194.26      2.07      5.00    755.94    195.00        2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4372E+02 OUTFLOW=0.4348E+02 BASIN STORAGE=0.3485E-02 PERCENT ERROR=   0.5
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                24  MANE        2.81    712.57    195.93      1.60      5.00    683.20    195.00        1.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4211E+02 OUTFLOW=0.4189E+02 BASIN STORAGE=0.6065E-02 PERCENT ERROR=   0.5

               25N  MANE        4.31   1247.82    204.02      2.11      5.00   1216.63    205.00        2.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8859E+02 OUTFLOW=0.8801E+02 BASIN STORAGE=0.1552E-01 PERCENT ERROR=   0.6

               25S  MANE        2.95   1387.24    195.20      2.26      5.00   1382.42    195.00        2.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7570E+02 OUTFLOW=0.7535E+02 BASIN STORAGE=0.9688E-02 PERCENT ERROR=   0.5

               21H  MANE        4.20     62.60    199.65      1.78      5.00     62.34    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4128E+01 OUTFLOW=0.4098E+01 BASIN STORAGE=0.7793E-03 PERCENT ERROR=   0.7

               26N  MANE        4.38    677.78    209.77      1.61      5.00    673.89    210.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5502E+02 OUTFLOW=0.5473E+02 BASIN STORAGE=0.9032E-02 PERCENT ERROR=   0.5

               26S  MANE        3.18    239.32    195.89      1.61      5.00    229.95    195.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1443E+02 OUTFLOW=0.1437E+02 BASIN STORAGE=0.1797E-02 PERCENT ERROR=   0.4

                27  MANE        0.62   2007.62    190.77      1.61      5.00   1984.32    190.00        1.62

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1028E+03 OUTFLOW=0.1026E+03 BASIN STORAGE=0.1039E-01 PERCENT ERROR=   0.2


*** NORMAL END OF HEC-1 ***
```

```
1****************************************                    ****************************************
*                                      *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *   U.S. ARMY CORPS OF ENGINEERS       *
*             JUN 09 1992              *                    *   HYDROLOGIC ENGINEERING CENTER      *
*           VERSION 4.0.3E             *                    *         609 SECOND STREET            *
*                                      *                    *      DAVIS, CALIFORNIA 95616         *
*  RUN DATE  01/21/99  TIME  16:27:45  *                    *         (916) 551-1748               *
*                                      *                    *                                      *
****************************************                    ****************************************

                                        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. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                          HEC-1 INPUT                                          PAGE  1

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

        1           ID        FILE <RWDAM21F.DAT>
        2           ID        THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
        3           ID        THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
        4           ID
        5           ID        THE MODIFICIATION INCLUDE THE FOLLOWING:
        6           ID        1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
        7           ID           TO CONCENTRATION POINT AT THE APEX OF 21F
        8           ID        2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE
        9           ID
       10           ID        NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
       11           ID        1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
       12           ID        MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
       13           ID        25S.
       14           ID
       15           ID        100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
       16           ID        RAINFALL FROM NOAA ATLAS
       17           ID
       18           ID        FILE RAW4A.DAT
       19           ID        WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
       20           ID        FOR 22, 23, 24, 25N, AND 25S.  ROUTE COMBINED HYDROGRAPHS
       21           ID        22, 23, 24, 25N AND 25S TO 21G.  SUN-BASIN 26 COMBINED AT
       22           ID        THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
       23           ID        ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
       24           ID        INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
       25           ID        PROPOSED ROAD CROSSINGS.
       26           ID
       27           ID        REVISED BY GREINER 12-9-93 BY RON FERGUSON
       28           ID        REVISED BY C. J. LOVELY, COS, 3-9-94
       29           ID        Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
       30           ID           *Eliminate DSS Records
```

```
 31          ID          *Divide #26 into 26N & 26S; 26N is portion north of Jomax
 32          ID          *Add 26N @ CP21H and route with 21H to apex
 33          ID          *Add 26S @ apex
 34          ID          *Modify reach length in 26S & 26N to reflect division
 35          ID
 36          ID        ******************************************************************
 37          ID        * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
 38          ID        * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.       *
 39          ID        ******************************************************************
 40          ID
 41          ID    September 1998 - HDR Engineering Modified by adding basin south of the
 42          ID    September 1998 - center of Section 36 (Alternative No. 3)
 43          ID    September 1998 - Filename <RAWALT2.DAT>
 44          ID
 45          ID
 46          ID   ****************************************************************************
             *DIAGRAM
 47          IT       5 03MAR94       0     500
 48          IO       5       0       0       0
             *
1                                    HEC-1 INPUT                                    PAGE  2

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

 49          KK      16     SUB
 50          KM        RUNOFF FROM SUB-BASIN 16
 51          BA  1.4570
 52          PH       0      13    0.77    1.51    2.65    3.00    3.23    3.66
 53          LS       0      83     9.8       0       0       0       0       0
 54          UK     217   .0581     .20     100
 55          RK   14800   .0216    .045       0    TRAP      25       3
             *

 56          KK      17     SUB
 57          KM        RUNOFF FROM SUB-BASIN 17
 58          BA  1.1851       0       0
 59          LS       0      83     9.8
 60          UK     285   .0421     .20     100       0       0       0
 61          RK   12200   .0254    .045       0    TRAP      25       3
             *

 62          KK      18     SUB
 63          KM        RUNOFF FROM SUB-BASIN 18
 64          BA  1.2641
 65          LS       0      83     6.5       0
 66          UK     285   .0421     .20     100       0       0       0
 67          RK   10840   .0259    .045       0    TRAP      25       3
             *

 68          KK     19A      CP
 69          KM        COMBINE HYDROGRAPHS SUB16, SUB17 AND SUB18
 70          HC       3
             *

 71          KK     19B      CP
 72          KM        ROUTE CP19A TO CP19B
 73          RS       1    FLOW      -1       0       0
 74          RC    .055    .040    .055    1100   .0155       0       0       0
 75          RX       0       1     126     132     167     173     298     299
 76          RY      10       8       3       0       0       3       8      10
             *

 77          KK      15     SUB
 78          KM        RUNOFF FROM SUBBASIN 15
 79          BA  1.3702       0       0
 80          LS       0      82     5.4       0
```

Alternative 2

```
 81          UK     217   .0581     .20     100       0       0       0
 82          RK   21200   .0236    .045       0    TRAP      25       3
             *

 83          KK     19C      CP
 84          KM        COMBINE HYDROGRAPHS SUB15 & CP19B
 85          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE  3

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

 86          KK    19.1      CP
 87          KM        ROUTE CP 19C TO 19.1
 88          RS       1    FLOW      -1       0       0
 89          RC    .055    .040    .055    1800   .0200       0       0
 90          RX       0       1     151     166     216     231     381     382
 91          RY      10       9       3       0       0       3       9      10
             *

 92          KK      19     SUB
 93          KM        RUNOFF FROM SUB-BASIN 19
 94          BA  0.1872
 95          LS       0      84     7.2       0
 96          UK     275   .0800     .20     100       0       0       0
 97          RK    3730   .0352    .045    .160    TRAP      15       3
 98          RK    1800   .0200    .045       0    TRAP      50      30
             *

 99          KK      20     SUB
100          KM        RUNOFF FROM SUB-BASIN 20
101          BA  0.5698       0       0
102          LS       0      84     3.6       0
103          UK     300   .0750     .20     100       0       0       0
104          RK    9640   .0197    .045       0    TRAP      15       3
             *

105          KK    CP20      CP
106          KM        COMBINE SUB 19, SUB 20 AND CP 19.1
107          HC       3
             *
108          KM    *******BEGIN SUBAREA 21 BREAKDOWN-3/94 REVISIONS*****

109          KK  RRCP20      CP
110          KM        ROUTE CP20 TO CP 21A, WHICH IS 4600'
111          RS       1    FLOW      -1       0       0
112          RC    .055    .040    .055    4600   .0217       0       0       0
113          RX       0      30      60      85     195     220     250     280
114          RY      10       4       1       0       0       1       4      10
             *

115          KK     21A     SUB
116          KM        RUNOFF FROM SUB-BASIN 21A
117          BA     .42       0       0
118          LS       0      80     6.4       0       0       0
119          UK     297   .0558     .20     100       0       0       0
120          RK    6400   .0344    .045       0    TRAP      10       3
             *

121          KK   CP21A
122          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE  4

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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```
 123          KK   RR21A       CP
 124          KM        ROUTE CP21A TO 21B    WHICH IS 960'
 125          RS       1    FLOW      -1       0       0
 126          RC    .055    .040    .055     960   .0156       0       0       0
 127          RX       0      10      60     205     295     440     490     500
 128          RY       6       4       2       0       0       2       4       6
              *

 129          KK     21B     SUB
 130          KM        RUNOFF FROM SUB-BASIN 21B
 131          BA   0.276       0       0
 132          LS       0      80     6.4       0       0       0
 133          UK     297   .0558     .20     100       0       0       0
 134          RK    6300   .0381    .045       0    TRAP      10       3
              *

 135          KK   CP21B
 136          HC       2
              *

 137          KK   RR21B       CP
 138          KM        ROUTE CP21B TO 21C    WHICH IS 4400'
 139          RS       1    FLOW      -1       0       0
 140          RC    .055    .040    .055    4400   .0205       0       0       0
 141          RX       0      10      60     205     295     440     490     500
 142          RY       6       4       2       0       0       2       4       6
              *

 143          KK     21C     SUB
 144          KM        RUNOFF FROM SUB-BASIN 21C
 145          BA    .748       0       0
 146          LS       0      80     6.4       0       0       0
 147          UK     297   .0558     .20     100       0       0       0
 148          RK    9900   .0328    .045       0    TRAP      20       3
              *

 149          KK   CP21C
 150          HC       2
              *

 151          KK   RR21C       CP
 152          KM        ROUTE CP21C TO 21D    WHICH IS 5700'
 153          RS       1    FLOW      -1       0       0
 154          RC    .055    .040    .055    5700   .0181       0       0       0
 155          RX       0      20     175     210     300     335     490     510
 156          RY     5.5     3.5     2.5       0       0     2.5     3.5     5.5
              *

 157          KK     21D     SUB
 158          KM        RUNOFF FROM SUB-BASIN 21D
 159          BA   1.059       0       0
 160          LS       0      80     6.4       0       0       0
 161          UK     297   .0558     .20     100       0       0       0
 162          RK   14500   .0252    .045       0    TRAP      30       3
              *
```



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

 163          KK   CP21D
 164          HC       2
              *

 165          KK   RR21D       CP
 166          KM        ROUTE CP21D TO 21E    WHICH IS 1100'
```

```
167          RS       1    FLOW      -1       0       0
168          RC    .055    .040    .055    1100   .0200       0       0       0
169          RX       0      20     175     210     300     335     490     510
170          RY     5.5     3.5     2.5       0       0     2.5     3.5     5.5
             *

171          KK     21E     SUB
172          KM         RUNOFF FROM SUB-BASIN 21E
173          BA   0.257       0       0
174          LS       0      80     6.4       0       0       0
175          UK     297  .0333     .20     100       0       0       0
176          RK    6600  .0288    .045       0    TRAP      15       3
             *

177          KK   CP21E
178          HC       2
             *

179          KK   RR21E      CP
180          KM        ROUTE CP21E TO 21F    WHICH IS 2800'
181          RS       1    FLOW      -1       0       0
182          RC    .055    .040    .055    2800   .0143       0       0       0
183          RX       0      70     170     180     230     240     340     410
184          RY    10.5     4.5     3.5       0       0     3.5     4.5    10.5
             *

185          KK     21F     SUB
186          KM         RUNOFF FROM SUB-BASIN 21F
187          BA   0.469       0       0
188          LS       0      80     6.4       0       0       0
189          UK     297  .0333     .20     100       0       0       0
190          RK   10400  .0279    .045       0    TRAP      20       3
             *

191          KK   CP21F
192          HC       2
             *

193          KK   RR21F      CP
194          KM   ROUTE CP21F TO 21G (1900' DOWNSTREAM)
195          RS       1    FLOW      -1       0       0
196          RC    .055    .040    .055    1900   .0158       0       0       0
197          RX       0      20      70     345     455     730     780     800
198          RY      10       8       2       0       0       2       8      10
             *
```



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

199          KK     21G     SUB
200          KM   RUNOFF FROM SUB-BASIN 21G
201          BA   .0172       0       0
202          LS       0      80     6.4       0       0       0
203          UK     297  .0333     .20     100       0       0       0
204          RK    4000  .0300    .045       0    TRAP      10       3
             *

205          KK   CP21G
206          HC       2
             *

207          KK      22     SUB
208          KM       RUNOFF FROM SUB-BASIN 22
209          BA  1.3860
210          LS       0      84     5.1       0
211          UK     225  .0590     .20     100       0       0       0       0
```

```
212          RK   13000   .0238    .045       0    TRAP      25       3
             *

213          KK      23     SUB
214          KM        RUNOFF FROM SUB-BASIN 23
215          BA  0.3945       0       0
216          LS       0      84     6.3       0
217          UK     225   .0590     .20     100       0       0       0
218          RK   10200   .0304    .045       0    TRAP      20       3
             *

219          KK     24A      CP
220          KM        COMBINE HYDROGRAPHS FOR SUB 22 AND SUB 23
221          HC       2
             *

222          KK    24.1      CP
223          KM        ROUTE CP 24A TO CP 24.1
224          RS       3    FLOW      -1       0       0
225          RC    .055    .040    .055    6800   .0257       0       0       0
226          RX       0       1     101     107     122     128     228     229
227          RY      10       8       3       0       0       3       8      10
             *

228          KK      24     SUB
229          KM        RUNOFF FROM SUB-BASIN 24
230          KM        DRAINAGE AREA CHANGED TO MATCH VALUE USED BY MICHAEL BAKER
231          KM        Jr., INC.
232          BA  0.4907       0       0
233          LS       0      77     6.8       0
234          UK     295   .0438     .20     100       0       0       0
235          RK    6800   .0257    .045       0    TRAP      15       3
             *
```

1 HEC-1 INPUT PAGE 7

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

236          KK   24.2A      CP
237          KM        COMBINE SUB 24 & CP 24.1 - APEX
238          HC       2
             *

239          KK     25N       SUB
240          KM        RUNOFF FROM SUB-BASIN 25N - APEX
241          BA  0.7834       0       0       0       0       0       0       0
242          LS       0      84     9.0       0
243          UK     295   .0438     .20     100       0       0       0
244          RK   16700   .0302    .045       0    TRAP      25       3
             *

245          KK     25S     SUB
246          KM        RUNOFF FROM SUB-BASIN 25S - APEX
247          BA  0.6256       0       0       0       0       0       0       0
248          LS       0      86     9.0       0
249          UK     295   .0438     .20     100       0       0       0
250          RK    8900   .0278    .045       0    TRAP      25       3
             *

251          KK    25.1      CP
252          KM        COMBINE HYDROGRAPHS FOR SUB-BASINS 25N AND 25S
253          HC       2
             *

254          KK   24.2B      CP
255          KM        COMBINE TOTAL HYDROGRAPH 24.2A WITH 25.1
256          HC       2
```

```
                 *
 257             KK  PIMARD      CP
 258             KM   ROUTE THE TOTAL HYDROGRAPH AT THE CONCENTRATION POINT
 259             KM   24.2B TO THE CULVERT AT THE PIMA ROAD. THERE IS NO
 260             KM   CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
 261             RS       1    FLOW      -1       0       0
 262             RC    .055    .040    .055    2000   .0287       0       0       0
 263             RX       0       1     101     107     122     128     228     229
 264             RY      10       8       3       0       0       3       8      10
                 *

 265             KK  RR24.2      CP
 266             KM   ROUTE THE TOTAL HYDROGRAPH AT CONCENTRATION POINT
 267             KM   24.2B FROM THE CULVERT UNDER PIMA ROAD TO CONCENTRATION
 268             KM   POINT 21.05.
 269             RS       1    FLOW      -1       0       0
 270             RC    .055    .040    .055    3050   .0238       0       0       0
 271             RX       0       1     101     107     122     128     228     229
 272             RY      10       8       3       0       0       3       8      10
                 *
1                                                HEC-1 INPUT                                                PAGE  8
LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 273             KK  C21.05 CONFLUENCE OF DGB CHANNELS NEAR MID-SECTION 36
 274             KM         COMBINE HYDROGRAPH CP21G WITH HYDROGRAPH RR24.2
 275             KM         (FROM THE PIMA ROAD CULVERT)
 276             HC       2
                 *

 277             KK  RR24.3      CP
 278             KM   ROUTE THE TOTAL HYDROGRAPH FROM THE CONVLUENCE IN THE CENTER OF SECTION 36
 279             KM   24.2B TO THE BASIN AND DAM JUST SOUTH OF THE CENTER OF THE SECTION
 280             RS       1    FLOW      -1       0       0
 281             RC    .055    .040    .055    1600   .0238       0       0       0
 282             RX       0       1     101     107     122     128     228     229
 283             RY      10       8       3       0       0       3       8      10
                 *  ******************************************************************************

 284             KK     DAM
 285             KO       3
 286             RS       1    FLOW       0
 287             SV       0     163     339     529     732     950    1187    1442    1714
 288             SE    2130    2135    2140    2145    2150    2155    2160    2165    2170
 289             SS    2160     200     3.2     1.5
                 *  2 - 36" RCP Culverts for outlet
 290             SL    2130    14.1      .6      .5
                 *  ******************************************************************************
                 *

 291             KK    R21G      CP
 292             KM        ROUTE CP21G(21.05)TO 21H WHICH IS 3100'
 293             RS       1    FLOW      -1       0       0
 294             RC    .055    .040    .055    3100   .0194       0       0       0
 295             RX       0      90     120     355     585     820     850     940
 296             RY       9       4     1.5       0       0     1.5       4       9
                 *

 297             KK     21H     SUB
 298             KM        RUNOFF FROM SUB-BASIN 21H
 299             BA   .0431       0       0
 300             LS       0      80     6.4       0       0       0
 301             UK     297   .0333     .20     100       0       0       0
 302             RK    4600   .0278    .045       0    TRAP      20       3
                 *
```

```
 303          KK     26N
 304          KM       Runoff from sub-basin 26N
 305          BA   .6376       0       0
 306          LS       0      75    12.7       0
 307          UK     200   .0250     .20     100       0
 308          RK   12000   .0263    .045       0    TRAP      35      10
              *
1                                          HEC-1 INPUT                                                    PAGE  9

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

 309          KK   CP21H   JOMAX RD
 310          KO       3
 311          HC       3
              *

 312          KK   RR21H      CP
 313          KM        ROUTE HYDROGRAPH AT CONCENTRATION POINT 21H   DOWNSTREAM FROM
 314          KM        JOMAX ROAD          THERE IS NO ADDITIONAL CONTRIBUTING
 315          KM        DRAINAGE AREA AT THIS CONCENTRATION POINT.  USED CHANNEL
 316          KM        GEOMETRY                              FROM REACH SIX
 317          KM             DEVELOPED BY C. LOVELY
 318          RS       1    FLOW      -1       0       0
 319          RC    .055    .040    .055    2390   .0188       0       0       0
 320          RX       0      90     120     355     585     820     850     940
 321          RY       9       4     1.5       0       0     1.5       4       9
              *

 322          KK     26S     SUB
 323          KM       RUNOFF FROM SUB-BASIN 26S
 324          BA  0.1672       0       0
 325          LS       0      75    12.7       0
 326          UK     200   .0250     .20     100       0       0       0
 327          RK    4000   .0263    .045       0    TRAP      35      10
              *

 328          KK  *APEX*      CP
 329          KM        COMBINE FLOW FROM SUB-BASIN 26 ,
 330          KM            AND ROUTED HYDROGRAPH FROM JOMAX ROAD.
 331          HC       2
              *
 332          KM        *********END SUBAREA 21 REVISIONS************

 333          KK   CP27A      CP AT HAPPY VALLEY RD
 334          KM        ROUTE FLOW FROM CONCENTRATION POINT APEX  TO 27A (HAPPY VALLEY
 335          KM        ROAD).  THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION PT.
 336          KM
 337          RS       1    FLOW      -1       0       0
 338          RC    .055    .040    .055    1600   .0196       0       0       0
 339          RX       0       1     201     211     261     271     471     472
 340          RY      10       4       2       0       0       2       4      10
              *

 341          KK   CP27B      CP AT MILLER RD
 342          KM        ROUTE FLOW FROM CONCENTRATION POINT 27B TO 27C (MILLER ROAD).
 343          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
 344          RS       1    FLOW      -1       0       0
 345          RC    .055    .040    .055    3300   .0196       0       0       0
 346          RX       0       1     201     211     261     271     471     472
 347          RY      10       4       2       0       0       2       4      10
              *
1                                          HEC-1 INPUT                                                    PAGE 10

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

```
348          KK   CP27C      CP AT PINNACLE PEAK RD
349          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (PINNACLE PK ROAD).
350          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
351          RS       1    FLOW      -1       0       0
352          RC    .055    .040    .055    3300   .0196       0       0       0
353          RX       0       1     201     211     261     271     471     472
354          RY      10       4       2       0       0       2       4      10
             *

355          KK   CP27D      CP AT SCOTTSDALE RD
356          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (SCOTTSDALE ROAD)
357          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
358          RS       1    FLOW      -1       0       0
359          RC    .055    .040    .055    1000   .0196       0       0       0
360          RX       0       1     201     211     261     271     471     472
361          RY      10       4       2       0       0       2       4      10
             *

362          KK      27     SUB
363          KM        RUNOFF FROM SUB-BASIN 27
364          BA  1.1913       0       0
365          LS       0      75    12.7       0
366          UK     200   .0250     .20     100       0       0       0
367          RK    1500   .0263    .045       0    TRAP      35      10
             *

368          KK    CP27      CP AT SCOTTSDALE RD
369          KO       3
370          KM        COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
371          KM        POINT 27D WITH SUB 27 .  TOTAL FLOW AT
372          KM        SCOTTSDALE ROAD FOR FAN 4.
373          HC       2
             *
374          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   49          16
                .
                .
   56           .          17
                .           .
                .           .
   62           .           .          18
                .           .           .
                .           .           .
   68         19A.......................
                V
                V
   71         19B
                .
                .
   77           .          15
                .           .
                .           .
   83         19C............
                V
                V
   86        19.1
                .
                .
   92           .          19
```

```
                .          .
 99             .          .          20
                .          .           .
105          CP20.......................
                V
                V
109        RRCP20
                .
                .
115             .        21A
                .          .
                .          .
121         CP21A............
                V
                V
123         RR21A
                .
                .
129             .        21B
                .          .
                .          .
135         CP21B............
                V
                V
137         RR21B
                .
                .
143             .        21C
                .          .
                .          .
149         CP21C............
                V
                V
151         RR21C
                .
                .
157             .        21D
                .          .
                .          .
163         CP21D............
                V
                V
165         RR21D
                .
                .
171             .        21E
                .          .
                .          .
177         CP21E............
                V
                V
179         RR21E
                .
                .
185             .        21F
                .          .
                .          .
191         CP21F............
                V
                V
193         RR21F
                .
                .
199             .        21G
                .          .
```

```
205      CP21G...........
                 .
207              22
                 .
213              .         23
                 .         .
219              24A........
                 V
                 V
222            24.1
                 .
228              .         24
                 .         .
236            24.2A.......
                 .
239              .        25N
                 .         .
245              .         .        25S
                 .         .         .
251              .       25.1.......
                 .         .
254            24.2B.......
                 V
                 V
257           PIMARD
                 V
                 V
265           RR24.2
                 .
273      C21.05..........
             V
             V
277      RR24.3
             V
             V
284         DAM
             V
             V
291         R21G
                 .
297              .        21H
                 .
303              .        26N
                 .         .
309      CP21H......................
             V
             V
312      RR21H
                 .
322              .        26S
                 .
```

```
  328      *APEX*............
                V
                V
  333       CP27A
                V
                V
  341       CP27B
                V
                V
  348       CP27C
                V
                V
  355       CP27D
                .
                .
  362           .          27
                .           .
                .           .
  368        CP27............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN 09 1992              *
*           VERSION 4.0.3E             *
*                                      *
*  RUN DATE  01/21/99  TIME  16:27:45  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 551-1748              *
*                                      *
****************************************
```

FILE <RWDAM21F.DAT>
THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.

THE MODIFICIATION INCLUDE THE FOLLOWING:
1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
   TO CONCENTRATION POINT AT THE APEX OF 21F
2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE

NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
25S.

100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
RAINFALL FROM NOAA ATLAS

FILE RAW4A.DAT
WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
FOR 22, 23, 24, 25N, AND 25S. ROUTE COMBINED HYDROGRAPHS
22, 23, 24, 25N AND 25S TO 21G. SUN-BASIN 26 COMBINED AT
THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
PROPOSED ROAD CROSSINGS.

REVISED BY GREINER 12-9-93 BY RON FERGUSON
REVISED BY C. J. LOVELY, COS, 3-9-94
Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
   *Eliminate DSS Records
   *Divide #26 into 26N & 26S; 26N is portion north of Jomax
   *Add 26N @ CP21H and route with 21H to apex

```
                                  *Add 26S @ apex
                                  *Modify reach length in 26S & 26N to reflect division

                                 ******************************************************************
                                 * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
                                 * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.      *
                                 ******************************************************************

                              September 1998 - HDR Engineering Modified by adding basin south of the
                              September 1998 - center of Section 36 (Alternative No. 3)
                              September 1998 - Filename <RAWALT2.DAT>


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

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

     IT          HYDROGRAPH TIME DATA
                        NMIN           5  MINUTES IN COMPUTATION INTERVAL
                       IDATE      3MAR94  STARTING DATE
                       ITIME        0000  STARTING TIME
                          NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      4MAR94  ENDING DATE
                      NDTIME        1735  ENDING TIME
                       ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL    0.08 HOURS
                       TOTAL TIME BASE   41.58 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
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0


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


            **************
            *            *
 284 KK     *       DAM  *
            *            *
```

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

285 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           3  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

              HYDROGRAPH ROUTING DATA

286 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC        0.00  INITIAL CONDITION
                          X        0.00 WORKING R AND D COEFFICIENT

287 SV            STORAGE         0.0     163.0     339.0     529.0     732.0     950.0    1187.0    1442.0    1714.0

288 SE          ELEVATION     2130.00   2135.00   2140.00   2145.00   2150.00   2155.00   2160.00   2165.00   2170.00

290 SL          LOW-LEVEL OUTLET
                      ELEVL     2130.00  ELEVATION AT CENTER OF OUTLET
                      CAREA       14.10  CROSS-SECTIONAL AREA
                       COQL        0.60  COEFFICIENT
                       EXPL        0.50  EXPONENT OF HEAD

289 SS          SPILLWAY
                       CREL     2160.00  SPILLWAY CREST ELEVATION
                      SPWID      200.00  SPILLWAY WIDTH
                       COQW        3.20  WEIR COEFFICIENT
                       EXPW        1.50  EXPONENT OF HEAD

                                                    ***

                                        COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW       0.00     99.13    109.13    121.38    136.72    156.51    182.99    220.26    276.59    371.63
        ELEVATION    2130.00   2132.13   2132.59   2133.20   2134.06   2135.32   2137.27   2140.54   2146.62   2160.00

          OUTFLOW     393.64    540.04    931.49   1688.66   2932.20   4782.74   7360.93  10787.40  15182.78  20667.69
        ELEVATION    2160.10   2160.41   2160.91   2161.61   2162.51   2163.61   2164.91   2166.41   2168.10   2170.00

                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00     69.59     84.33    104.33    132.37    163.00    174.29    243.04    339.00    359.46
          OUTFLOW       0.00     99.13    109.13    121.38    136.72    151.72    156.51    182.99    214.56    220.26
        ELEVATION    2130.00   2132.13   2132.59   2133.20   2134.06   2135.00   2135.32   2137.27   2140.00   2140.54

          STORAGE     529.00    594.68    732.00    950.00   1187.00   1192.29   1207.73   1233.34   1269.10   1315.02
          OUTFLOW     262.78    276.59    303.43    339.25    371.63    393.66    540.00    931.59   1688.73   2932.26
        ELEVATION    2145.00   2146.62   2150.00   2155.00   2160.00   2160.10   2160.41   2160.91   2161.61   2162.51

          STORAGE    1371.10   1437.34   1442.00   1518.51   1610.84   1714.00
          OUTFLOW    4782.86   7361.19   7556.82  10787.31  15183.02  20667.69
        ELEVATION    2163.61   2164.91   2165.00   2166.41   2168.10   2170.00

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

                      HYDROGRAPH AT STATION      DAM

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR      41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    371.       7.92                367.         338.         283.         283.
                        (INCHES)    0.263        0.970        1.407        1.407
                         (AC-FT)    182.         671.         972.         972.
```

```
 PEAK STORAGE   TIME                        MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
   1184.        7.92                1154.        956.        727.        727.
  PEAK STAGE    TIME                        MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
  2159.93       7.92              2159.31     2155.00     2149.38     2149.38
                        CUMULATIVE AREA =   12.96 SQ MI


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


            **************
            *            *
  309 KK    *     CP21H  *        JOMAX RD
            *            *
            **************

  310 KO          OUTPUT CONTROL VARIABLES
                        IPRNT           3  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE

  311 HC          HYDROGRAPH COMBINATION
                        ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    CP21H
  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+     768.      3.50                421.        357.        298.        298.
                        (INCHES)    0.287       0.975       1.410       1.410
                         (AC-FT)    209.        709.        1025.       1025.
                        CUMULATIVE AREA =   13.64 SQ MI
MANE2 NPLAN,NSTM       1      0


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


            **************
            *            *
  368 KK    *      CP27  *          CP AT SCOTTSDALE RD
            *            *
            **************

  369 KO          OUTPUT CONTROL VARIABLES
                        IPRNT           3  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
```

```
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                                 COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
                                 POINT 27D WITH SUB 27 .  TOTAL FLOW AT
                                 SCOTTSDALE ROAD FOR FAN 4.

 373 HC          HYDROGRAPH COMBINATION
                      ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
MANE2 NPLAN,NSTM       1      0
      ***             ***            ***            ***            ***

                        HYDROGRAPH AT STATION     CP27

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                                  (CFS)
+    1993.      3.17              596.        404.        328.        328.
                              (INCHES)      0.369       1.001       1.410       1.410
                               (AC-FT)       295.        801.       1128.       1128.

                        CUMULATIVE AREA =   15.00 SQ MI

1
                                                   RUNOFF SUMMARY
                                              FLOW IN CUBIC FEET PER SECOND
                                            TIME IN HOURS,  AREA IN SQUARE MILES

                                     PEAK   TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN     MAXIMUM     TIME OF
          OPERATION       STATION    FLOW    PEAK                                           AREA      STAGE     MAX STAGE
+                                                        6-HOUR     24-HOUR     72-HOUR

          HYDROGRAPH AT
+                            16     2595.    3.25         319.        81.         47.       1.46

          HYDROGRAPH AT
+                            17     2114.    3.25         259.        65.         38.       1.19

          HYDROGRAPH AT
+                            18     2357.    3.25         270.        68.         39.       1.26

          3 COMBINED AT
+                           19A     7066.    3.25         848.       214.        124.       3.91

          ROUTED TO
+                           19B     7034.    3.33         848.       214.        124.       3.91
+                                                                                            6.96        3.33

          HYDROGRAPH AT
+                            15     1848.    3.42         278.        70.         41.       1.37

          2 COMBINED AT
+                           19C     8679.    3.33        1125.       284.        164.       5.28

          ROUTED TO
+                          19.1     8266.    3.33        1125.       284.        164.       5.28
+                                                                                            6.02        3.33

          HYDROGRAPH AT
+                            19      431.    3.25          42.        11.          6.       0.19

          HYDROGRAPH AT
+                            20     1052.    3.25         123.        31.         18.       0.57

          3 COMBINED AT
```

```
+                    CP20    9603.  3.33    1290.    326.    188.    6.03
        ROUTED TO
+                   RRCP20   8867.  3.42    1289.    326.    188.    6.03
+                                                                   4.02     3.42
        HYDROGRAPH AT
+                    21A      763.  3.25      80.     20.     12.    0.42
        2 COMBINED AT
+                   CP21A    9325.  3.42    1368.    346.    200.    6.45
        ROUTED TO
+                   RR21A    9163.  3.50    1368.    346.    200.    6.45
+                                                                   3.42     3.50
        HYDROGRAPH AT
+                    21B      497.  3.25      53.     13.      8.    0.28
        2 COMBINED AT
+                   CP21B    9404.  3.50    1420.    359.    207.    6.73
        ROUTED TO
+                   RR21B    8768.  3.58    1419.    359.    207.    6.73
+                                                                   3.69     3.58
        HYDROGRAPH AT
+                    21C     1207.  3.25     142.     36.     21.    0.75
        2 COMBINED AT
+                   CP21C    9344.  3.58    1560.    395.    228.    7.48
        ROUTED TO
+                   RR21C    7778.  3.75    1554.    395.    228.    7.48
+                                                                   4.07     3.75
        HYDROGRAPH AT
+                    21D     1447.  3.33     201.     51.     29.    1.06
        2 COMBINED AT
+                   CP21D    8537.  3.67    1754.    446.    257.    8.54
        ROUTED TO
+                   RR21D    8506.  3.75    1753.    446.    257.    8.54
+                                                                   4.13     3.75
        HYDROGRAPH AT
+                    21E      392.  3.33      49.     12.      7.    0.26
        2 COMBINED AT
+                   CP21E    8645.  3.75    1801.    458.    265.    8.79
        ROUTED TO
+                   RR21E    8393.  3.83    1799.    458.    265.    8.79
+                                                                   6.30     3.83
        HYDROGRAPH AT
+                    21F      644.  3.33      89.     22.     13.    0.47
        2 COMBINED AT
+                   CP21F    8636.  3.75    1886.    481.    278.    9.26
        ROUTED TO
+                   RR21F    8620.  3.83    1883.    481.    278.    9.26
+                                                                   2.68     3.83
        HYDROGRAPH AT
```

```
+                    21G      25.   3.33      3.     1.     0.    0.02
      2 COMBINED AT
+                  CP21G    8629.   3.83   1887.   482.   278.    9.28
      HYDROGRAPH AT
+                     22    2753.   3.25    304.    76.    44.    1.39
      HYDROGRAPH AT
+                     23     756.   3.25     87.    22.    13.    0.39
      2 COMBINED AT
+                    24A    3509.   3.25    391.    98.    57.    1.78
      ROUTED TO
+                   24.1    2849.   3.42    391.    98.    57.    1.78
+                                                          5.53    3.42
      HYDROGRAPH AT
+                     24     683.   3.25     84.    21.    12.    0.49
      2 COMBINED AT
+                  24.2A    3382.   3.42    474.   120.    69.    2.27
      HYDROGRAPH AT
+                    25N    1217.   3.42    175.    44.    26.    0.78
      HYDROGRAPH AT
+                    25S    1382.   3.25    151.    38.    22.    0.63
      2 COMBINED AT
+                   25.1    2363.   3.33    326.    82.    48.    1.41
      2 COMBINED AT
+                  24.2B    5490.   3.42    800.   202.   117.    3.68
      ROUTED TO
+                  PIMARD    5410.   3.42    800.   202.   117.    3.68
+                                                          6.79    3.42
      ROUTED TO
+                  RR24.2    5164.   3.50    799.   202.   117.    3.68
+                                                          6.90    3.50
      2 COMBINED AT
+                  C21.05   11894.   3.75   2683.   683.   395.   12.96
      ROUTED TO
+                  RR24.3   11824.   3.75   2683.   683.   395.   12.96
+                                                          9.00    3.75
      ROUTED TO
+                     DAM     371.   7.92    367.   338.   283.   12.96
+                                                       2159.93    7.92
      ROUTED TO
+                     R21G     371.   8.33    367.   338.   281.   12.96
+                                                          0.45    8.33
      HYDROGRAPH AT
+                     21H      62.   3.33      8.     2.     1.    0.04
      HYDROGRAPH AT
+                     26N     674.   3.50    109.    28.    16.    0.64
      3 COMBINED AT
+                   CP21H     768.   3.50    421.   357.   298.   13.64
```

```
          ROUTED TO
+                        RR21H      647.    3.67        415.       356.       297.      13.64
+                                                                                                  0.59       3.67
          HYDROGRAPH AT
+                          26S      230.    3.25         29.         7.         4.       0.17
          2 COMBINED AT
+                        *APEX*     758.    3.58        435.       362.       301.      13.81
          ROUTED TO
+                        CP27A      750.    3.67        435.       362.       301.      13.81
+                                                                                                  1.79       3.67
          ROUTED TO
+                        CP27B      718.    3.75        433.       361.       300.      13.81
+                                                                                                  1.75       3.75
          ROUTED TO
+                        CP27C      686.    3.83        430.       360.       299.      13.81
+                                                                                                  1.70       3.83
          ROUTED TO
+                        CP27D      686.    3.92        430.       360.       298.      13.81
+                                                                                                  1.70       3.92
          HYDROGRAPH AT
+                           27     1984.    3.17        205.        52.        30.       1.19
          2 COMBINED AT
+                         CP27     1993.    3.17        596.       404.       328.      15.00
1
                                   SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                       (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                  INTERPOLATED TO
                                                                              COMPUTATION INTERVAL
          ISTAQ    ELEMENT      DT        PEAK    TIME TO      VOLUME      DT        PEAK    TIME TO      VOLUME
                                                     PEAK                                       PEAK

                              (MIN)      (CFS)     (MIN)       (IN)    (MIN)      (CFS)     (MIN)       (IN)
             16    MANE        3.31    2714.57    197.99       2.05     5.00    2595.35    195.00       2.06

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1602E+03 OUTFLOW=0.1596E+03 BASIN STORAGE=0.1487E-01 PERCENT ERROR=   0.4

             17    MANE        3.72    2179.71    195.53       2.05     5.00    2113.93    195.00       2.05

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1303E+03 OUTFLOW=0.1296E+03 BASIN STORAGE=0.1813E-01 PERCENT ERROR=   0.6

             18    MANE        3.06    2403.41    196.84       2.00     5.00    2357.00    195.00       2.00

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1353E+03 OUTFLOW=0.1346E+03 BASIN STORAGE=0.1762E-01 PERCENT ERROR=   0.5

             15    MANE        3.60    1852.02    207.71       1.91     5.00    1847.60    205.00       1.91

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1401E+03 OUTFLOW=0.1393E+03 BASIN STORAGE=0.1918E-01 PERCENT ERROR=   0.5

             19    MANE        1.73     440.63    193.75       2.09     5.00     430.55    195.00       2.09
```

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CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2089E+02 OUTFLOW=0.2083E+02 BASIN STORAGE=0.1376E-02 PERCENT ERROR=   0.3

                20  MANE        3.79   1104.65    196.23      2.02      5.00   1052.10    195.00        2.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6186E+02 OUTFLOW=0.6151E+02 BASIN STORAGE=0.5950E-02 PERCENT ERROR=   0.6

               21A  MANE        2.39    781.28    193.64      1.79      5.00    762.73    195.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4022E+02 OUTFLOW=0.4006E+02 BASIN STORAGE=0.4421E-02 PERCENT ERROR=   0.4

               21B  MANE        2.59    504.98    194.27      1.79      5.00    497.48    195.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2643E+02 OUTFLOW=0.2632E+02 BASIN STORAGE=0.2952E-02 PERCENT ERROR=   0.4

               21C  MANE        3.26   1262.50    196.65      1.79      5.00   1206.94    195.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7164E+02 OUTFLOW=0.7124E+02 BASIN STORAGE=0.9548E-02 PERCENT ERROR=   0.5

               21D  MANE        3.13   1492.11    200.84      1.79      5.00   1447.37    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1014E+03 OUTFLOW=0.1009E+03 BASIN STORAGE=0.1927E-01 PERCENT ERROR=   0.5

               21E  MANE        3.07    409.14    198.46      1.79      5.00    391.91    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2461E+02 OUTFLOW=0.2448E+02 BASIN STORAGE=0.4121E-02 PERCENT ERROR=   0.5

               21F  MANE        4.37    667.83    201.44      1.78      5.00    644.11    200.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4492E+02 OUTFLOW=0.4457E+02 BASIN STORAGE=0.8835E-02 PERCENT ERROR=   0.8

               21G  MANE        4.21     25.33    199.36      1.78      5.00     25.13    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1647E+01 OUTFLOW=0.1637E+01 BASIN STORAGE=0.2774E-03 PERCENT ERROR=   0.6

                22  MANE        3.74   2772.23    194.54      2.05      5.00   2752.96    195.00        2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1522E+03 OUTFLOW=0.1514E+03 BASIN STORAGE=0.1237E-01 PERCENT ERROR=   0.5

                23  MANE        4.00    758.21    194.26      2.07      5.00    755.94    195.00        2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4372E+02 OUTFLOW=0.4348E+02 BASIN STORAGE=0.3485E-02 PERCENT ERROR=   0.5

                24  MANE        2.81    712.57    195.93      1.60      5.00    683.20    195.00        1.60
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CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4211E+02 OUTFLOW=0.4189E+02 BASIN STORAGE=0.6065E-02 PERCENT ERROR=   0.5

              25N  MANE        4.31   1247.82    204.02      2.11      5.00   1216.63    205.00        2.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8859E+02 OUTFLOW=0.8801E+02 BASIN STORAGE=0.1552E-01 PERCENT ERROR=   0.6

              25S  MANE        2.95   1387.24    195.20      2.26      5.00   1382.42    195.00        2.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7570E+02 OUTFLOW=0.7535E+02 BASIN STORAGE=0.9688E-02 PERCENT ERROR=   0.5

              21H  MANE        4.20     62.60    199.65      1.78      5.00     62.34    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4128E+01 OUTFLOW=0.4098E+01 BASIN STORAGE=0.7793E-03 PERCENT ERROR=   0.7

              26N  MANE        4.38    677.78    209.77      1.61      5.00    673.89    210.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5502E+02 OUTFLOW=0.5473E+02 BASIN STORAGE=0.9032E-02 PERCENT ERROR=   0.5

              26S  MANE        3.18    239.32    195.89      1.61      5.00    229.95    195.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1443E+02 OUTFLOW=0.1437E+02 BASIN STORAGE=0.1797E-02 PERCENT ERROR=   0.4

               27  MANE        0.62   2007.62    190.77      1.61      5.00   1984.32    190.00        1.62

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1028E+03 OUTFLOW=0.1026E+03 BASIN STORAGE=0.1039E-01 PERCENT ERROR=   0.2


*** NORMAL END OF HEC-1 ***
```

```
1****************************************                                    ****************************************
*                                      *                                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *   U.S. ARMY CORPS OF ENGINEERS       *
*             JUN 09 1992              *                                    *   HYDROLOGIC ENGINEERING CENTER      *
*           VERSION 4.0.3E             *                                    *         609 SECOND STREET            *
*                                      *                                    *      DAVIS, CALIFORNIA 95616         *
*  RUN DATE  01/21/99  TIME  16:29:15  *                                    *          (916) 551-1748              *
*                                      *                                    *                                      *
****************************************                                    ****************************************


                                        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. THIS IS THE FORTRAN77 VERSION
          NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
          DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
          KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


1                                                HEC-1 INPUT                                                PAGE  1

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

            1           ID        FILE <RWDAM21F.DAT>
            2           ID        THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
            3           ID        THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
            4           ID
            5           ID        THE MODIFICIATION INCLUDE THE FOLLOWING:
            6           ID        1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
            7           ID           TO CONCENTRATION POINT AT THE APEX OF 21F
            8           ID        2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE
            9           ID
           10           ID        NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
           11           ID        1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
           12           ID        MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
           13           ID        25S.
           14           ID
           15           ID        100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
           16           ID        RAINFALL FROM NOAA ATLAS
           17           ID
           18           ID        FILE RAW4A.DAT
           19           ID        WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
           20           ID        FOR 22, 23, 24, 25N, AND 25S.  ROUTE COMBINED HYDROGRAPHS
           21           ID        22, 23, 24, 25N AND 25S TO 21G.  SUN-BASIN 26 COMBINED AT
           22           ID        THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
           23           ID        ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
           24           ID        INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
           25           ID        PROPOSED ROAD CROSSINGS.
           26           ID
           27           ID        REVISED BY GREINER 12-9-93 BY RON FERGUSON
           28           ID        REVISED BY C. J. LOVELY, COS, 3-9-94
           29           ID        Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
           30           ID           *Eliminate DSS Records
```

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 31          ID          *Divide #26 into 26N & 26S; 26N is portion north of Jomax
 32          ID          *Add 26N @ CP21H and route with 21H to apex
 33          ID          *Add 26S @ apex
 34          ID          *Modify reach length in 26S & 26N to reflect division
 35          ID
 36          ID        ******************************************************************
 37          ID        * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
 38          ID        * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.       *
 39          ID        ******************************************************************
 40          ID
 41          ID    September 1998 - HDR Engineering Modified by adding basin to the
 42          ID    September 1998 - center of Section 36 (Alternative No. 3)
 43          ID    September 1998 - Filename <RAWALT3.DAT>
 44          ID
 45          ID
 46          ID   ***********************************************************************
             *DIAGRAM
 47          IT       5 03MAR94       0     500
 48          IO       5       0       0       0
             *
1                                        HEC-1 INPUT                                    PAGE  2

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

 49          KK      16     SUB
 50          KM        RUNOFF FROM SUB-BASIN 16
 51          BA  1.4570
 52          PH       0      13    0.77    1.51    2.65    3.00    3.23    3.66
 53          LS       0      83     9.8       0       0       0       0       0
 54          UK     217   .0581     .20     100
 55          RK   14800   .0216    .045       0    TRAP      25       3
             *

 56          KK      17     SUB
 57          KM        RUNOFF FROM SUB-BASIN 17
 58          BA  1.1851       0       0
 59          LS       0      83     9.8
 60          UK     285   .0421     .20     100       0       0       0
 61          RK   12200   .0254    .045       0    TRAP      25       3
             *

 62          KK      18     SUB
 63          KM        RUNOFF FROM SUB-BASIN 18
 64          BA  1.2641
 65          LS       0      83     6.5       0
 66          UK     285   .0421     .20     100       0       0       0
 67          RK   10840   .0259    .045       0    TRAP      25       3
             *

 68          KK     19A      CP
 69          KM        COMBINE HYDROGRAPHS SUB16, SUB17 AND SUB18
 70          HC       3
             *

 71          KK     19B      CP
 72          KM        ROUTE CP19A TO CP19B
 73          RS       1    FLOW      -1       0       0
 74          RC    .055    .040    .055    1100   .0155       0       0       0
 75          RX       0       1     126     132     167     173     298     299
 76          RY      10       8       3       0       0       3       8      10
             *

 77          KK      15     SUB
 78          KM        RUNOFF FROM SUBBASIN 15
 79          BA  1.3702       0       0
 80          LS       0      82     5.4       0
```

```
 81          UK     217   .0581     .20     100       0       0       0
 82          RK   21200   .0236    .045       0    TRAP      25       3
             *

 83          KK     19C      CP
 84          KM        COMBINE HYDROGRAPHS SUB15 & CP19B
 85          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE  3

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

 86          KK    19.1      CP
 87          KM        ROUTE CP 19C TO 19.1
 88          RS       1    FLOW      -1       0       0
 89          RC    .055    .040    .055    1800   .0200       0       0
 90          RX       0       1     151     166     216     231     381     382
 91          RY      10       9       3       0       0       3       9      10
             *

 92          KK      19     SUB
 93          KM        RUNOFF FROM SUB-BASIN 19
 94          BA  0.1872
 95          LS       0      84     7.2       0
 96          UK     275   .0800     .20     100       0       0       0
 97          RK    3730   .0352    .045    .160    TRAP      15       3
 98          RK    1800   .0200    .045       0    TRAP      50      30
             *

 99          KK      20     SUB
100          KM        RUNOFF FROM SUB-BASIN 20
101          BA  0.5698       0       0
102          LS       0      84     3.6       0
103          UK     300   .0750     .20     100       0       0       0
104          RK    9640   .0197    .045       0    TRAP      15       3
             *

105          KK    CP20      CP
106          KM        COMBINE SUB 19, SUB 20 AND CP 19.1
107          HC       3
             *
108          KM    *******BEGIN SUBAREA 21 BREAKDOWN-3/94 REVISIONS*****

109          KK  RRCP20      CP
110          KM        ROUTE CP20 TO CP 21A, WHICH IS 4600'
111          RS       1    FLOW      -1       0       0
112          RC    .055    .040    .055    4600   .0217       0       0       0
113          RX       0      30      60      85     195     220     250     280
114          RY      10       4       1       0       0       1       4      10
             *

115          KK     21A     SUB
116          KM        RUNOFF FROM SUB-BASIN 21A
117          BA     .42       0       0
118          LS       0      80     6.4       0       0       0
119          UK     297   .0558     .20     100       0       0       0
120          RK    6400   .0344    .045       0    TRAP      10       3
             *

121          KK   CP21A
122          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE  4

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

```
 123          KK   RR21A       CP
 124          KM        ROUTE CP21A TO 21B    WHICH IS 960'
 125          RS       1    FLOW      -1       0       0
 126          RC    .055    .040    .055     960   .0156       0       0       0
 127          RX       0      10      60     205     295     440     490     500
 128          RY       6       4       2       0       0       2       4       6
              *

 129          KK     21B     SUB
 130          KM        RUNOFF FROM SUB-BASIN 21B
 131          BA   0.276       0       0
 132          LS       0      80     6.4       0       0       0
 133          UK     297   .0558     .20     100       0       0       0
 134          RK    6300   .0381    .045       0    TRAP      10       3
              *

 135          KK   CP21B
 136          HC       2
              *

 137          KK   RR21B       CP
 138          KM        ROUTE CP21B TO 21C    WHICH IS 4400'
 139          RS       1    FLOW      -1       0       0
 140          RC    .055    .040    .055    4400   .0205       0       0       0
 141          RX       0      10      60     205     295     440     490     500
 142          RY       6       4       2       0       0       2       4       6
              *

 143          KK     21C     SUB
 144          KM        RUNOFF FROM SUB-BASIN 21C
 145          BA    .748       0       0
 146          LS       0      80     6.4       0       0       0
 147          UK     297   .0558     .20     100       0       0       0
 148          RK    9900   .0328    .045       0    TRAP      20       3
              *

 149          KK   CP21C
 150          HC       2
              *

 151          KK   RR21C       CP
 152          KM        ROUTE CP21C TO 21D    WHICH IS 5700'
 153          RS       1    FLOW      -1       0       0
 154          RC    .055    .040    .055    5700   .0181       0       0       0
 155          RX       0      20     175     210     300     335     490     510
 156          RY     5.5     3.5     2.5       0       0     2.5     3.5     5.5
              *

 157          KK     21D     SUB
 158          KM        RUNOFF FROM SUB-BASIN 21D
 159          BA   1.059       0       0
 160          LS       0      80     6.4       0       0       0
 161          UK     297   .0558     .20     100       0       0       0
 162          RK   14500   .0252    .045       0    TRAP      30       3
              *
```



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

 163          KK   CP21D
 164          HC       2
              *

 165          KK   RR21D       CP
 166          KM        ROUTE CP21D TO 21E    WHICH IS 1100'
```

```
167          RS       1    FLOW      -1       0       0
168          RC    .055    .040    .055    1100   .0200       0       0       0
169          RX       0      20     175     210     300     335     490     510
170          RY     5.5     3.5     2.5       0       0     2.5     3.5     5.5
             *

171          KK     21E     SUB
172          KM        RUNOFF FROM SUB-BASIN 21E
173          BA   0.257       0       0
174          LS       0      80     6.4       0       0       0
175          UK     297   .0333     .20     100       0       0       0
176          RK    6600   .0288    .045       0    TRAP      15       3
             *

177          KK   CP21E
178          HC       2
             *

179          KK   RR21E      CP
180          KM        ROUTE CP21E TO 21F    WHICH IS 2800'
181          RS       1    FLOW      -1       0       0
182          RC    .055    .040    .055    2800   .0143       0       0       0
183          RX       0      70     170     180     230     240     340     410
184          RY    10.5     4.5     3.5       0       0     3.5     4.5    10.5
             *

185          KK     21F     SUB
186          KM        RUNOFF FROM SUB-BASIN 21F
187          BA   0.469       0       0
188          LS       0      80     6.4       0       0       0
189          UK     297   .0333     .20     100       0       0       0
190          RK   10400   .0279    .045       0    TRAP      20       3
             *

191          KK   CP21F
192          HC       2
             *

193          KK   RR21F      CP
194          KM   ROUTE CP21F TO 21G (1900' DOWNSTREAM)
195          RS       1    FLOW      -1       0       0
196          RC    .055    .040    .055    1900   .0158       0       0       0
197          RX       0      20      70     345     455     730     780     800
198          RY      10       8       2       0       0       2       8      10
             *
```



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

199          KK     21G     SUB
200          KM   RUNOFF FROM SUB-BASIN 21G
201          BA   .0172       0       0
202          LS       0      80     6.4       0       0       0
203          UK     297   .0333     .20     100       0       0       0
204          RK    4000   .0300    .045       0    TRAP      10       3
             *

205          KK   CP21G
206          HC       2
             *

207          KK      22     SUB
208          KM       RUNOFF FROM SUB-BASIN 22
209          BA  1.3860
210          LS       0      84     5.1       0
211          UK     225   .0590     .20     100       0       0       0       0
```

```
212          RK   13000   .0238    .045       0    TRAP      25       3
             *

213          KK      23     SUB
214          KM        RUNOFF FROM SUB-BASIN 23
215          BA  0.3945       0       0
216          LS       0      84     6.3       0
217          UK     225   .0590     .20     100       0       0       0
218          RK   10200   .0304    .045       0    TRAP      20       3
             *

219          KK     24A      CP
220          KM        COMBINE HYDROGRAPHS FOR SUB 22 AND SUB 23
221          HC       2
             *

222          KK    24.1      CP
223          KM        ROUTE CP 24A TO CP 24.1
224          RS       3    FLOW      -1       0       0
225          RC    .055    .040    .055    6800   .0257       0       0       0
226          RX       0       1     101     107     122     128     228     229
227          RY      10       8       3       0       0       3       8      10
             *

228          KK      24     SUB
229          KM        RUNOFF FROM SUB-BASIN 24
230          KM        DRAINAGE AREA CHANGED TO MATCH VALUE USED BY MICHAEL BAKER
231          KM        Jr., INC.
232          BA  0.4907       0       0
233          LS       0      77     6.8       0
234          UK     295   .0438     .20     100       0       0       0
235          RK    6800   .0257    .045       0    TRAP      15       3
             *
```



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

236          KK   24.2A      CP
237          KM        COMBINE SUB 24 & CP 24.1 - APEX
238          HC       2
             *

239          KK     25N     SUB
240          KM        RUNOFF FROM SUB-BASIN 25N - APEX
241          BA  0.7834       0       0       0       0       0       0       0
242          LS       0      84     9.0       0
243          UK     295   .0438     .20     100       0       0       0
244          RK   16700   .0302    .045       0    TRAP      25       3
             *

245          KK     25S     SUB
246          KM        RUNOFF FROM SUB-BASIN 25S - APEX
247          BA  0.6256       0       0       0       0       0       0       0
248          LS       0      86     9.0       0
249          UK     295   .0438     .20     100       0       0       0
250          RK    8900   .0278    .045       0    TRAP      25       3
             *

251          KK    25.1      CP
252          KM        COMBINE HYDROGRAPHS FOR SUB-BASINS 25N AND 25S
253          HC       2
             *

254          KK   24.2B      CP
255          KM        COMBINE TOTAL HYDROGRAPH 24.2A WITH 25.1
256          HC       2
```

```
                 *

257              KK  PIMARD      CP
258              KM   ROUTE THE TOTAL HYDROGRAPH AT THE CONCENTRATION POINT
259              KM   24.2B TO THE CULVERT AT THE PIMA ROAD. THERE IS NO
260              KM   CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
261              RS       1    FLOW      -1       0       0
262              RC    .055    .040    .055    2000   .0287       0       0       0
263              RX       0       1     101     107     122     128     228     229
264              RY      10       8       3       0       0       3       8      10
                 *

265              KK  RR24.2      CP
266              KM   ROUTE THE TOTAL HYDROGRAPH AT CONCENTRATION POINT
267              KM   24.2B FROM THE CULVERT UNDER PIMA ROAD TO CONCENTRATION
268              KM   POINT 21.05.
269              RS       1    FLOW      -1       0       0
270              RC    .055    .040    .055    3050   .0238       0       0       0
271              RX       0       1     101     107     122     128     228     229
272              RY      10       8       3       0       0       3       8      10
                 *
                 *
1                                          HEC-1 INPUT                                                    PAGE  8

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

273              KK  C21.05 CONFLUENCE OF DGB CHANNELS NEAR MID-SECTION 36
274              KM         COMBINE HYDROGRAPH CP21G WITH HYDROGRAPH RR24.2
275              KM         (FROM THE PIMA ROAD CULVERT)
276              HC       2
                 *  ******************************************************************************

277              KK     DAM
278              KO       3
279              RS       1    FLOW       0
280              SV       0     204     426     666     923    1197    1491    1803
281              SE    2175    2180    2185    2190    2195    2200    2205    2210
282              SS    2200     200     3.2     1.5
                 *  2 - 36" RCP Culverts for outlet
283              SL    2175    14.1      .6      .5
                 *  ******************************************************************************
                 *

284              KK    R21G      CP
285              KM         ROUTE CP21G(21.05)TO 21H WHICH IS 3100'
286              RS       1    FLOW      -1       0       0
287              RC    .055    .040    .055    3100   .0194       0       0       0
288              RX       0      90     120     355     585     820     850     940
289              RY       9       4     1.5       0       0     1.5       4       9
                 *

290              KK     21H     SUB
291              KM         RUNOFF FROM SUB-BASIN 21H
292              BA   .0431       0       0
293              LS       0      80     6.4       0       0       0
294              UK     297   .0333     .20     100       0       0       0
295              RK    4600   .0278    .045       0    TRAP      20       3
                 *

296              KK     26N
297              KM         Runoff from sub-basin 26N
298              BA   .6376       0       0
299              LS       0      75    12.7       0
300              UK     200   .0250     .20     100       0
301              RK   12000   .0263    .045       0    TRAP      35      10
                 *
```

2 2/0
2,175
3 5

```
 302          KK   CP21H   JOMAX RD
 303          KO       3
 304          HC       3
              *

 305          KK   RR21H      CP
 306          KM        ROUTE HYDROGRAPH AT CONCENTRATION POINT 21H   DOWNSTREAM FROM
 307          KM        JOMAX ROAD           THERE IS NO ADDITIONAL CONTRIBUTING
 308          KM        DRAINAGE AREA AT THIS CONCENTRATION POINT.  USED CHANNEL
 309          KM        GEOMETRY                          FROM REACH SIX
 310          KM             DEVELOPED BY C. LOVELY
 311          RS       1    FLOW      -1       0       0
 312          RC    .055    .040    .055    2390   .0188       0       0       0
1                                          HEC-1 INPUT                                                    PAGE  9

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

 313          RX       0      90     120     355     585     820     850     940
 314          RY       9       4     1.5       0       0     1.5       4       9
              *

 315          KK     26S     SUB
 316          KM       RUNOFF FROM SUB-BASIN 26S
 317          BA  0.1672       0       0
 318          LS       0      75    12.7       0
 319          UK     200   .0250     .20     100       0       0       0
 320          RK    4000   .0263    .045       0    TRAP      35      10
              *

 321          KK  *APEX*      CP
 322          KM        COMBINE FLOW FROM SUB-BASIN 26 ,
 323          KM            AND ROUTED HYDROGRAPH FROM JOMAX ROAD.
 324          HC       2
              *
 325          KM        *********END SUBAREA 21 REVISIONS************

 326          KK   CP27A      CP AT HAPPY VALLEY RD
 327          KM        ROUTE FLOW FROM CONCENTRATION POINT APEX  TO 27A (HAPPY VALLEY
 328          KM        ROAD).  THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION PT.
 329          KM
 330          RS       1    FLOW      -1       0       0
 331          RC    .055    .040    .055    1600   .0196       0       0       0
 332          RX       0       1     201     211     261     271     471     472
 333          RY      10       4       2       0       0       2       4      10
              *

 334          KK   CP27B      CP AT MILLER RD
 335          KM        ROUTE FLOW FROM CONCENTRATION POINT 27B TO 27C (MILLER ROAD).
 336          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
 337          RS       1    FLOW      -1       0       0
 338          RC    .055    .040    .055    3300   .0196       0       0       0
 339          RX       0       1     201     211     261     271     471     472
 340          RY      10       4       2       0       0       2       4      10
              *

 341          KK   CP27C      CP AT PINNACLE PEAK RD
 342          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (PINNACLE PK ROAD).
 343          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
 344          RS       1    FLOW      -1       0       0
 345          RC    .055    .040    .055    3300   .0196       0       0       0
 346          RX       0       1     201     211     261     271     471     472
 347          RY      10       4       2       0       0       2       4      10
              *

 348          KK   CP27D     CP AT SCOTTSDALE RD
 349          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (SCOTTSDALE ROAD)
```

```
          350          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
          351          RS       1    FLOW      -1       0       0
          352          RC    .055    .040    .055    1000   .0196       0       0       0
          353          RX       0       1     201     211     261     271     471     472
          354          RY      10       4       2       0       0       2       4      10
                       *
1                                                   HEC-1 INPUT                                                    PAGE 10

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


          355          KK      27     SUB
          356          KM        RUNOFF FROM SUB-BASIN 27
          357          BA  1.1913       0       0
          358          LS       0      75    12.7       0
          359          UK     200   .0250     .20     100       0       0       0
          360          RK    1500   .0263    .045       0    TRAP      35      10
                       *

          361          KK    CP27      CP AT SCOTTSDALE RD
          362          KO       3
          363          KM        COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
          364          KM        POINT 27D WITH SUB 27 .  TOTAL FLOW AT
          365          KM        SCOTTSDALE ROAD FOR FAN 4.
          366          HC       2
                       *
          367          ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    49          16
                .
                .
    56          .          17
                .           .
                .           .
    62          .           .          18
                .           .           .
                .           .           .
    68        19A.......................
                V
                V
    71        19B
                .
                .
    77          .          15
                .           .
                .           .
    83        19C............
                V
                V
    86       19.1
                .
                .
    92          .          19
                .           .
                .           .
    99          .           .          20
                .           .           .
                .           .           .
   105       CP20.......................
                V
                V
```

```
109     RRCP20
            .
115         .        21A
            .          .
121     CP21A...........
            V
            V
123     RR21A
            .
129         .        21B
            .          .
135     CP21B...........
            V
            V
137     RR21B
            .
143         .        21C
            .          .
149     CP21C...........
            V
            V
151     RR21C
            .
157         .        21D
            .          .
163     CP21D...........
            V
            V
165     RR21D
            .
171         .        21E
            .          .
177     CP21E...........
            V
            V
179     RR21E
            .
185         .        21F
            .          .
191     CP21F...........
            V
            V
193     RR21F
            .
199         .        21G
            .          .
205     CP21G...........
            .
207         .         22
            .          .
213         .          .        23
```

```
                .          .          .
                .          .          .
219             .        24A...........
                .          V
                .          V
222             .       24.1
                .          .
                .          .
228             .          .         24
                .          .          .
                .          .          .
236             .     24.2A...........
                .          .
                .          .
239             .          .        25N
                .          .          .
                .          .          .
245             .          .          .        25S
                .          .          .          .
                .          .          .          .
251             .          .      25.1...........
                .          .          .
                .          .          .
254             .     24.2B...........
                .          V
                .          V
257             .    PIMARD
                .          V
                .          V
265             .    RR24.2
                .          .
                .          .
273        C21.05...........
                V
                V
277           DAM
                V
                V
284           R21G
                .
                .
290             .        21H
                .          .
                .          .
296             .          .        26N
                .          .          .
                .          .          .
302         CP21H.........................
                V
                V
305         RR21H
                .
                .
315             .        26S
                .          .
                .          .
321        *APEX*...........
                V
                V
326         CP27A
                V
                V
334         CP27B
                V
                V
341         CP27C
                V
```

```
                V
  348       CP27D
                .
                .
  355           .          27
                .           .
                .           .
  361       CP27............
 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN 09 1992             *
*            VERSION 4.0.3E            *
*                                      *
*  RUN DATE  01/21/99  TIME  16:29:15  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748             *
*                                      *
****************************************
```

```
FILE <RWDAM21F.DAT>
THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.

THE MODIFICIATION INCLUDE THE FOLLOWING:
1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
   TO CONCENTRATION POINT AT THE APEX OF 21F
2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE

NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
25S.

100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
RAINFALL FROM NOAA ATLAS

FILE RAW4A.DAT
WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
FOR 22, 23, 24, 25N, AND 25S.  ROUTE COMBINED HYDROGRAPHS
22, 23, 24, 25N AND 25S TO 21G.  SUN-BASIN 26 COMBINED AT
THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
PROPOSED ROAD CROSSINGS.

REVISED BY GREINER 12-9-93 BY RON FERGUSON
REVISED BY C. J. LOVELY, COS, 3-9-94
Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
   *Eliminate DSS Records
   *Divide #26 into 26N & 26S; 26N is portion north of Jomax
   *Add 26N @ CP21H and route with 21H to apex
   *Add 26S @ apex
   *Modify reach length in 26S & 26N to reflect division

*******************************************************************
* ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
* MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.       *
*******************************************************************

September 1998 - HDR Engineering Modified by adding basin to the
September 1998 - center of Section 36 (Alternative No. 3)
September 1998 - Filename <RAWALT3.DAT>
```

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

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

     IT          HYDROGRAPH TIME DATA
                        NMIN           5  MINUTES IN COMPUTATION INTERVAL
                       IDATE      3MAR94  STARTING DATE
                       ITIME        0000  STARTING TIME
                          NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      4MAR94  ENDING DATE
                      NDTIME        1735  ENDING TIME
                       ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL    0.08 HOURS
                       TOTAL TIME BASE   41.58 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
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0


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


            **************
            *            *
 277 KK     *       DAM  *
            *            *
            **************

 278 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           3  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

 279 RS          STORAGE ROUTING
                       NSTPS           1  NUMBER OF SUBREACHES
```

```
                    ITYP        FLOW  TYPE OF INITIAL CONDITION
                  RSVRIC        0.00  INITIAL CONDITION
                       X        0.00 WORKING R AND D COEFFICIENT

280 SV          STORAGE         0.0     204.0     426.0     666.0     923.0    1197.0    1491.0    1803.0

281 SE        ELEVATION     2175.00   2180.00   2185.00   2190.00   2195.00   2200.00   2205.00   2210.00

283 SL        LOW-LEVEL OUTLET
                    ELEVL     2175.00  ELEVATION AT CENTER OF OUTLET
                    CAREA       14.10  CROSS-SECTIONAL AREA
                     COQL        0.60  COEFFICIENT
                     EXPL        0.50  EXPONENT OF HEAD

282 SS        SPILLWAY
                     CREL     2200.00  SPILLWAY CREST ELEVATION
                    SPWID      200.00  SPILLWAY WIDTH
                     COQW        3.20  WEIR COEFFICIENT
                     EXPW        1.50  EXPONENT OF HEAD

                                                  ***

                                   COMPUTED OUTFLOW-ELEVATION DATA

        OUTFLOW       0.00     98.85    108.45    120.13    134.62    153.09    177.43    210.97    260.16    339.25
      ELEVATION    2175.00   2177.12   2177.56   2178.13   2178.94   2180.09   2181.84   2184.67   2189.70   2200.00

        OUTFLOW     361.44    508.29    900.40   1658.34   2902.70   4754.02   7332.86  10759.77  15155.30  20639.98
      ELEVATION    2200.10   2200.41   2200.91   2201.61   2202.51   2203.61   2204.91   2206.41   2208.10   2210.00

                              COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

        STORAGE       0.00     86.60    104.25    127.90    160.62    204.00    208.04    285.63    411.29    426.00
        OUTFLOW       0.00     98.85    108.46    120.13    134.62    151.72    153.09    177.43    210.97    214.56
      ELEVATION    2175.00   2177.12   2177.56   2178.13   2178.94   2180.00   2180.09   2181.84   2184.67   2185.00

        STORAGE     651.71    666.00    923.00   1197.00   1203.12   1220.94   1250.47   1291.72   1344.66   1409.32
        OUTFLOW     260.16    262.78    303.43    339.25    361.42    508.31    900.41   1658.46   2902.76   4754.21
      ELEVATION    2189.70   2190.00   2195.00   2200.00   2200.10   2200.41   2200.91   2201.61   2202.51   2203.61

        STORAGE    1485.67   1491.00   1578.81   1684.69   1803.00
        OUTFLOW    7332.93   7527.04  10759.95  15155.24  20639.98
      ELEVATION    2204.91   2205.00   2206.41   2208.10   2210.00

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

                    HYDROGRAPH AT STATION      DAM

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    339.       8.00                 336.        311.        263.        263.
                         (INCHES)   0.241       0.892       1.306       1.306
                          (AC-FT)    166.        616.        903.        903.

  PEAK STORAGE  TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR        24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
    1196.       8.00                1169.        987.        766.        766.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR        24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
   2199.98      8.00              2199.48     2196.13     2191.66     2191.66
```

```
                    CUMULATIVE AREA =   12.96 SQ MI


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


          **************
          *            *
  302 KK  *     CP21H  *        JOMAX RD
          *            *
          **************

  303 KO        OUTPUT CONTROL VARIABLES
                     IPRNT           3  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

  304 HC        HYDROGRAPH COMBINATION
                     ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0

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

                     HYDROGRAPH AT STATION    CP21H

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     41.58-HR
+   (CFS)      (HR)
                        (CFS)
+    770.      3.50                395.        331.        278.        278.
                      (INCHES)    0.269       0.902       1.314       1.314
                       (AC-FT)     196.        656.        956.        956.

                    CUMULATIVE AREA =   13.64 SQ MI

MANE2 NPLAN,NSTM       1      0


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


          **************
          *            *
  361 KK  *      CP27  *          CP AT SCOTTSDALE RD
          *            *
          **************

  362 KO        OUTPUT CONTROL VARIABLES
                     IPRNT           3  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                              COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
                              POINT 27D WITH SUB 27 .  TOTAL FLOW AT
                              SCOTTSDALE ROAD FOR FAN 4.

  366 HC        HYDROGRAPH COMBINATION
                     ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
MANE2 NPLAN,NSTM       1      0
```

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

HYDROGRAPH AT STATION CP27

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	41.58-HR
+ 1993.	3.17	(CFS)	574.	378.	308.	308.
		(INCHES)	0.356	0.937	1.323	1.323
		(AC-FT)	284.	749.	1059.	1059.

CUMULATIVE AREA = 15.00 SQ MI

1

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	16	2595.	3.25	319.	81.	47.	1.46		
+	HYDROGRAPH AT	17	2114.	3.25	259.	65.	38.	1.19		
+	HYDROGRAPH AT	18	2357.	3.25	270.	68.	39.	1.26		
+	3 COMBINED AT	19A	7066.	3.25	848.	214.	124.	3.91		
+	ROUTED TO	19B	7034.	3.33	848.	214.	124.	3.91		
+									6.96	3.33
+	HYDROGRAPH AT	15	1848.	3.42	278.	70.	41.	1.37		
+	2 COMBINED AT	19C	8679.	3.33	1125.	284.	164.	5.28		
+	ROUTED TO	19.1	8266.	3.33	1125.	284.	164.	5.28		
+									6.02	3.33
+	HYDROGRAPH AT	19	431.	3.25	42.	11.	6.	0.19		
+	HYDROGRAPH AT	20	1052.	3.25	123.	31.	18.	0.57		
+	3 COMBINED AT	CP20	9603.	3.33	1290.	326.	188.	6.03		
+	ROUTED TO	RRCP20	8867.	3.42	1289.	326.	188.	6.03		
+									4.02	3.42
+	HYDROGRAPH AT	21A	763.	3.25	80.	20.	12.	0.42		
+	2 COMBINED AT	CP21A	9325.	3.42	1368.	346.	200.	6.45		

+	ROUTED TO	RR21A	9163.	3.50	1368.	346.	200.	6.45		
+									3.42	3.50
+	HYDROGRAPH AT	21B	497.	3.25	53.	13.	8.	0.28		
+	2 COMBINED AT	CP21B	9404.	3.50	1420.	359.	207.	6.73		
+	ROUTED TO	RR21B	8768.	3.58	1419.	359.	207.	6.73		
+									3.69	3.58
+	HYDROGRAPH AT	21C	1207.	3.25	142.	36.	21.	0.75		
+	2 COMBINED AT	CP21C	9344.	3.58	1560.	395.	228.	7.48		
+	ROUTED TO	RR21C	7778.	3.75	1554.	395.	228.	7.48		
+									4.07	3.75
+	HYDROGRAPH AT	21D	1447.	3.33	201.	51.	29.	1.06		
+	2 COMBINED AT	CP21D	8537.	3.67	1754.	446.	257.	8.54		
+	ROUTED TO	RR21D	8506.	3.75	1753.	446.	257.	8.54		
+									4.13	3.75
+	HYDROGRAPH AT	21E	392.	3.33	49.	12.	7.	0.26		
+	2 COMBINED AT	CP21E	8645.	3.75	1801.	458.	265.	8.79		
+	ROUTED TO	RR21E	8393.	3.83	1799.	458.	265.	8.79		
+									6.30	3.83
+	HYDROGRAPH AT	21F	644.	3.33	89.	22.	13.	0.47		
+	2 COMBINED AT	CP21F	8636.	3.75	1886.	481.	278.	9.26		
+	ROUTED TO	RR21F	8620.	3.83	1883.	481.	278.	9.26		
+									2.68	3.83
+	HYDROGRAPH AT	21G	25.	3.33	3.	1.	0.	0.02		
+	2 COMBINED AT	CP21G	8629.	3.83	1887.	482.	278.	9.28		
+	HYDROGRAPH AT	22	2753.	3.25	304.	76.	44.	1.39		
+	HYDROGRAPH AT	23	756.	3.25	87.	22.	13.	0.39		

```
+          2 COMBINED AT
                          24A     3509.   3.25      391.      98.      57.     1.78
+          ROUTED TO
                          24.1    2849.   3.42      391.      98.      57.     1.78
+                                                                     5.53     3.42
+          HYDROGRAPH AT
                           24      683.   3.25       84.      21.      12.     0.49
+          2 COMBINED AT
                          24.2A   3382.   3.42      474.     120.      69.     2.27
+          HYDROGRAPH AT
                           25N    1217.   3.42      175.      44.      26.     0.78
+          HYDROGRAPH AT
                           25S    1382.   3.25      151.      38.      22.     0.63
+          2 COMBINED AT
                          25.1    2363.   3.33      326.      82.      48.     1.41
+          2 COMBINED AT
                          24.2B   5490.   3.42      800.     202.     117.     3.68
+          ROUTED TO
                          PIMARD  5410.   3.42      800.     202.     117.     3.68
+                                                                     6.79     3.42
+          ROUTED TO
                          RR24.2  5164.   3.50      799.     202.     117.     3.68
+                                                                     6.90     3.50
+          2 COMBINED AT
                          C21.05 11894.   3.75     2683.     683.     395.    12.96
+          ROUTED TO
                           DAM     339.   8.00      336.     311.     263.    12.96
+                                                                  2199.98     8.00
+          ROUTED TO
                           R21G    339.   8.33      335.     311.     261.    12.96
+                                                                     0.41     8.42
+          HYDROGRAPH AT
                           21H      62.   3.33        8.       2.       1.     0.04
+          HYDROGRAPH AT
                           26N     674.   3.50      109.      28.      16.     0.64
+          3 COMBINED AT
                          CP21H    770.   3.50      395.     331.     278.    13.64
+          ROUTED TO
                          RR21H    648.   3.67      389.     330.     277.    13.64
+                                                                     0.59     3.67
+          HYDROGRAPH AT
                           26S     230.   3.25       29.       7.       4.     0.17
+          2 COMBINED AT
                          *APEX*   759.   3.58      410.     335.     281.    13.81
+          ROUTED TO
                          CP27A    751.   3.67      410.     335.     281.    13.81
+                                                                     1.79     3.67
```

```
1****************************************                    ****************************************
*                                      *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *   U.S. ARMY CORPS OF ENGINEERS       *
*             JUN 09 1992              *                    *   HYDROLOGIC ENGINEERING CENTER      *
*           VERSION 4.0.3E             *                    *         609 SECOND STREET            *
*                                      *                    *      DAVIS, CALIFORNIA 95616         *
*  RUN DATE  01/21/99  TIME  16:30:29  *                    *         (916) 551-1748               *
*                                      *                    *                                      *
****************************************                    ****************************************

                                    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. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                                HEC-1 INPUT                                                PAGE  1

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

        1           ID        FILE <RWDAM21F.DAT>
        2           ID        THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
        3           ID        THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
        4           ID
        5           ID        THE MODIFICIATION INCLUDE THE FOLLOWING:
        6           ID        1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
        7           ID           TO CONCENTRATION POINT AT THE APEX OF 21F
        8           ID        2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE
        9           ID
       10           ID        NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
       11           ID        1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
       12           ID        MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
       13           ID        25S.
       14           ID
       15           ID        100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
       16           ID        RAINFALL FROM NOAA ATLAS
       17           ID
       18           ID        FILE RAW4A.DAT
       19           ID        WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
       20           ID        FOR 22, 23, 24, 25N, AND 25S.  ROUTE COMBINED HYDROGRAPHS
       21           ID        22, 23, 24, 25N AND 25S TO 21G.  SUN-BASIN 26 COMBINED AT
       22           ID        THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
       23           ID        ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
       24           ID        INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
       25           ID        PROPOSED ROAD CROSSINGS.
       26           ID
       27           ID        REVISED BY GREINER 12-9-93 BY RON FERGUSON
       28           ID        REVISED BY C. J. LOVELY, COS, 3-9-94
       29           ID        Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
       30           ID           *Eliminate DSS Records
```

```
 31          ID          *Divide #26 into 26N & 26S; 26N is portion north of Jomax
 32          ID          *Add 26N @ CP21H and route with 21H to apex
 33          ID          *Add 26S @ apex
 34          ID          *Modify reach length in 26S & 26N to reflect division
 35          ID
 36          ID       ******************************************************************
 37          ID       * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
 38          ID       * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.       *
 39          ID       ******************************************************************
 40          ID
 41          ID    September 1998 - HDR Engineering Modified by adding basin to the
 42          ID    September 1998 - center of Section 36 (Alternative No. 4)
 43          ID    September 1998 - Filename <RAWALT4.DAT>
 44          ID
 45          ID
 46          ID   ****************************************************************************
             *DIAGRAM
 47          IT       5 03MAR94       0     500
 48          IO       5       0       0       0
             *
1                                        HEC-1 INPUT                                    PAGE  2

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

 49          KK      16     SUB
 50          KM        RUNOFF FROM SUB-BASIN 16
 51          BA  1.4570
 52          PH       0      13    0.77    1.51    2.65    3.00    3.23    3.66
 53          LS       0      83     9.8       0       0       0       0       0
 54          UK     217   .0581     .20     100
 55          RK   14800   .0216    .045       0    TRAP      25       3
             *

 56          KK      17     SUB
 57          KM        RUNOFF FROM SUB-BASIN 17
 58          BA  1.1851       0       0
 59          LS       0      83     9.8
 60          UK     285   .0421     .20     100       0       0       0
 61          RK   12200   .0254    .045       0    TRAP      25       3
             *

 62          KK      18     SUB
 63          KM        RUNOFF FROM SUB-BASIN 18
 64          BA  1.2641
 65          LS       0      83     6.5       0
 66          UK     285   .0421     .20     100       0       0       0
 67          RK   10840   .0259    .045       0    TRAP      25       3
             *

 68          KK     19A      CP
 69          KM        COMBINE HYDROGRAPHS SUB16, SUB17 AND SUB18
 70          HC       3
             *

 71          KK     19B      CP
 72          KM        ROUTE CP19A TO CP19B
 73          RS       1    FLOW      -1       0       0
 74          RC    .055    .040    .055    1100   .0155       0       0       0
 75          RX       0       1     126     132     167     173     298     299
 76          RY      10       8       3       0       0       3       8      10
             *

 77          KK      15     SUB
 78          KM        RUNOFF FROM SUBBASIN 15
 79          BA  1.3702       0       0
 80          LS       0      82     5.4       0
```

```
 81          UK     217   .0581     .20     100       0       0       0
 82          RK   21200   .0236    .045       0    TRAP      25       3
             *

 83          KK     19C      CP
 84          KM        COMBINE HYDROGRAPHS SUB15 & CP19B
 85          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE  3

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

 86          KK    19.1      CP
 87          KM        ROUTE CP 19C TO 19.1
 88          RS       1    FLOW      -1       0       0
 89          RC    .055    .040    .055    1800   .0200       0       0
 90          RX       0       1     151     166     216     231     381     382
 91          RY      10       9       3       0       0       3       9      10
             *

 92          KK      19     SUB
 93          KM        RUNOFF FROM SUB-BASIN 19
 94          BA  0.1872
 95          LS       0      84     7.2       0
 96          UK     275   .0800     .20     100       0       0       0
 97          RK    3730   .0352    .045    .160    TRAP      15       3
 98          RK    1800   .0200    .045       0    TRAP      50      30
             *

 99          KK      20     SUB
100          KM        RUNOFF FROM SUB-BASIN 20
101          BA  0.5698       0       0
102          LS       0      84     3.6       0
103          UK     300   .0750     .20     100       0       0       0
104          RK    9640   .0197    .045       0    TRAP      15       3
             *

105          KK    CP20      CP
106          KM        COMBINE SUB 19, SUB 20 AND CP 19.1
107          HC       3
             *
108          KM    *******BEGIN SUBAREA 21 BREAKDOWN-3/94 REVISIONS*****

109          KK  RRCP20      CP
110          KM        ROUTE CP20 TO CP 21A, WHICH IS 4600'
111          RS       1    FLOW      -1       0       0
112          RC    .055    .040    .055    4600   .0217       0       0       0
113          RX       0      30      60      85     195     220     250     280
114          RY      10       4       1       0       0       1       4      10
             *

115          KK     21A     SUB
116          KM        RUNOFF FROM SUB-BASIN 21A
117          BA     .42       0       0
118          LS       0      80     6.4       0       0       0
119          UK     297   .0558     .20     100       0       0       0
120          RK    6400   .0344    .045       0    TRAP      10       3
             *

121          KK   CP21A
122          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE  4

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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```
 123          KK   RR21A       CP
 124          KM        ROUTE CP21A TO 21B    WHICH IS 960'
 125          RS       1    FLOW      -1       0       0
 126          RC    .055    .040    .055     960   .0156       0       0       0
 127          RX       0      10      60     205     295     440     490     500
 128          RY       6       4       2       0       0       2       4       6
              *

 129          KK     21B     SUB
 130          KM        RUNOFF FROM SUB-BASIN 21B
 131          BA   0.276       0       0
 132          LS       0      80     6.4       0       0       0
 133          UK     297   .0558     .20     100       0       0       0
 134          RK    6300   .0381    .045       0    TRAP      10       3
              *

 135          KK   CP21B
 136          HC       2
              *

 137          KK   RR21B       CP
 138          KM        ROUTE CP21B TO 21C    WHICH IS 4400'
 139          RS       1    FLOW      -1       0       0
 140          RC    .055    .040    .055    4400   .0205       0       0       0
 141          RX       0      10      60     205     295     440     490     500
 142          RY       6       4       2       0       0       2       4       6
              *

 143          KK     21C     SUB
 144          KM        RUNOFF FROM SUB-BASIN 21C
 145          BA    .748       0       0
 146          LS       0      80     6.4       0       0       0
 147          UK     297   .0558     .20     100       0       0       0
 148          RK    9900   .0328    .045       0    TRAP      20       3
              *

 149          KK   CP21C
 150          HC       2
              *

 151          KK   RR21C       CP
 152          KM        ROUTE CP21C TO 21D    WHICH IS 5700'
 153          RS       1    FLOW      -1       0       0
 154          RC    .055    .040    .055    5700   .0181       0       0       0
 155          RX       0      20     175     210     300     335     490     510
 156          RY     5.5     3.5     2.5       0       0     2.5     3.5     5.5
              *

 157          KK     21D     SUB
 158          KM        RUNOFF FROM SUB-BASIN 21D
 159          BA   1.059       0       0
 160          LS       0      80     6.4       0       0       0
 161          UK     297   .0558     .20     100       0       0       0
 162          RK   14500   .0252    .045       0    TRAP      30       3
              *
```



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

 163          KK   CP21D
 164          HC       2
              *

 165          KK   RR21D       CP
 166          KM        ROUTE CP21D TO 21E    WHICH IS 1100'
```

```
167          RS      1    FLOW      -1       0       0
168          RC   .055    .040    .055    1100   .0200       0       0       0
169          RX      0      20     175     210     300     335     490     510
170          RY    5.5     3.5     2.5       0       0     2.5     3.5     5.5
             *

171          KK    21E     SUB
172          KM        RUNOFF FROM SUB-BASIN 21E
173          BA  0.257       0       0
174          LS      0      80     6.4       0       0       0
175          UK    297   .0333     .20     100       0       0       0
176          RK   6600   .0288    .045       0    TRAP      15       3
             *

177          KK  CP21E
178          HC      2
             *

179          KK  RR21E      CP
180          KM        ROUTE CP21E TO 21F    WHICH IS 2800'
181          RS      1    FLOW      -1       0       0
182          RC   .055    .040    .055    2800   .0143       0       0       0
183          RX      0      70     170     180     230     240     340     410
184          RY   10.5     4.5     3.5       0       0     3.5     4.5    10.5
             *

185          KK    21F     SUB
186          KM        RUNOFF FROM SUB-BASIN 21F
187          BA  0.469       0       0
188          LS      0      80     6.4       0       0       0
189          UK    297   .0333     .20     100       0       0       0
190          RK  10400   .0279    .045       0    TRAP      20       3
             *

191          KK  CP21F
192          HC      2
             *

193          KK  RR21F      CP
194          KM  ROUTE CP21F TO 21G (1900' DOWNSTREAM)
195          RS      1    FLOW      -1       0       0
196          RC   .055    .040    .055    1900   .0158       0       0       0
197          RX      0      20      70     345     455     730     780     800
198          RY     10       8       2       0       0       2       8      10
             *
```



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

199          KK    21G     SUB
200          KM  RUNOFF FROM SUB-BASIN 21G
201          BA  .0172       0       0
202          LS      0      80     6.4       0       0       0
203          UK    297   .0333     .20     100       0       0       0
204          RK   4000   .0300    .045       0    TRAP      10       3
             *

205          KK  CP21G
206          HC      2
             *

207          KK     22     SUB
208          KM        RUNOFF FROM SUB-BASIN 22
209          BA  1.3860
210          LS      0      84     5.1       0
211          UK    225   .0590     .20     100       0       0       0       0
```

```
 212          RK   13000   .0238    .045       0    TRAP      25       3
              *

 213          KK      23     SUB
 214          KM         RUNOFF FROM SUB-BASIN 23
 215          BA  0.3945       0       0
 216          LS       0      84     6.3       0
 217          UK     225   .0590     .20     100       0       0       0
 218          RK   10200   .0304    .045       0    TRAP      20       3
              *

 219          KK     24A      CP
 220          KM         COMBINE HYDROGRAPHS FOR SUB 22 AND SUB 23
 221          HC       2
              *

 222          KK    24.1      CP
 223          KM         ROUTE CP 24A TO CP 24.1
 224          RS       3    FLOW      -1       0       0
 225          RC    .055    .040    .055    6800   .0257       0       0       0
 226          RX       0       1     101     107     122     128     228     229
 227          RY      10       8       3       0       0       3       8      10
              *

 228          KK      24     SUB
 229          KM         RUNOFF FROM SUB-BASIN 24
 230          KM         DRAINAGE AREA CHANGED TO MATCH VALUE USED BY MICHAEL BAKER
 231          KM         Jr., INC.
 232          BA  0.4907       0       0
 233          LS       0      77     6.8       0
 234          UK     295   .0438     .20     100       0       0       0
 235          RK    6800   .0257    .045       0    TRAP      15       3
              *
1                                          HEC-1 INPUT                                          PAGE  7
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 236          KK   24.2A      CP
 237          KM         COMBINE SUB 24 & CP 24.1 - APEX
 238          HC       2
              *

 239          KK     25N       SUB
 240          KM         RUNOFF FROM SUB-BASIN 25N - APEX
 241          BA  0.7834       0       0       0       0       0       0       0
 242          LS       0      84     9.0       0
 243          UK     295   .0438     .20     100       0       0       0
 244          RK   16700   .0302    .045       0    TRAP      25       3
              *

 245          KK     25S     SUB
 246          KM         RUNOFF FROM SUB-BASIN 25S - APEX
 247          BA  0.6256       0       0       0       0       0       0       0
 248          LS       0      86     9.0       0
 249          UK     295   .0438     .20     100       0       0       0
 250          RK    8900   .0278    .045       0    TRAP      25       3
              *

 251          KK    25.1      CP
 252          KM         COMBINE HYDROGRAPHS FOR SUB-BASINS 25N AND 25S
 253          HC       2
              *

 254          KK   24.2B      CP
 255          KM         COMBINE TOTAL HYDROGRAPH 24.2A WITH 25.1
 256          HC       2
```

```
                 *

257              KK  PIMARD      CP
258              KM   ROUTE THE TOTAL HYDROGRAPH AT THE CONCENTRATION POINT
259              KM   24.2B TO THE CULVERT AT THE PIMA ROAD. THERE IS NO
260              KM   CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
261              RS       1    FLOW      -1       0       0
262              RC    .055    .040    .055    2000   .0287       0       0       0
263              RX       0       1     101     107     122     128     228     229
264              RY      10       8       3       0       0       3       8      10
                 *

265              KK  RR24.2      CP
266              KM   ROUTE THE TOTAL HYDROGRAPH AT CONCENTRATION POINT
267              KM   24.2B FROM THE CULVERT UNDER PIMA ROAD TO CONCENTRATION
268              KM   POINT 21.05.
269              RS       1    FLOW      -1       0       0
270              RC    .055    .040    .055    3050   .0238       0       0       0
271              RX       0       1     101     107     122     128     228     229
272              RY      10       8       3       0       0       3       8      10
                 *
                 *
1                                                HEC-1 INPUT                                                PAGE  8

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

273              KK  C21.05 CONFLUENCE OF DGB CHANNELS NEAR MID-SECTION 36
274              KM         COMBINE HYDROGRAPH CP21G WITH HYDROGRAPH RR24.2
275              KM         (FROM THE PIMA ROAD CULVERT)
276              HC       2
                 *  ******************************************************************************

277              KK     DAM
278              KO       3
279              RS       1    FLOW       0
280              SV       0      68     254     461     690     937    1204    1491    1802
281              SE    2173    2175    2180    2185    2190    2195    2200    2205    2210
282              SS    2200     200     3.2     1.5
                 *  2 - 36" RCP Culverts for outlet
283              SL    2173    14.1      .6      .5
                 *  ******************************************************************************
                 *

284              KK    R21G      CP
285              KM        ROUTE CP21G(21.05)TO 21H WHICH IS 3100'
286              RS       1    FLOW      -1       0       0
287              RC    .055    .040    .055    3100   .0194       0       0       0
288              RX       0      90     120     355     585     820     850     940
289              RY       9       4     1.5       0       0     1.5       4       9
                 *

290              KK     21H     SUB
291              KM        RUNOFF FROM SUB-BASIN 21H
292              BA   .0431       0       0
293              LS       0      80     6.4       0       0       0
294              UK     297   .0333     .20     100       0       0       0
295              RK    4600   .0278    .045       0    TRAP      20       3
                 *

296              KK     26N
297              KM       Runoff from sub-basin 26N
298              BA   .6376       0       0
299              LS       0      75    12.7       0
300              UK     200   .0250     .20     100       0
301              RK   12000   .0263    .045       0    TRAP      35      10
                 *
```

```
 302          KK   CP21H   JOMAX RD
 303          KO       3
 304          HC       3
              *

 305          KK   RR21H      CP
 306          KM        ROUTE HYDROGRAPH AT CONCENTRATION POINT 21H   DOWNSTREAM FROM
 307          KM        JOMAX ROAD           THERE IS NO ADDITIONAL CONTRIBUTING
 308          KM        DRAINAGE AREA AT THIS CONCENTRATION POINT.  USED CHANNEL
 309          KM        GEOMETRY                          FROM REACH SIX
 310          KM            DEVELOPED BY C. LOVELY
 311          RS       1    FLOW      -1       0       0
 312          RC    .055    .040    .055    2390   .0188       0       0       0
1                                          HEC-1 INPUT                                                    PAGE  9

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

 313          RX       0      90     120     355     585     820     850     940
 314          RY       9       4     1.5       0       0     1.5       4       9
              *

 315          KK     26S     SUB
 316          KM       RUNOFF FROM SUB-BASIN 26S
 317          BA  0.1672       0       0
 318          LS       0      75    12.7       0
 319          UK     200   .0250     .20     100       0       0       0
 320          RK    4000   .0263    .045       0    TRAP      35      10
              *

 321          KK  *APEX*      CP
 322          KM        COMBINE FLOW FROM SUB-BASIN 26 ,
 323          KM            AND ROUTED HYDROGRAPH FROM JOMAX ROAD.
 324          HC       2
              *
 325          KM        *********END SUBAREA 21 REVISIONS************

 326          KK   CP27A      CP AT HAPPY VALLEY RD
 327          KM        ROUTE FLOW FROM CONCENTRATION POINT APEX  TO 27A (HAPPY VALLEY
 328          KM        ROAD).  THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION PT.
 329          KM
 330          RS       1    FLOW      -1       0       0
 331          RC    .055    .040    .055    1600   .0196       0       0       0
 332          RX       0       1     201     211     261     271     471     472
 333          RY      10       4       2       0       0       2       4      10
              *

 334          KK   CP27B      CP AT MILLER RD
 335          KM        ROUTE FLOW FROM CONCENTRATION POINT 27B TO 27C (MILLER ROAD).
 336          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
 337          RS       1    FLOW      -1       0       0
 338          RC    .055    .040    .055    3300   .0196       0       0       0
 339          RX       0       1     201     211     261     271     471     472
 340          RY      10       4       2       0       0       2       4      10
              *

 341          KK   CP27C      CP AT PINNACLE PEAK RD
 342          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (PINNACLE PK ROAD).
 343          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
 344          RS       1    FLOW      -1       0       0
 345          RC    .055    .040    .055    3300   .0196       0       0       0
 346          RX       0       1     201     211     261     271     471     472
 347          RY      10       4       2       0       0       2       4      10
              *

 348          KK   CP27D     CP AT SCOTTSDALE RD
 349          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (SCOTTSDALE ROAD)
```

```
          350          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
          351          RS       1    FLOW      -1       0       0
          352          RC    .055    .040    .055    1000   .0196       0       0       0
          353          RX       0       1     201     211     261     271     471     472
          354          RY      10       4       2       0       0       2       4      10
                       *
1                                                HEC-1 INPUT                                                    PAGE 10

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

          355          KK      27     SUB
          356          KM        RUNOFF FROM SUB-BASIN 27
          357          BA  1.1913       0       0
          358          LS       0      75    12.7       0
          359          UK     200   .0250     .20     100       0       0       0
          360          RK    1500   .0263    .045       0    TRAP      35      10
                       *

          361          KK    CP27      CP AT SCOTTSDALE RD
          362          KO       3
          363          KM        COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
          364          KM        POINT 27D WITH SUB 27 .  TOTAL FLOW AT
          365          KM        SCOTTSDALE ROAD FOR FAN 4.
          366          HC       2
                       *
          367          ZZ
1
                 SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    49          16
                 .
                 .
    56           .          17
                 .           .
                 .           .
    62           .           .          18
                 .           .           .
                 .           .           .
    68         19A.......................
                 V
                 V
    71         19B
                 .
                 .
    77           .          15
                 .           .
                 .           .
    83         19C............
                 V
                 V
    86        19.1
                 .
                 .
    92           .          19
                 .           .
                 .           .
    99           .           .          20
                 .           .           .
                 .           .           .
   105        CP20.......................
                 V
                 V
```

```
109     RRCP20
            .
115         .        21A
            .          .
121      CP21A..........
            V
            V
123      RR21A
            .
            .
129         .        21B
            .          .
135      CP21B..........
            V
            V
137      RR21B
            .
            .
143         .        21C
            .          .
149      CP21C..........
            V
            V
151      RR21C
            .
            .
157         .        21D
            .          .
163      CP21D..........
            V
            V
165      RR21D
            .
            .
171         .        21E
            .          .
177      CP21E..........
            V
            V
179      RR21E
            .
            .
185         .        21F
            .          .
191      CP21F..........
            V
            V
193      RR21F
            .
            .
199         .        21G
            .          .
205      CP21G..........
            .
            .
207         .         22
            .          .
            .          .
213         .          .        23
```

```
                .          .          .
                .          .          .
219             .        24A...........
                .          V
                .          V
222             .       24.1
                .          .
                .          .
228             .          .         24
                .          .          .
                .          .          .
236             .     24.2A............
                .          .
                .          .
239             .          .        25N
                .          .          .
                .          .          .
245             .          .          .        25S
                .          .          .          .
                .          .          .          .
251             .          .     25.1............
                .          .          .
                .          .          .
254             .     24.2B............
                .          V
                .          V
257             .    PIMARD
                .          V
                .          V
265             .    RR24.2
                .          .
                .          .
273       C21.05............
                V
                V
277          DAM
                V
                V
284         R21G
                .
                .
290             .        21H
                .          .
                .          .
296             .          .        26N
                .          .          .
                .          .          .
302        CP21H.......................
                V
                V
305        RR21H
                .
                .
315             .        26S
                .          .
                .          .
321       *APEX*............
                V
                V
326        CP27A
                V
                V
334        CP27B
                V
                V
341        CP27C
                V
```

```
                V
  348        CP27D
                .
                .
  355           .          27
                .           .
                .           .
  361        CP27............
 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN 09 1992             *
*            VERSION 4.0.3E            *
*                                      *
*  RUN DATE  01/21/99  TIME  16:30:29  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748             *
*                                      *
****************************************
```

```
FILE <RWDAM21F.DAT>
THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.

THE MODIFICIATION INCLUDE THE FOLLOWING:
1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
   TO CONCENTRATION POINT AT THE APEX OF 21F
2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE

NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
25S.

100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
RAINFALL FROM NOAA ATLAS

FILE RAW4A.DAT
WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
FOR 22, 23, 24, 25N, AND 25S.  ROUTE COMBINED HYDROGRAPHS
22, 23, 24, 25N AND 25S TO 21G.  SUN-BASIN 26 COMBINED AT
THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
PROPOSED ROAD CROSSINGS.

REVISED BY GREINER 12-9-93 BY RON FERGUSON
REVISED BY C. J. LOVELY, COS, 3-9-94
Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
   *Eliminate DSS Records
   *Divide #26 into 26N & 26S; 26N is portion north of Jomax
   *Add 26N @ CP21H and route with 21H to apex
   *Add 26S @ apex
   *Modify reach length in 26S & 26N to reflect division

*******************************************************************
* ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
* MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.       *
*******************************************************************

September 1998 - HDR Engineering Modified by adding basin to the
September 1998 - center of Section 36 (Alternative No. 4)
September 1998 - Filename <RAWALT4.DAT>
```

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

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

     IT          HYDROGRAPH TIME DATA
                        NMIN           5  MINUTES IN COMPUTATION INTERVAL
                       IDATE      3MAR94  STARTING DATE
                       ITIME        0000  STARTING TIME
                          NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      4MAR94  ENDING DATE
                      NDTIME        1735  ENDING TIME
                       ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL    0.08 HOURS
                       TOTAL TIME BASE   41.58 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
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0


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


            **************
            *            *
  277 KK    *       DAM  *
            *            *
            **************

  278 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           3  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

  279 RS          STORAGE ROUTING
                       NSTPS           1  NUMBER OF SUBREACHES
```

```
                    ITYP        FLOW  TYPE OF INITIAL CONDITION
                  RSVRIC        0.00  INITIAL CONDITION
                       X        0.00 WORKING R AND D COEFFICIENT

280 SV          STORAGE         0.0      68.0     254.0     461.0     690.0     937.0    1204.0    1491.0    1802.0

281 SE        ELEVATION     2173.00   2175.00   2180.00   2185.00   2190.00   2195.00   2200.00   2205.00   2210.00

283 SL        LOW-LEVEL OUTLET
                   ELEVL     2173.00  ELEVATION AT CENTER OF OUTLET
                   CAREA       14.10  CROSS-SECTIONAL AREA
                    COQL        0.60  COEFFICIENT
                    EXPL        0.50  EXPONENT OF HEAD

282 SS        SPILLWAY
                    CREL     2200.00  SPILLWAY CREST ELEVATION
                   SPWID      200.00  SPILLWAY WIDTH
                    COQW        3.20  WEIR COEFFICIENT
                    EXPW        1.50  EXPONENT OF HEAD

                                                  ***

                                        COMPUTED OUTFLOW-ELEVATION DATA

        OUTFLOW      0.00     98.97    108.75    120.67    135.52    154.55    179.80    214.90    267.03    352.55
      ELEVATION   2173.00   2175.13   2175.57   2176.16   2176.99   2178.19   2180.02   2183.03   2188.49   2200.00

        OUTFLOW    374.67    521.33    913.15   1670.76   2914.76   4765.75   7344.31  10771.04  15166.50  20651.29
      ELEVATION   2200.10   2200.41   2200.91   2201.61   2202.51   2203.61   2204.91   2206.41   2208.10   2210.00

                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

        STORAGE      0.00     68.00     72.75     89.16    111.26    142.02    186.62    254.00    254.92    379.51
        OUTFLOW      0.00     95.95     98.97    108.75    120.67    135.52    154.55    179.51    179.80    214.90
      ELEVATION   2173.00   2175.00   2175.13   2175.57   2176.16   2176.99   2178.19   2180.00   2180.02   2183.03

        STORAGE    461.00    620.81    690.00    937.00   1204.00   1209.97   1227.36   1256.17   1296.43   1348.12
        OUTFLOW    235.04    267.03    279.75    318.24    352.55    374.70    521.37    913.04   1670.78   2914.73
      ELEVATION   2185.00   2188.49   2190.00   2195.00   2200.00   2200.10   2200.41   2200.91   2201.61   2202.51

        STORAGE   1411.23   1485.77   1491.00   1578.51   1684.05   1802.00
        OUTFLOW   4765.79   7344.10   7539.23  10771.27  15166.19  20651.29
      ELEVATION   2203.61   2204.91   2205.00   2206.41   2208.10   2210.00

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

                    HYDROGRAPH AT STATION      DAM

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)      (HR)
                          (CFS)
+     351.     8.00                347.        322.        272.        272.
                        (INCHES)    0.249       0.923       1.352       1.352
                         (AC-FT)    172.        638.        934.        934.

 PEAK STORAGE  TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)     (HR)
    1191.      8.00               1163.        975.        750.        750.

 PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+   (FEET)     (HR)
  2199.76      8.00             2199.23     2195.64     2190.81     2190.81
```

```
                    CUMULATIVE AREA =   12.96 SQ MI


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


            **************
            *            *
  302 KK    *     CP21H  *        JOMAX RD
            *            *
            **************

  303 KO          OUTPUT CONTROL VARIABLES
                       IPRNT          3  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE

  304 HC          HYDROGRAPH COMBINATION
                       ICOMP          3  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
      ***             ***            ***            ***            ***

                     HYDROGRAPH AT STATION    CP21H

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                         (CFS)
+     776.      3.50                 406.        342.        287.        287.
                       (INCHES)     0.277       0.932       1.357       1.357
                        (AC-FT)     201.        678.        987.        987.

                     CUMULATIVE AREA =   13.64 SQ MI

MANE2 NPLAN,NSTM       1      0


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


            **************
            *            *
  361 KK    *      CP27  *          CP AT SCOTTSDALE RD
            *            *
            **************

  362 KO          OUTPUT CONTROL VARIABLES
                       IPRNT          3  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE
                                COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
                                POINT 27D WITH SUB 27 .  TOTAL FLOW AT
                                SCOTTSDALE ROAD FOR FAN 4.

  366 HC          HYDROGRAPH COMBINATION
                       ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
MANE2 NPLAN,NSTM       1      0
```

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

                        HYDROGRAPH AT STATION     CP27

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR      41.58-HR
+   (CFS)       (HR)
                                  (CFS)
+    1993.      3.17              583.         388.         317.         317.
                             (INCHES)        0.362        0.963        1.362        1.362
                              (AC-FT)          289.         770.        1089.        1089.

                        CUMULATIVE AREA =   15.00 SQ MI

1
                                          RUNOFF SUMMARY
                                   FLOW IN CUBIC FEET PER SECOND
                                 TIME IN HOURS,  AREA IN SQUARE MILES

                                          PEAK   TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN    MAXIMUM    TIME OF
          OPERATION        STATION        FLOW    PEAK                                          AREA     STAGE    MAX STAGE
+                                                                6-HOUR       24-HOUR       72-HOUR

          HYDROGRAPH AT
+                                 16      2595.     3.25         319.          81.           47.      1.46
          HYDROGRAPH AT
+                                 17      2114.     3.25         259.          65.           38.      1.19
          HYDROGRAPH AT
+                                 18      2357.     3.25         270.          68.           39.      1.26
          3 COMBINED AT
+                                19A      7066.     3.25         848.         214.          124.      3.91
          ROUTED TO
+                                19B      7034.     3.33         848.         214.          124.      3.91
+                                                                                                     6.96       3.33
          HYDROGRAPH AT
+                                 15      1848.     3.42         278.          70.           41.      1.37
          2 COMBINED AT
+                                19C      8679.     3.33        1125.         284.          164.      5.28
          ROUTED TO
+                               19.1      8266.     3.33        1125.         284.          164.      5.28
+                                                                                                     6.02       3.33
          HYDROGRAPH AT
+                                 19       431.     3.25          42.          11.            6.      0.19
          HYDROGRAPH AT
+                                 20      1052.     3.25         123.          31.           18.      0.57
          3 COMBINED AT
+                               CP20      9603.     3.33        1290.         326.          188.      6.03
          ROUTED TO
+                             RRCP20      8867.     3.42        1289.         326.          188.      6.03
+                                                                                                     4.02       3.42
          HYDROGRAPH AT
+                               21A       763.     3.25          80.          20.           12.      0.42
          2 COMBINED AT
+                             CP21A      9325.     3.42        1368.         346.          200.      6.45
```

+	ROUTED TO	RR21A	9163.	3.50	1368.	346.	200.	6.45		
+									3.42	3.50
+	HYDROGRAPH AT	21B	497.	3.25	53.	13.	8.	0.28		
+	2 COMBINED AT	CP21B	9404.	3.50	1420.	359.	207.	6.73		
+	ROUTED TO	RR21B	8768.	3.58	1419.	359.	207.	6.73		
+									3.69	3.58
+	HYDROGRAPH AT	21C	1207.	3.25	142.	36.	21.	0.75		
+	2 COMBINED AT	CP21C	9344.	3.58	1560.	395.	228.	7.48		
+	ROUTED TO	RR21C	7778.	3.75	1554.	395.	228.	7.48		
+									4.07	3.75
+	HYDROGRAPH AT	21D	1447.	3.33	201.	51.	29.	1.06		
+	2 COMBINED AT	CP21D	8537.	3.67	1754.	446.	257.	8.54		
+	ROUTED TO	RR21D	8506.	3.75	1753.	446.	257.	8.54		
+									4.13	3.75
+	HYDROGRAPH AT	21E	392.	3.33	49.	12.	7.	0.26		
+	2 COMBINED AT	CP21E	8645.	3.75	1801.	458.	265.	8.79		
+	ROUTED TO	RR21E	8393.	3.83	1799.	458.	265.	8.79		
+									6.30	3.83
+	HYDROGRAPH AT	21F	644.	3.33	89.	22.	13.	0.47		
+	2 COMBINED AT	CP21F	8636.	3.75	1886.	481.	278.	9.26		
+	ROUTED TO	RR21F	8620.	3.83	1883.	481.	278.	9.26		
+									2.68	3.83
+	HYDROGRAPH AT	21G	25.	3.33	3.	1.	0.	0.02		
+	2 COMBINED AT	CP21G	8629.	3.83	1887.	482.	278.	9.28		
+	HYDROGRAPH AT	22	2753.	3.25	304.	76.	44.	1.39		
+	HYDROGRAPH AT	23	756.	3.25	87.	22.	13.	0.39		

```
                2 COMBINED AT
+                        24A     3509.   3.25      391.      98.      57.     1.78
                ROUTED TO
+                       24.1     2849.   3.42      391.      98.      57.     1.78
+                                                                    5.53     3.42
                HYDROGRAPH AT
+                         24      683.   3.25       84.      21.      12.     0.49
                2 COMBINED AT
+                      24.2A     3382.   3.42      474.     120.      69.     2.27
                HYDROGRAPH AT
+                        25N     1217.   3.42      175.      44.      26.     0.78
                HYDROGRAPH AT
+                        25S     1382.   3.25      151.      38.      22.     0.63
                2 COMBINED AT
+                       25.1     2363.   3.33      326.      82.      48.     1.41
                2 COMBINED AT
+                      24.2B     5490.   3.42      800.     202.     117.     3.68
                ROUTED TO
+                     PIMARD     5410.   3.42      800.     202.     117.     3.68
+                                                                    6.79     3.42
                ROUTED TO
+                     RR24.2     5164.   3.50      799.     202.     117.     3.68
+                                                                    6.90     3.50
                2 COMBINED AT
+                     C21.05    11894.   3.75     2683.     683.     395.    12.96
                ROUTED TO
+                        DAM      351.   8.00      347.     322.     272.    12.96
+                                                                 2199.76     8.00
                ROUTED TO
+                        R21G     351.   8.33      347.     321.     270.    12.96
+                                                                    0.42     8.33
                HYDROGRAPH AT
+                        21H       62.   3.33        8.       2.       1.     0.04
                HYDROGRAPH AT
+                        26N      674.   3.50      109.      28.      16.     0.64
                3 COMBINED AT
+                      CP21H      776.   3.50      406.     342.     287.    13.64
                ROUTED TO
+                      RR21H      654.   3.67      400.     340.     286.    13.64
+                                                                    0.60     3.67
                HYDROGRAPH AT
+                        26S      230.   3.25       29.       7.       4.     0.17
                2 COMBINED AT
+                     *APEX*      764.   3.58      421.     346.     290.    13.81
                ROUTED TO
+                      CP27A      756.   3.67      421.     346.     290.    13.81
+                                                                    1.80     3.67
```

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          ROUTED TO
+                        CP27B      725.    3.75        418.       345.       288.      13.81
+                                                                                                  1.76       3.75
          ROUTED TO
+                        CP27C      692.    3.83        416.       345.       287.      13.81
+                                                                                                  1.71       3.83
          ROUTED TO
+                        CP27D      692.    3.92        416.       345.       287.      13.81
+                                                                                                  1.71       3.92
          HYDROGRAPH AT
+                           27     1984.    3.17        205.        52.        30.       1.19
          2 COMBINED AT
+                         CP27     1993.    3.17        583.       388.       317.      15.00
1
                                   SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                       (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                INTERPOLATED TO
                                                                            COMPUTATION INTERVAL
            ISTAQ    ELEMENT      DT       PEAK    TIME TO      VOLUME      DT       PEAK    TIME TO      VOLUME
                                                      PEAK                                     PEAK

                                (MIN)     (CFS)     (MIN)      (IN)     (MIN)     (CFS)     (MIN)       (IN)

                16   MANE        3.31   2714.57    197.99      2.05      5.00   2595.35    195.00       2.06

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1602E+03 OUTFLOW=0.1596E+03 BASIN STORAGE=0.1487E-01 PERCENT ERROR=   0.4

                17   MANE        3.72   2179.71    195.53      2.05      5.00   2113.93    195.00       2.05

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1303E+03 OUTFLOW=0.1296E+03 BASIN STORAGE=0.1813E-01 PERCENT ERROR=   0.6

                18   MANE        3.06   2403.41    196.84      2.00      5.00   2357.00    195.00       2.00

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1353E+03 OUTFLOW=0.1346E+03 BASIN STORAGE=0.1762E-01 PERCENT ERROR=   0.5

                15   MANE        3.60   1852.02    207.71      1.91      5.00   1847.60    205.00       1.91

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1401E+03 OUTFLOW=0.1393E+03 BASIN STORAGE=0.1918E-01 PERCENT ERROR=   0.5

                19   MANE        1.73    440.63    193.75      2.09      5.00    430.55    195.00       2.09

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2089E+02 OUTFLOW=0.2083E+02 BASIN STORAGE=0.1376E-02 PERCENT ERROR=   0.3

                20   MANE        3.79   1104.65    196.23      2.02      5.00   1052.10    195.00       2.03

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6186E+02 OUTFLOW=0.6151E+02 BASIN STORAGE=0.5950E-02 PERCENT ERROR=   0.6

               21A   MANE        2.39    781.28    193.64      1.79      5.00    762.73    195.00       1.79

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4022E+02 OUTFLOW=0.4006E+02 BASIN STORAGE=0.4421E-02 PERCENT ERROR=   0.4
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          21B  MANE        2.59    504.98    194.27      1.79      5.00    497.48    195.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2643E+02 OUTFLOW=0.2632E+02 BASIN STORAGE=0.2952E-02 PERCENT ERROR=   0.4

          21C  MANE        3.26   1262.50    196.65      1.79      5.00   1206.94    195.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7164E+02 OUTFLOW=0.7124E+02 BASIN STORAGE=0.9548E-02 PERCENT ERROR=   0.5

          21D  MANE        3.13   1492.11    200.84      1.79      5.00   1447.37    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1014E+03 OUTFLOW=0.1009E+03 BASIN STORAGE=0.1927E-01 PERCENT ERROR=   0.5

          21E  MANE        3.07    409.14    198.46      1.79      5.00    391.91    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2461E+02 OUTFLOW=0.2448E+02 BASIN STORAGE=0.4121E-02 PERCENT ERROR=   0.5

          21F  MANE        4.37    667.83    201.44      1.78      5.00    644.11    200.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4492E+02 OUTFLOW=0.4457E+02 BASIN STORAGE=0.8835E-02 PERCENT ERROR=   0.8

          21G  MANE        4.21     25.33    199.36      1.78      5.00     25.13    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1647E+01 OUTFLOW=0.1637E+01 BASIN STORAGE=0.2774E-03 PERCENT ERROR=   0.6

           22  MANE        3.74   2772.23    194.54      2.05      5.00   2752.96    195.00        2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1522E+03 OUTFLOW=0.1514E+03 BASIN STORAGE=0.1237E-01 PERCENT ERROR=   0.5

           23  MANE        4.00    758.21    194.26      2.07      5.00    755.94    195.00        2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4372E+02 OUTFLOW=0.4348E+02 BASIN STORAGE=0.3485E-02 PERCENT ERROR=   0.5

           24  MANE        2.81    712.57    195.93      1.60      5.00    683.20    195.00        1.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4211E+02 OUTFLOW=0.4189E+02 BASIN STORAGE=0.6065E-02 PERCENT ERROR=   0.5

          25N  MANE        4.31   1247.82    204.02      2.11      5.00   1216.63    205.00        2.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8859E+02 OUTFLOW=0.8801E+02 BASIN STORAGE=0.1552E-01 PERCENT ERROR=   0.6

          25S  MANE        2.95   1387.24    195.20      2.26      5.00   1382.42    195.00        2.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7570E+02 OUTFLOW=0.7535E+02 BASIN STORAGE=0.9688E-02 PERCENT ERROR=   0.5
```

```
          21H  MANE        4.20     62.60    199.65      1.78      5.00     62.34    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4128E+01 OUTFLOW=0.4098E+01 BASIN STORAGE=0.7793E-03 PERCENT ERROR=   0.7

          26N  MANE        4.38    677.78    209.77      1.61      5.00    673.89    210.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5502E+02 OUTFLOW=0.5473E+02 BASIN STORAGE=0.9032E-02 PERCENT ERROR=   0.5

          26S  MANE        3.18    239.32    195.89      1.61      5.00    229.95    195.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1443E+02 OUTFLOW=0.1437E+02 BASIN STORAGE=0.1797E-02 PERCENT ERROR=   0.4

           27  MANE        0.62   2007.62    190.77      1.61      5.00   1984.32    190.00        1.62

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1028E+03 OUTFLOW=0.1026E+03 BASIN STORAGE=0.1039E-01 PERCENT ERROR=   0.2


*** NORMAL END OF HEC-1 ***
```

```
1****************************************                                    ****************************************
*                                      *                                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                    *    U.S. ARMY CORPS OF ENGINEERS      *
*             JUN 09 1992              *                                    *    HYDROLOGIC ENGINEERING CENTER     *
*            VERSION 4.0.3E            *                                    *          609 SECOND STREET           *
*                                      *                                    *       DAVIS, CALIFORNIA 95616        *
*  RUN DATE  01/21/99  TIME  16:16:44  *                                    *          (916) 551-1748              *
*                                      *                                    *                                      *
****************************************                                    ****************************************


                                    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. THIS IS THE FORTRAN77 VERSION
          NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
          DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
          KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


1                                                HEC-1 INPUT                                                PAGE  1

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

            1           ID        FILE <RWDAM21F.DAT>
            2           ID        THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
            3           ID        THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
            4           ID
            5           ID        THE MODIFICIATION INCLUDE THE FOLLOWING:
            6           ID        1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
            7           ID           TO CONCENTRATION POINT AT THE APEX OF 21F
            8           ID        2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE
            9           ID
           10           ID        NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
           11           ID        1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
           12           ID        MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
           13           ID        25S.
           14           ID
           15           ID        100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
           16           ID        RAINFALL FROM NOAA ATLAS
           17           ID
           18           ID        FILE RAW4A.DAT
           19           ID        WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
           20           ID        FOR 22, 23, 24, 25N, AND 25S.  ROUTE COMBINED HYDROGRAPHS
           21           ID        22, 23, 24, 25N AND 25S TO 21G.  SUN-BASIN 26 COMBINED AT
           22           ID        THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
           23           ID        ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
           24           ID        INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
           25           ID        PROPOSED ROAD CROSSINGS.
           26           ID
           27           ID        REVISED BY GREINER 12-9-93 BY RON FERGUSON
           28           ID        REVISED BY C. J. LOVELY, COS, 3-9-94
           29           ID        Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
           30           ID           *Eliminate DSS Records
```

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 31          ID          *Divide #26 into 26N & 26S; 26N is portion north of Jomax
 32          ID          *Add 26N @ CP21H and route with 21H to apex
 33          ID          *Add 26S @ apex
 34          ID          *Modify reach length in 26S & 26N to reflect division
 35          ID
 36          ID        ******************************************************************
 37          ID        * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
 38          ID        * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.       *
 39          ID        ******************************************************************
 40          ID
 41          ID    September 1998 - HDR Engineering Modified by adding basin to the
 42          ID    September 1998 - center of Section 36 (Alternative No. 4)
 43          ID    September 1998 - Filename <RAWALT4.DAT>
 44          ID
 45          ID
 46          ID   ***************************************************************************
             *DIAGRAM
 47          IT       5 03MAR94       0     500
 48          IO       5       0       0       0
             *
1                                        HEC-1 INPUT                                    PAGE  2

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

 49          KK      16     SUB
 50          KM         RUNOFF FROM SUB-BASIN 16
 51          BA  1.4570
 52          PH       0      13    0.77    1.51    2.65    3.00    3.23    3.66
 53          LS       0      83     9.8       0       0       0       0       0
 54          UK     217   .0581     .20     100
 55          RK   14800   .0216    .045       0    TRAP      25       3
             *

 56          KK      17     SUB
 57          KM         RUNOFF FROM SUB-BASIN 17
 58          BA  1.1851       0       0
 59          LS       0      83     9.8
 60          UK     285   .0421     .20     100       0       0       0
 61          RK   12200   .0254    .045       0    TRAP      25       3
             *

 62          KK      18     SUB
 63          KM         RUNOFF FROM SUB-BASIN 18
 64          BA  1.2641
 65          LS       0      83     6.5       0
 66          UK     285   .0421     .20     100       0       0       0
 67          RK   10840   .0259    .045       0    TRAP      25       3
             *

 68          KK     19A      CP
 69          KM         COMBINE HYDROGRAPHS SUB16, SUB17 AND SUB18
 70          HC       3
             *

 71          KK     19B      CP
 72          KM         ROUTE CP19A TO CP19B
 73          RS       1    FLOW      -1       0       0
 74          RC    .055    .040    .055    1100   .0155       0       0       0
 75          RX       0       1     126     132     167     173     298     299
 76          RY      10       8       3       0       0       3       8      10
             *

 77          KK      15     SUB
 78          KM         RUNOFF FROM SUBBASIN 15
 79          BA  1.3702       0       0
 80          LS       0      82     5.4       0
```

```
 81          UK     217   .0581     .20     100       0       0       0
 82          RK   21200   .0236    .045       0    TRAP      25       3
             *

 83          KK     19C      CP
 84          KM        COMBINE HYDROGRAPHS SUB15 & CP19B
 85          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE  3

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

 86          KK    19.1      CP
 87          KM        ROUTE CP 19C TO 19.1
 88          RS       1    FLOW      -1       0       0
 89          RC    .055    .040    .055    1800   .0200       0       0
 90          RX       0       1     151     166     216     231     381     382
 91          RY      10       9       3       0       0       3       9      10
             *

 92          KK      19     SUB
 93          KM        RUNOFF FROM SUB-BASIN 19
 94          BA  0.1872
 95          LS       0      84     7.2       0
 96          UK     275   .0800     .20     100       0       0       0
 97          RK    3730   .0352    .045    .160    TRAP      15       3
 98          RK    1800   .0200    .045       0    TRAP      50      30
             *

 99          KK      20     SUB
100          KM        RUNOFF FROM SUB-BASIN 20
101          BA  0.5698       0       0
102          LS       0      84     3.6       0
103          UK     300   .0750     .20     100       0       0       0
104          RK    9640   .0197    .045       0    TRAP      15       3
             *

105          KK    CP20      CP
106          KM        COMBINE SUB 19, SUB 20 AND CP 19.1
107          HC       3
             *
108          KM    *******BEGIN SUBAREA 21 BREAKDOWN-3/94 REVISIONS*****

109          KK  RRCP20      CP
110          KM        ROUTE CP20 TO CP 21A, WHICH IS 4600'
111          RS       1    FLOW      -1       0       0
112          RC    .055    .040    .055    4600   .0217       0       0       0
113          RX       0      30      60      85     195     220     250     280
114          RY      10       4       1       0       0       1       4      10
             *

115          KK     21A     SUB
116          KM        RUNOFF FROM SUB-BASIN 21A
117          BA     .42       0       0
118          LS       0      80     6.4       0       0       0
119          UK     297   .0558     .20     100       0       0       0
120          RK    6400   .0344    .045       0    TRAP      10       3
             *

121          KK   CP21A
122          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE  4

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

```
 123          KK   RR21A      CP
 124          KM        ROUTE CP21A TO 21B    WHICH IS 960'
 125          RS       1    FLOW      -1       0       0
 126          RC    .055    .040     .055     960   .0156       0       0       0
 127          RX       0      10      60     205     295     440     490     500
 128          RY       6       4       2       0       0       2       4       6
              *

 129          KK     21B     SUB
 130          KM        RUNOFF FROM SUB-BASIN 21B
 131          BA   0.276       0       0
 132          LS       0      80     6.4       0       0       0
 133          UK     297   .0558     .20     100       0       0       0
 134          RK    6300   .0381    .045       0    TRAP      10       3
              *

 135          KK   CP21B
 136          HC       2
              *

 137          KK   RR21B      CP
 138          KM        ROUTE CP21B TO 21C    WHICH IS 4400'
 139          RS       1    FLOW      -1       0       0
 140          RC    .055    .040     .055    4400   .0205       0       0       0
 141          RX       0      10      60     205     295     440     490     500
 142          RY       6       4       2       0       0       2       4       6
              *

 143          KK     21C     SUB
 144          KM        RUNOFF FROM SUB-BASIN 21C
 145          BA    .748       0       0
 146          LS       0      80     6.4       0       0       0
 147          UK     297   .0558     .20     100       0       0       0
 148          RK    9900   .0328    .045       0    TRAP      20       3
              *

 149          KK   CP21C
 150          HC       2
              *

 151          KK   RR21C      CP
 152          KM        ROUTE CP21C TO 21D    WHICH IS 5700'
 153          RS       1    FLOW      -1       0       0
 154          RC    .055    .040     .055    5700   .0181       0       0       0
 155          RX       0      20     175     210     300     335     490     510
 156          RY     5.5     3.5     2.5       0       0     2.5     3.5     5.5
              *

 157          KK     21D     SUB
 158          KM        RUNOFF FROM SUB-BASIN 21D
 159          BA   1.059       0       0
 160          LS       0      80     6.4       0       0       0
 161          UK     297   .0558     .20     100       0       0       0
 162          RK   14500   .0252    .045       0    TRAP      30       3
              *
```



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

 163          KK   CP21D
 164          HC       2
              *

 165          KK   RR21D      CP
 166          KM        ROUTE CP21D TO 21E    WHICH IS 1100'
```

```
167          RS       1    FLOW      -1       0       0
168          RC    .055    .040    .055    1100   .0200       0       0       0
169          RX       0      20     175     210     300     335     490     510
170          RY     5.5     3.5     2.5       0       0     2.5     3.5     5.5
             *

171          KK     21E     SUB
172          KM        RUNOFF FROM SUB-BASIN 21E
173          BA   0.257       0       0
174          LS       0      80     6.4       0       0       0
175          UK     297   .0333     .20     100       0       0       0
176          RK    6600   .0288    .045       0    TRAP      15       3
             *

177          KK   CP21E
178          HC       2
             *

179          KK   RR21E      CP
180          KM       ROUTE CP21E TO 21F    WHICH IS 2800'
181          RS       1    FLOW      -1       0       0
182          RC    .055    .040    .055    2800   .0143       0       0       0
183          RX       0      70     170     180     230     240     340     410
184          RY    10.5     4.5     3.5       0       0     3.5     4.5    10.5
             *

185          KK     21F     SUB
186          KM        RUNOFF FROM SUB-BASIN 21F
187          BA   0.469       0       0
188          LS       0      80     6.4       0       0       0
189          UK     297   .0333     .20     100       0       0       0
190          RK   10400   .0279    .045       0    TRAP      20       3
             *

191          KK   CP21F
192          HC       2
             *

193          KK   RR21F      CP
194          KM   ROUTE CP21F TO 21G (1900' DOWNSTREAM)
195          RS       1    FLOW      -1       0       0
196          RC    .055    .040    .055    1900   .0158       0       0       0
197          RX       0      20      70     345     455     730     780     800
198          RY      10       8       2       0       0       2       8      10
             *
```



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

199          KK     21G     SUB
200          KM   RUNOFF FROM SUB-BASIN 21G
201          BA   .0172       0       0
202          LS       0      80     6.4       0       0       0
203          UK     297   .0333     .20     100       0       0       0
204          RK    4000   .0300    .045       0    TRAP      10       3
             *

205          KK   CP21G
206          HC       2
             *

207          KK      22     SUB
208          KM       RUNOFF FROM SUB-BASIN 22
209          BA  1.3860
210          LS       0      84     5.1       0
211          UK     225   .0590     .20     100       0       0       0       0
```

```
 212          RK   13000   .0238    .045       0    TRAP      25       3
              *

 213          KK      23     SUB
 214          KM         RUNOFF FROM SUB-BASIN 23
 215          BA  0.3945       0       0
 216          LS       0      84     6.3       0
 217          UK     225   .0590     .20     100       0       0       0
 218          RK   10200   .0304    .045       0    TRAP      20       3
              *

 219          KK     24A      CP
 220          KM         COMBINE HYDROGRAPHS FOR SUB 22 AND SUB 23
 221          HC       2
              *

 222          KK    24.1      CP
 223          KM         ROUTE CP 24A TO CP 24.1
 224          RS       3    FLOW      -1       0       0
 225          RC    .055    .040    .055    6800   .0257       0       0       0
 226          RX       0       1     101     107     122     128     228     229
 227          RY      10       8       3       0       0       3       8      10
              *

 228          KK      24     SUB
 229          KM         RUNOFF FROM SUB-BASIN 24
 230          KM         DRAINAGE AREA CHANGED TO MATCH VALUE USED BY MICHAEL BAKER
 231          KM         Jr., INC.
 232          BA  0.4907       0       0
 233          LS       0      77     6.8       0
 234          UK     295   .0438     .20     100       0       0       0
 235          RK    6800   .0257    .045       0    TRAP      15       3
              *
```



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

 236          KK   24.2A      CP
 237          KM         COMBINE SUB 24 & CP 24.1 - APEX
 238          HC       2
              *

 239          KK     25N       SUB
 240          KM         RUNOFF FROM SUB-BASIN 25N - APEX
 241          BA  0.7834       0       0       0       0       0       0       0
 242          LS       0      84     9.0       0
 243          UK     295   .0438     .20     100       0       0       0
 244          RK   16700   .0302    .045       0    TRAP      25       3
              *

 245          KK     25S     SUB
 246          KM         RUNOFF FROM SUB-BASIN 25S - APEX
 247          BA  0.6256       0       0       0       0       0       0       0
 248          LS       0      86     9.0       0
 249          UK     295   .0438     .20     100       0       0       0
 250          RK    8900   .0278    .045       0    TRAP      25       3
              *

 251          KK    25.1      CP
 252          KM         COMBINE HYDROGRAPHS FOR SUB-BASINS 25N AND 25S
 253          HC       2
              *

 254          KK   24.2B      CP
 255          KM         COMBINE TOTAL HYDROGRAPH 24.2A WITH 25.1
 256          HC       2
```

```
                 *
 257             KK  PIMARD      CP
 258             KM   ROUTE THE TOTAL HYDROGRAPH AT THE CONCENTRATION POINT
 259             KM   24.2B TO THE CULVERT AT THE PIMA ROAD. THERE IS NO
 260             KM   CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
 261             RS       1    FLOW      -1       0       0
 262             RC    .055    .040    .055    2000   .0287       0       0       0
 263             RX       0       1     101     107     122     128     228     229
 264             RY      10       8       3       0       0       3       8      10
                 *

 265             KK  RR24.2      CP
 266             KM   ROUTE THE TOTAL HYDROGRAPH AT CONCENTRATION POINT
 267             KM   24.2B FROM THE CULVERT UNDER PIMA ROAD TO CONCENTRATION
 268             KM   POINT 21.05.
 269             RS       1    FLOW      -1       0       0
 270             RC    .055    .040    .055    3050   .0238       0       0       0
 271             RX       0       1     101     107     122     128     228     229
 272             RY      10       8       3       0       0       3       8      10
                 *
                 *
1                                          HEC-1 INPUT                                          PAGE  8

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

 273             KK  C21.05 CONFLUENCE OF DGB CHANNELS NEAR MID-SECTION 36
 274             KM         COMBINE HYDROGRAPH CP21G WITH HYDROGRAPH RR24.2
 275             KM         (FROM THE PIMA ROAD CULVERT)
 276             HC       2
                 *  ******************************************************************************

 277             KK     DAM
 278             KO       3
 279             RS       1    FLOW       0
 280             SV       0      65     304     580     878    1196    1536    1897    2125
 281             SE    2180    2185    2190    2195    2200    2205    2210    2215    2218
 282             SS    2208     200     3.2     1.5
                 *  2 - 36" RCP Culverts for outlet
 283             SL    2180    14.1      .6      .5
                 *  ******************************************************************************
                 *

 284             KK    R21G      CP
 285             KM        ROUTE CP21G(21.05)TO 21H WHICH IS 3100'
 286             RS       1    FLOW      -1       0       0
 287             RC    .055    .040    .055    3100   .0194       0       0       0
 288             RX       0      90     120     355     585     820     850     940
 289             RY       9       4     1.5       0       0     1.5       4       9
                 *

 290             KK     21H     SUB
 291             KM        RUNOFF FROM SUB-BASIN 21H
 292             BA   .0431       0       0
 293             LS       0      80     6.4       0       0       0
 294             UK     297   .0333     .20     100       0       0       0
 295             RK    4600   .0278    .045       0    TRAP      20       3
                 *

 296             KK     26N
 297             KM       Runoff from sub-basin 26N
 298             BA   .6376       0       0
 299             LS       0      75    12.7       0
 300             UK     200   .0250     .20     100       0
 301             RK   12000   .0263    .045       0    TRAP      35      10
                 *
```

2218
2180
38

```
 302          KK   CP21H   JOMAX RD
 303          KO       3
 304          HC       3
              *

 305          KK   RR21H      CP
 306          KM        ROUTE HYDROGRAPH AT CONCENTRATION POINT 21H   DOWNSTREAM FROM
 307          KM        JOMAX ROAD          THERE IS NO ADDITIONAL CONTRIBUTING
 308          KM        DRAINAGE AREA AT THIS CONCENTRATION POINT.  USED CHANNEL
 309          KM        GEOMETRY                          FROM REACH SIX
 310          KM             DEVELOPED BY C. LOVELY
 311          RS       1    FLOW      -1       0       0
 312          RC    .055    .040    .055    2390   .0188       0       0       0
1                                          HEC-1 INPUT                                                    PAGE  9

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

 313          RX       0      90     120     355     585     820     850     940
 314          RY       9       4     1.5       0       0     1.5       4       9
              *

 315          KK     26S     SUB
 316          KM       RUNOFF FROM SUB-BASIN 26S
 317          BA  0.1672       0       0
 318          LS       0      75    12.7       0
 319          UK     200   .0250     .20     100       0       0       0
 320          RK    4000   .0263    .045       0    TRAP      35      10
              *

 321          KK  *APEX*      CP
 322          KM        COMBINE FLOW FROM SUB-BASIN 26 ,
 323          KM           AND ROUTED HYDROGRAPH FROM JOMAX ROAD.
 324          HC       2
              *
 325          KM        *********END SUBAREA 21 REVISIONS************

 326          KK   CP27A      CP AT HAPPY VALLEY RD
 327          KM        ROUTE FLOW FROM CONCENTRATION POINT APEX  TO 27A (HAPPY VALLEY
 328          KM        ROAD).  THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION PT.
 329          KM
 330          RS       1    FLOW      -1       0       0
 331          RC    .055    .040    .055    1600   .0196       0       0       0
 332          RX       0       1     201     211     261     271     471     472
 333          RY      10       4       2       0       0       2       4      10
              *

 334          KK   CP27B      CP AT MILLER RD
 335          KM        ROUTE FLOW FROM CONCENTRATION POINT 27B TO 27C (MILLER ROAD).
 336          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
 337          RS       1    FLOW      -1       0       0
 338          RC    .055    .040    .055    3300   .0196       0       0       0
 339          RX       0       1     201     211     261     271     471     472
 340          RY      10       4       2       0       0       2       4      10
              *

 341          KK   CP27C      CP AT PINNACLE PEAK RD
 342          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (PINNACLE PK ROAD).
 343          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
 344          RS       1    FLOW      -1       0       0
 345          RC    .055    .040    .055    3300   .0196       0       0       0
 346          RX       0       1     201     211     261     271     471     472
 347          RY      10       4       2       0       0       2       4      10
              *

 348          KK   CP27D     CP AT SCOTTSDALE RD
 349          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (SCOTTSDALE ROAD)
```

```
          350          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
          351          RS       1    FLOW      -1       0       0
          352          RC    .055    .040    .055    1000   .0196       0       0       0
          353          RX       0       1     201     211     261     271     471     472
          354          RY      10       4       2       0       0       2       4      10
                       *
1                                                   HEC-1 INPUT                                                    PAGE 10

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


          355          KK      27     SUB
          356          KM        RUNOFF FROM SUB-BASIN 27
          357          BA  1.1913       0       0
          358          LS       0      75    12.7       0
          359          UK     200   .0250     .20     100       0       0       0
          360          RK    1500   .0263    .045       0    TRAP      35      10
                       *

          361          KK    CP27      CP AT SCOTTSDALE RD
          362          KO       3
          363          KM        COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
          364          KM        POINT 27D WITH SUB 27 .  TOTAL FLOW AT
          365          KM        SCOTTSDALE ROAD FOR FAN 4.
          366          HC       2
                       *
          367          ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    49          16
                 .
                 .
    56           .          17
                 .           .
                 .           .
    62           .           .          18
                 .           .           .
                 .           .           .
    68         19A.......................
                 V
                 V
    71         19B
                 .
                 .
    77           .          15
                 .           .
                 .           .
    83         19C............
                 V
                 V
    86        19.1
                 .
                 .
    92           .          19
                 .           .
                 .           .
    99           .           .          20
                 .           .           .
                 .           .           .
   105        CP20.......................
                 V
                 V
```

```
109     RRCP20
            .
115         .        21A
            .          .
121     CP21A...........
            V
            V
123     RR21A
            .
129         .        21B
            .          .
135     CP21B...........
            V
            V
137     RR21B
            .
143         .        21C
            .          .
149     CP21C...........
            V
            V
151     RR21C
            .
157         .        21D
            .          .
163     CP21D...........
            V
            V
165     RR21D
            .
171         .        21E
            .          .
177     CP21E...........
            V
            V
179     RR21E
            .
185         .        21F
            .          .
191     CP21F...........
            V
            V
193     RR21F
            .
199         .        21G
            .          .
205     CP21G...........
            .
207         .         22
            .          .
213         .          .        23
```

```
                .          .          .
219             .        24A..........
                .          V
                .          V
222             .       24.1
                .          .
                .          .
228             .          .         24
                .          .          .
                .          .          .
236             .     24.2A..........
                .          .
                .          .
239             .          .        25N
                .          .          .
                .          .          .
245             .          .          .        25S
                .          .          .          .
                .          .          .          .
251             .          .      25.1..........
                .          .          .
                .          .          .
254             .     24.2B..........
                .          V
                .          V
257             .    PIMARD
                .          V
                .          V
265             .    RR24.2
                .          .
                .          .
273       C21.05..........
                V
                V
277          DAM
                V
                V
284          R21G
                .
                .
290             .       21H
                .          .
                .          .
296             .          .        26N
                .          .          .
                .          .          .
302        CP21H.......................
                V
                V
305        RR21H
                .
                .
315             .       26S
                .          .
                .          .
321       *APEX*..........
                V
                V
326        CP27A
                V
                V
334        CP27B
                V
                V
341        CP27C
                V
```

```
                V
  348        CP27D
                 .
                 .
  355            .          27
                 .           .
                 .           .
  361        CP27............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN 09 1992              *
*           VERSION 4.0.3E             *
*                                      *
*  RUN DATE  01/21/99  TIME  16:16:44  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 551-1748              *
*                                      *
****************************************
```

FILE <RWDAM21F.DAT>
THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.

THE MODIFICIATION INCLUDE THE FOLLOWING:
1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
   TO CONCENTRATION POINT AT THE APEX OF 21F
2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE

NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
25S.

100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
RAINFALL FROM NOAA ATLAS

FILE RAW4A.DAT
WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
FOR 22, 23, 24, 25N, AND 25S. ROUTE COMBINED HYDROGRAPHS
22, 23, 24, 25N AND 25S TO 21G. SUN-BASIN 26 COMBINED AT
THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
PROPOSED ROAD CROSSINGS.

REVISED BY GREINER 12-9-93 BY RON FERGUSON
REVISED BY C. J. LOVELY, COS, 3-9-94
Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
   *Eliminate DSS Records
   *Divide #26 into 26N & 26S; 26N is portion north of Jomax
   *Add 26N @ CP21H and route with 21H to apex
   *Add 26S @ apex
   *Modify reach length in 26S & 26N to reflect division

```
*****************************************************************
* ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
* MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.      *
*****************************************************************
```

September 1998 - HDR Engineering Modified by adding basin to the
September 1998 - center of Section 36 (Alternative No. 4)
September 1998 - Filename <RAWALT4.DAT>

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

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

     IT          HYDROGRAPH TIME DATA
                        NMIN           5  MINUTES IN COMPUTATION INTERVAL
                       IDATE      3MAR94  STARTING DATE
                       ITIME        0000  STARTING TIME
                          NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      4MAR94  ENDING DATE
                      NDTIME        1735  ENDING TIME
                       ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL    0.08 HOURS
                       TOTAL TIME BASE   41.58 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
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0


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


            **************
            *            *
 277 KK     *       DAM  *
            *            *
            **************

 278 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           3  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

 279 RS          STORAGE ROUTING
                       NSTPS           1  NUMBER OF SUBREACHES
```

```
                    ITYP        FLOW  TYPE OF INITIAL CONDITION
                  RSVRIC        0.00  INITIAL CONDITION
                       X        0.00 WORKING R AND D COEFFICIENT

280 SV          STORAGE         0.0      65.0     304.0     580.0     878.0    1196.0    1536.0    1897.0    2125.0

281 SE        ELEVATION     2180.00   2185.00   2190.00   2195.00   2200.00   2205.00   2210.00   2215.00   2218.00

283 SL        LOW-LEVEL OUTLET
                   ELEVL     2180.00  ELEVATION AT CENTER OF OUTLET
                   CAREA       14.10  CROSS-SECTIONAL AREA
                    COQL        0.60  COEFFICIENT
                    EXPL        0.50  EXPONENT OF HEAD

282 SS        SPILLWAY
                    CREL     2208.00  SPILLWAY CREST ELEVATION
                   SPWID      200.00  SPILLWAY WIDTH
                    COQW        3.20  WEIR COEFFICIENT
                    EXPW        1.50  EXPONENT OF HEAD
                                                  ***
                                      COMPUTED OUTFLOW-ELEVATION DATA

        OUTFLOW      0.00     99.02    108.88    120.92    135.94    155.23    180.91    216.75    270.31    359.02
      ELEVATION   2180.00   2182.13   2182.58   2183.18   2184.01   2185.23   2187.11   2190.21   2195.87   2208.00

        OUTFLOW    381.10    527.67    919.36   1676.82   2920.66   4771.49   7349.92  10776.56  15171.99  20656.82
      ELEVATION   2208.10   2208.41   2208.91   2209.61   2210.51   2211.61   2212.91   2214.41   2216.10   2218.00

                                      COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

        STORAGE      0.00     27.69     33.48     41.29     52.19     65.00     76.21    165.82    304.00    315.33
        OUTFLOW      0.00     99.03    108.88    120.92    135.94    151.72    155.23    180.91    214.56    216.75
      ELEVATION   2180.00   2182.13   2182.58   2183.18   2184.01   2185.00   2185.23   2187.11   2190.00   2190.21

        STORAGE    580.00    631.98    878.00   1196.00   1400.00   1407.06   1427.66   1461.81   1509.49   1536.00
        OUTFLOW    262.78    270.31    303.43    339.25    359.02    381.08    527.64    919.40   1676.76   2181.82
      ELEVATION   2195.00   2195.87   2200.00   2205.00   2208.00   2208.10   2208.41   2208.91   2209.61   2210.00

        STORAGE   1572.86   1652.25   1746.03   1854.17   1897.00   1980.89   2125.00
        OUTFLOW   2920.55   4771.42   7350.06  10776.50  12254.37  15171.88  20656.83
      ELEVATION   2210.51   2211.61   2212.91   2214.41   2215.00   2216.10   2218.00

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

                    HYDROGRAPH AT STATION      DAM

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                           (CFS)
+     339.      8.00       336.       315.        270.        270.
                      (INCHES)      0.241      0.903       1.343       1.343
                       (AC-FT)       166.       624.        928.        928.

  PEAK STORAGE  TIME                        MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
    1192.       8.00      1165.       982.        757.        757.

  PEAK STAGE    TIME                        MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
   2204.94      8.00      2204.51    2201.61     2197.45     2197.45
```

```
                    CUMULATIVE AREA =   12.96 SQ MI


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


            **************
            *            *
  302 KK    *     CP21H  *        JOMAX RD
            *            *
            **************

  303 KO          OUTPUT CONTROL VARIABLES
                        IPRNT           3  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE

  304 HC          HYDROGRAPH COMBINATION
                        ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
      ***             ***             ***             ***             ***

                       HYDROGRAPH AT STATION    CP21H

 PEAK FLOW    TIME                          MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     41.58-HR
+   (CFS)     (HR)
                          (CFS)
+     808.    3.50                402.        336.        285.        285.
                        (INCHES)  0.274       0.915       1.349       1.349
                         (AC-FT)   199.        666.        981.        981.

                       CUMULATIVE AREA =   13.64 SQ MI

MANE2 NPLAN,NSTM       1      0


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


            **************
            *            *
  361 KK    *      CP27  *          CP AT SCOTTSDALE RD
            *            *
            **************

  362 KO          OUTPUT CONTROL VARIABLES
                        IPRNT           3  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE
                                 COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
                                 POINT 27D WITH SUB 27 .  TOTAL FLOW AT
                                 SCOTTSDALE ROAD FOR FAN 4.

  366 HC          HYDROGRAPH COMBINATION
                        ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM       1      0
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      ***          ***          ***          ***          ***

                    HYDROGRAPH AT STATION     CP27

  PEAK FLOW     TIME                      MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                                (CFS)
+    1993.      3.17             581.        382.        315.        315.
                            (INCHES)       0.360       0.948       1.353       1.353
                             (AC-FT)        288.        758.       1083.       1083.

                    CUMULATIVE AREA =    15.00 SQ MI

1
                                   RUNOFF SUMMARY
                              FLOW IN CUBIC FEET PER SECOND
                           TIME IN HOURS,  AREA IN SQUARE MILES

                                     PEAK   TIME OF    AVERAGE FLOW FOR MAXIMUM PERIOD     BASIN    MAXIMUM    TIME OF
+        OPERATION        STATION    FLOW    PEAK                                         AREA     STAGE    MAX STAGE
                                                        6-HOUR      24-HOUR     72-HOUR
+        HYDROGRAPH AT
                              16    2595.    3.25        319.         81.         47.      1.46
+        HYDROGRAPH AT
                              17    2114.    3.25        259.         65.         38.      1.19
+        HYDROGRAPH AT
                              18    2357.    3.25        270.         68.         39.      1.26
+        3 COMBINED AT
                             19A    7066.    3.25        848.        214.        124.      3.91
+        ROUTED TO
                             19B    7034.    3.33        848.        214.        124.      3.91
+                                                                                          6.96       3.33
+        HYDROGRAPH AT
                              15    1848.    3.42        278.         70.         41.      1.37
+        2 COMBINED AT
                             19C    8679.    3.33       1125.        284.        164.      5.28
+        ROUTED TO
                            19.1    8266.    3.33       1125.        284.        164.      5.28
+                                                                                          6.02       3.33
+        HYDROGRAPH AT
                              19     431.    3.25         42.         11.          6.      0.19
+        HYDROGRAPH AT
                              20    1052.    3.25        123.         31.         18.      0.57
+        3 COMBINED AT
                            CP20    9603.    3.33       1290.        326.        188.      6.03
+        ROUTED TO
                           RRCP20   8867.    3.42       1289.        326.        188.      6.03
+                                                                                          4.02       3.42
+        HYDROGRAPH AT
                             21A     763.    3.25         80.         20.         12.      0.42
+        2 COMBINED AT
                           CP21A    9325.    3.42       1368.        346.        200.      6.45
```

```
+          ROUTED TO
+                        RR21A    9163.   3.50     1368.     346.     200.    6.45
+                                                                                    3.42     3.50
+          HYDROGRAPH AT
+                          21B     497.   3.25       53.      13.       8.    0.28
+          2 COMBINED AT
+                        CP21B    9404.   3.50     1420.     359.     207.    6.73
+          ROUTED TO
+                        RR21B    8768.   3.58     1419.     359.     207.    6.73
+                                                                                    3.69     3.58
+          HYDROGRAPH AT
+                          21C    1207.   3.25      142.      36.      21.    0.75
+          2 COMBINED AT
+                        CP21C    9344.   3.58     1560.     395.     228.    7.48
+          ROUTED TO
+                        RR21C    7778.   3.75     1554.     395.     228.    7.48
+                                                                                    4.07     3.75
+          HYDROGRAPH AT
+                          21D    1447.   3.33      201.      51.      29.    1.06
+          2 COMBINED AT
+                        CP21D    8537.   3.67     1754.     446.     257.    8.54
+          ROUTED TO
+                        RR21D    8506.   3.75     1753.     446.     257.    8.54
+                                                                                    4.13     3.75
+          HYDROGRAPH AT
+                          21E     392.   3.33       49.      12.       7.    0.26
+          2 COMBINED AT
+                        CP21E    8645.   3.75     1801.     458.     265.    8.79
+          ROUTED TO
+                        RR21E    8393.   3.83     1799.     458.     265.    8.79
+                                                                                    6.30     3.83
+          HYDROGRAPH AT
+                          21F     644.   3.33       89.      22.      13.    0.47
+          2 COMBINED AT
+                        CP21F    8636.   3.75     1886.     481.     278.    9.26
+          ROUTED TO
+                        RR21F    8620.   3.83     1883.     481.     278.    9.26
+                                                                                    2.68     3.83
+          HYDROGRAPH AT
+                          21G      25.   3.33        3.       1.       0.    0.02
+          2 COMBINED AT
+                        CP21G    8629.   3.83     1887.     482.     278.    9.28
+          HYDROGRAPH AT
+                           22    2753.   3.25      304.      76.      44.    1.39
+          HYDROGRAPH AT
+                           23     756.   3.25       87.      22.      13.    0.39
```

+	2 COMBINED AT	24A	3509.	3.25	391.	98.	57.	1.78	
+	ROUTED TO	24.1	2849.	3.42	391.	98.	57.	1.78	5.53 3.42
+	HYDROGRAPH AT	24	683.	3.25	84.	21.	12.	0.49	
+	2 COMBINED AT	24.2A	3382.	3.42	474.	120.	69.	2.27	
+	HYDROGRAPH AT	25N	1217.	3.42	175.	44.	26.	0.78	
+	HYDROGRAPH AT	25S	1382.	3.25	151.	38.	22.	0.63	
+	2 COMBINED AT	25.1	2363.	3.33	326.	82.	48.	1.41	
+	2 COMBINED AT	24.2B	5490.	3.42	800.	202.	117.	3.68	
+	ROUTED TO	PIMARD	5410.	3.42	800.	202.	117.	3.68	6.79 3.42
+	ROUTED TO	RR24.2	5164.	3.50	799.	202.	117.	3.68	6.90 3.50
+	2 COMBINED AT	C21.05	11894.	3.75	2683.	683.	395.	12.96	
+	ROUTED TO	DAM	339.	8.00	336.	315.	270.	12.96	2204.94 8.00
+	ROUTED TO	R21G	339.	8.33	336.	314.	268.	12.96	0.41 8.42
+	HYDROGRAPH AT	21H	62.	3.33	8.	2.	1.	0.04	
+	HYDROGRAPH AT	26N	674.	3.50	109.	28.	16.	0.64	
+	3 COMBINED AT	CP21H	808.	3.50	402.	336.	285.	13.64	
+	ROUTED TO	RR21H	684.	3.67	396.	334.	284.	13.64	0.61 3.67
+	HYDROGRAPH AT	26S	230.	3.25	29.	7.	4.	0.17	
+	2 COMBINED AT	*APEX*	793.	3.58	418.	340.	288.	13.81	
+	ROUTED TO	CP27A	785.	3.67	417.	340.	288.	13.81	1.84 3.67

```
          ROUTED TO
+                        CP27B      753.    3.75        415.       339.       287.      13.81
+                                                                                                  1.79       3.75
          ROUTED TO
+                        CP27C      720.    3.83        412.       339.       285.      13.81
+                                                                                                  1.75       3.83
          ROUTED TO
+                        CP27D      720.    3.92        412.       339.       285.      13.81
+                                                                                                  1.75       3.92
          HYDROGRAPH AT
+                           27     1984.    3.17        205.        52.        30.       1.19
          2 COMBINED AT
+                         CP27     1993.    3.17        581.       382.       315.      15.00
1
                                   SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                       (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                INTERPOLATED TO
                                                                            COMPUTATION INTERVAL
          ISTAQ    ELEMENT      DT        PEAK    TIME TO     VOLUME      DT        PEAK    TIME TO     VOLUME
                                                     PEAK                                     PEAK
                              (MIN)      (CFS)     (MIN)      (IN)    (MIN)      (CFS)     (MIN)       (IN)
             16    MANE         3.31    2714.57    197.99      2.05     5.00    2595.35    195.00       2.06

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1602E+03 OUTFLOW=0.1596E+03 BASIN STORAGE=0.1487E-01 PERCENT ERROR=   0.4

             17    MANE         3.72    2179.71    195.53      2.05     5.00    2113.93    195.00       2.05

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1303E+03 OUTFLOW=0.1296E+03 BASIN STORAGE=0.1813E-01 PERCENT ERROR=   0.6

             18    MANE         3.06    2403.41    196.84      2.00     5.00    2357.00    195.00       2.00

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1353E+03 OUTFLOW=0.1346E+03 BASIN STORAGE=0.1762E-01 PERCENT ERROR=   0.5

             15    MANE         3.60    1852.02    207.71      1.91     5.00    1847.60    205.00       1.91

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1401E+03 OUTFLOW=0.1393E+03 BASIN STORAGE=0.1918E-01 PERCENT ERROR=   0.5

             19    MANE         1.73     440.63    193.75      2.09     5.00     430.55    195.00       2.09

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2089E+02 OUTFLOW=0.2083E+02 BASIN STORAGE=0.1376E-02 PERCENT ERROR=   0.3

             20    MANE         3.79    1104.65    196.23      2.02     5.00    1052.10    195.00       2.03

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6186E+02 OUTFLOW=0.6151E+02 BASIN STORAGE=0.5950E-02 PERCENT ERROR=   0.6

            21A    MANE         2.39     781.28    193.64      1.79     5.00     762.73    195.00       1.79

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4022E+02 OUTFLOW=0.4006E+02 BASIN STORAGE=0.4421E-02 PERCENT ERROR=   0.4
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          21B  MANE        2.59   504.98   194.27     1.79     5.00   497.48   195.00       1.79
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2643E+02 OUTFLOW=0.2632E+02 BASIN STORAGE=0.2952E-02 PERCENT ERROR=   0.4
          21C  MANE        3.26  1262.50   196.65     1.79     5.00  1206.94   195.00       1.78
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7164E+02 OUTFLOW=0.7124E+02 BASIN STORAGE=0.9548E-02 PERCENT ERROR=   0.5
          21D  MANE        3.13  1492.11   200.84     1.79     5.00  1447.37   200.00       1.79
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1014E+03 OUTFLOW=0.1009E+03 BASIN STORAGE=0.1927E-01 PERCENT ERROR=   0.5
          21E  MANE        3.07   409.14   198.46     1.79     5.00   391.91   200.00       1.79
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2461E+02 OUTFLOW=0.2448E+02 BASIN STORAGE=0.4121E-02 PERCENT ERROR=   0.5
          21F  MANE        4.37   667.83   201.44     1.78     5.00   644.11   200.00       1.78
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4492E+02 OUTFLOW=0.4457E+02 BASIN STORAGE=0.8835E-02 PERCENT ERROR=   0.8
          21G  MANE        4.21    25.33   199.36     1.78     5.00    25.13   200.00       1.79
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1647E+01 OUTFLOW=0.1637E+01 BASIN STORAGE=0.2774E-03 PERCENT ERROR=   0.6
           22  MANE        3.74  2772.23   194.54     2.05     5.00  2752.96   195.00       2.05
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1522E+03 OUTFLOW=0.1514E+03 BASIN STORAGE=0.1237E-01 PERCENT ERROR=   0.5
           23  MANE        4.00   758.21   194.26     2.07     5.00   755.94   195.00       2.06
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4372E+02 OUTFLOW=0.4348E+02 BASIN STORAGE=0.3485E-02 PERCENT ERROR=   0.5
           24  MANE        2.81   712.57   195.93     1.60     5.00   683.20   195.00       1.60
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4211E+02 OUTFLOW=0.4189E+02 BASIN STORAGE=0.6065E-02 PERCENT ERROR=   0.5
          25N  MANE        4.31  1247.82   204.02     2.11     5.00  1216.63   205.00       2.11
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8859E+02 OUTFLOW=0.8801E+02 BASIN STORAGE=0.1552E-01 PERCENT ERROR=   0.6
          25S  MANE        2.95  1387.24   195.20     2.26     5.00  1382.42   195.00       2.26
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7570E+02 OUTFLOW=0.7535E+02 BASIN STORAGE=0.9688E-02 PERCENT ERROR=   0.5
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              21H  MANE        4.20     62.60    199.65      1.78      5.00     62.34    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4128E+01 OUTFLOW=0.4098E+01 BASIN STORAGE=0.7793E-03 PERCENT ERROR=   0.7

              26N  MANE        4.38    677.78    209.77      1.61      5.00    673.89    210.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5502E+02 OUTFLOW=0.5473E+02 BASIN STORAGE=0.9032E-02 PERCENT ERROR=   0.5

              26S  MANE        3.18    239.32    195.89      1.61      5.00    229.95    195.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1443E+02 OUTFLOW=0.1437E+02 BASIN STORAGE=0.1797E-02 PERCENT ERROR=   0.4

               27  MANE        0.62   2007.62    190.77      1.61      5.00   1984.32    190.00        1.62

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1028E+03 OUTFLOW=0.1026E+03 BASIN STORAGE=0.1039E-01 PERCENT ERROR=   0.2


*** NORMAL END OF HEC-1 ***
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1****************************************                    ****************************************
*                                      *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *    U.S. ARMY CORPS OF ENGINEERS      *
*             JUN 09 1992              *                    *    HYDROLOGIC ENGINEERING CENTER     *
*           VERSION 4.0.3E             *                    *          609 SECOND STREET           *
*                                      *                    *       DAVIS, CALIFORNIA 95616        *
*  RUN DATE  01/21/99  TIME  16:35:30  *                    *          (916) 551-1748              *
*                                      *                    *                                      *
****************************************                    ****************************************

                                        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. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                          HEC-1 INPUT                                          PAGE  1

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

        1           ID        FILE <RWDAM21F.DAT>
        2           ID        THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
        3           ID        THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
        4           ID
        5           ID        THE MODIFICIATION INCLUDE THE FOLLOWING:
        6           ID        1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
        7           ID           TO CONCENTRATION POINT AT THE APEX OF 21F
        8           ID        2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE
        9           ID
       10           ID        NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
       11           ID        1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
       12           ID        MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
       13           ID        25S.
       14           ID
       15           ID        100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
       16           ID        RAINFALL FROM NOAA ATLAS
       17           ID
       18           ID        FILE RAW4A.DAT
       19           ID        WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
       20           ID        FOR 22, 23, 24, 25N, AND 25S.  ROUTE COMBINED HYDROGRAPHS
       21           ID        22, 23, 24, 25N AND 25S TO 21G.  SUN-BASIN 26 COMBINED AT
       22           ID        THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
       23           ID        ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
       24           ID        INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
       25           ID        PROPOSED ROAD CROSSINGS.
       26           ID
       27           ID        REVISED BY GREINER 12-9-93 BY RON FERGUSON
       28           ID        REVISED BY C. J. LOVELY, COS, 3-9-94
       29           ID        Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
       30           ID           *Eliminate DSS Records
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 31          ID          *Divide #26 into 26N & 26S; 26N is portion north of Jomax
 32          ID          *Add 26N @ CP21H and route with 21H to apex
 33          ID          *Add 26S @ apex
 34          ID          *Modify reach length in 26S & 26N to reflect division
 35          ID
 36          ID        ******************************************************************
 37          ID        * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
 38          ID        * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.       *
 39          ID        ******************************************************************
 40          ID
 41          ID    September 1998 - HDR Engineering Modified by adding 2 basins to the
 42          ID    September 1998 - center of Section 36 (Alternative No. 5, adjacent basins)
 43          ID    September 1998 - Filename <RAWALT5.DAT>
 44          ID
 45          ID
 46          ID   ***************************************************************************
             *DIAGRAM
 47          IT       5 03MAR94       0     500
 48          IO       5       0       0       0
             *
1                                        HEC-1 INPUT                                    PAGE  2

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

 49          KK      16     SUB
 50          KM        RUNOFF FROM SUB-BASIN 16
 51          BA  1.4570
 52          PH       0      13    0.77    1.51    2.65    3.00    3.23    3.66
 53          LS       0      83     9.8       0       0       0       0       0
 54          UK     217   .0581     .20     100
 55          RK   14800   .0216    .045       0    TRAP      25       3
             *

 56          KK      17     SUB
 57          KM        RUNOFF FROM SUB-BASIN 17
 58          BA  1.1851       0       0
 59          LS       0      83     9.8
 60          UK     285   .0421     .20     100       0       0       0
 61          RK   12200   .0254    .045       0    TRAP      25       3
             *

 62          KK      18     SUB
 63          KM        RUNOFF FROM SUB-BASIN 18
 64          BA  1.2641
 65          LS       0      83     6.5       0
 66          UK     285   .0421     .20     100       0       0       0
 67          RK   10840   .0259    .045       0    TRAP      25       3
             *

 68          KK     19A      CP
 69          KM        COMBINE HYDROGRAPHS SUB16, SUB17 AND SUB18
 70          HC       3
             *

 71          KK     19B      CP
 72          KM        ROUTE CP19A TO CP19B
 73          RS       1    FLOW      -1       0       0
 74          RC    .055    .040    .055    1100   .0155       0       0       0
 75          RX       0       1     126     132     167     173     298     299
 76          RY      10       8       3       0       0       3       8      10
             *

 77          KK      15     SUB
 78          KM        RUNOFF FROM SUBBASIN 15
 79          BA  1.3702       0       0
 80          LS       0      82     5.4       0
```

```
 81          UK     217   .0581     .20     100       0       0       0
 82          RK   21200   .0236    .045       0    TRAP      25       3
             *

 83          KK     19C      CP
 84          KM        COMBINE HYDROGRAPHS SUB15 & CP19B
 85          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE  3

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

 86          KK    19.1      CP
 87          KM        ROUTE CP 19C TO 19.1
 88          RS       1    FLOW      -1       0       0
 89          RC    .055    .040    .055    1800   .0200       0       0
 90          RX       0       1     151     166     216     231     381     382
 91          RY      10       9       3       0       0       3       9      10
             *

 92          KK      19     SUB
 93          KM        RUNOFF FROM SUB-BASIN 19
 94          BA  0.1872
 95          LS       0      84     7.2       0
 96          UK     275   .0800     .20     100       0       0       0
 97          RK    3730   .0352    .045    .160    TRAP      15       3
 98          RK    1800   .0200    .045       0    TRAP      50      30
             *

 99          KK      20     SUB
100          KM        RUNOFF FROM SUB-BASIN 20
101          BA  0.5698       0       0
102          LS       0      84     3.6       0
103          UK     300   .0750     .20     100       0       0       0
104          RK    9640   .0197    .045       0    TRAP      15       3
             *

105          KK    CP20      CP
106          KM        COMBINE SUB 19, SUB 20 AND CP 19.1
107          HC       3
             *
108          KM    *******BEGIN SUBAREA 21 BREAKDOWN-3/94 REVISIONS*****

109          KK  RRCP20      CP
110          KM        ROUTE CP20 TO CP 21A, WHICH IS 4600'
111          RS       1    FLOW      -1       0       0
112          RC    .055    .040    .055    4600   .0217       0       0       0
113          RX       0      30      60      85     195     220     250     280
114          RY      10       4       1       0       0       1       4      10
             *

115          KK     21A     SUB
116          KM        RUNOFF FROM SUB-BASIN 21A
117          BA     .42       0       0
118          LS       0      80     6.4       0       0       0
119          UK     297   .0558     .20     100       0       0       0
120          RK    6400   .0344    .045       0    TRAP      10       3
             *

121          KK   CP21A
122          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE  4

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

```
 123          KK   RR21A       CP
 124          KM        ROUTE CP21A TO 21B    WHICH IS 960'
 125          RS       1    FLOW      -1       0       0
 126          RC    .055    .040    .055     960   .0156       0       0       0
 127          RX       0      10      60     205     295     440     490     500
 128          RY       6       4       2       0       0       2       4       6
              *

 129          KK     21B     SUB
 130          KM        RUNOFF FROM SUB-BASIN 21B
 131          BA   0.276       0       0
 132          LS       0      80     6.4       0       0       0
 133          UK     297   .0558     .20     100       0       0       0
 134          RK    6300   .0381    .045       0    TRAP      10       3
              *

 135          KK   CP21B
 136          HC       2
              *

 137          KK   RR21B       CP
 138          KM        ROUTE CP21B TO 21C    WHICH IS 4400'
 139          RS       1    FLOW      -1       0       0
 140          RC    .055    .040    .055    4400   .0205       0       0       0
 141          RX       0      10      60     205     295     440     490     500
 142          RY       6       4       2       0       0       2       4       6
              *

 143          KK     21C     SUB
 144          KM        RUNOFF FROM SUB-BASIN 21C
 145          BA    .748       0       0
 146          LS       0      80     6.4       0       0       0
 147          UK     297   .0558     .20     100       0       0       0
 148          RK    9900   .0328    .045       0    TRAP      20       3
              *

 149          KK   CP21C
 150          HC       2
              *

 151          KK   RR21C       CP
 152          KM        ROUTE CP21C TO 21D    WHICH IS 5700'
 153          RS       1    FLOW      -1       0       0
 154          RC    .055    .040    .055    5700   .0181       0       0       0
 155          RX       0      20     175     210     300     335     490     510
 156          RY     5.5     3.5     2.5       0       0     2.5     3.5     5.5
              *

 157          KK     21D     SUB
 158          KM        RUNOFF FROM SUB-BASIN 21D
 159          BA   1.059       0       0
 160          LS       0      80     6.4       0       0       0
 161          UK     297   .0558     .20     100       0       0       0
 162          RK   14500   .0252    .045       0    TRAP      30       3
              *
```



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

 163          KK   CP21D
 164          HC       2
              *

 165          KK   RR21D       CP
 166          KM        ROUTE CP21D TO 21E    WHICH IS 1100'
```

```
167          RS      1    FLOW      -1       0       0
168          RC   .055    .040    .055    1100   .0200       0       0       0
169          RX      0      20     175     210     300     335     490     510
170          RY    5.5     3.5     2.5       0       0     2.5     3.5     5.5
             *

171          KK    21E     SUB
172          KM        RUNOFF FROM SUB-BASIN 21E
173          BA  0.257       0       0
174          LS      0      80     6.4       0       0       0
175          UK    297  .0333     .20     100       0       0       0
176          RK   6600  .0288    .045       0    TRAP      15       3
             *

177          KK  CP21E
178          HC      2
             *

179          KK  RR21E      CP
180          KM        ROUTE CP21E TO 21F    WHICH IS 2800'
181          RS      1    FLOW      -1       0       0
182          RC   .055    .040    .055    2800   .0143       0       0       0
183          RX      0      70     170     180     230     240     340     410
184          RY   10.5     4.5     3.5       0       0     3.5     4.5    10.5
             *

185          KK    21F     SUB
186          KM        RUNOFF FROM SUB-BASIN 21F
187          BA  0.469       0       0
188          LS      0      80     6.4       0       0       0
189          UK    297  .0333     .20     100       0       0       0
190          RK  10400  .0279    .045       0    TRAP      20       3
             *

191          KK  CP21F
192          HC      2
             *

193          KK  RR21F      CP
194          KM  ROUTE CP21F TO 21G (1900' DOWNSTREAM)
195          RS      1    FLOW      -1       0       0
196          RC   .055    .040    .055    1900   .0158       0       0       0
197          RX      0      20      70     345     455     730     780     800
198          RY     10       8       2       0       0       2       8      10
             *
```



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

199          KK    21G     SUB
200          KM  RUNOFF FROM SUB-BASIN 21G
201          BA  .0172       0       0
202          LS      0      80     6.4       0       0       0
203          UK    297  .0333     .20     100       0       0       0
204          RK   4000  .0300    .045       0    TRAP      10       3
             *

205          KK  CP21G
206          HC      2
             *

207          KK     22     SUB
208          KM       RUNOFF FROM SUB-BASIN 22
209          BA  1.3860
210          LS      0      84     5.1       0
211          UK    225  .0590     .20     100       0       0       0       0
```

```
212          RK   13000   .0238    .045       0    TRAP      25       3
             *

213          KK      23     SUB
214          KM         RUNOFF FROM SUB-BASIN 23
215          BA  0.3945       0       0
216          LS       0      84     6.3       0
217          UK     225   .0590     .20     100       0       0       0
218          RK   10200   .0304    .045       0    TRAP      20       3
             *

219          KK     24A      CP
220          KM         COMBINE HYDROGRAPHS FOR SUB 22 AND SUB 23
221          HC       2
             *

222          KK    24.1      CP
223          KM         ROUTE CP 24A TO CP 24.1
224          RS       3    FLOW      -1       0       0
225          RC    .055    .040    .055    6800   .0257       0       0       0
226          RX       0       1     101     107     122     128     228     229
227          RY      10       8       3       0       0       3       8      10
             *

228          KK      24     SUB
229          KM         RUNOFF FROM SUB-BASIN 24
230          KM         DRAINAGE AREA CHANGED TO MATCH VALUE USED BY MICHAEL BAKER
231          KM         Jr., INC.
232          BA  0.4907       0       0
233          LS       0      77     6.8       0
234          UK     295   .0438     .20     100       0       0       0
235          RK    6800   .0257    .045       0    TRAP      15       3
             *
```



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

236          KK   24.2A      CP
237          KM         COMBINE SUB 24 & CP 24.1 - APEX
238          HC       2
             *

239          KK     25N      SUB
240          KM         RUNOFF FROM SUB-BASIN 25N - APEX
241          BA  0.7834       0       0       0       0       0       0       0
242          LS       0      84     9.0       0
243          UK     295   .0438     .20     100       0       0       0
244          RK   16700   .0302    .045       0    TRAP      25       3
             *

245          KK     25S      SUB
246          KM         RUNOFF FROM SUB-BASIN 25S - APEX
247          BA  0.6256       0       0       0       0       0       0       0
248          LS       0      86     9.0       0
249          UK     295   .0438     .20     100       0       0       0
250          RK    8900   .0278    .045       0    TRAP      25       3
             *

251          KK    25.1      CP
252          KM         COMBINE HYDROGRAPHS FOR SUB-BASINS 25N AND 25S
253          HC       2
             *

254          KK   24.2B      CP
255          KM         COMBINE TOTAL HYDROGRAPH 24.2A WITH 25.1
256          HC       2
```

```
                 *
 257             KK  PIMARD      CP
 258             KM   ROUTE THE TOTAL HYDROGRAPH AT THE CONCENTRATION POINT
 259             KM   24.2B TO THE CULVERT AT THE PIMA ROAD. THERE IS NO
 260             KM   CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
 261             RS       1    FLOW      -1       0       0
 262             RC    .055    .040    .055    2000   .0287       0       0       0
 263             RX       0       1     101     107     122     128     228     229
 264             RY      10       8       3       0       0       3       8      10
                 *

 265             KK  RR24.2      CP
 266             KM   ROUTE THE TOTAL HYDROGRAPH AT CONCENTRATION POINT
 267             KM   24.2B FROM THE CULVERT UNDER PIMA ROAD TO CONCENTRATION
 268             KM   POINT 21.05.
 269             RS       1    FLOW      -1       0       0
 270             RC    .055    .040    .055    3050   .0238       0       0       0
 271             RX       0       1     101     107     122     128     228     229
 272             RY      10       8       3       0       0       3       8      10
                 *
                 *
1                                                HEC-1 INPUT                                                PAGE  8

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

 273             KK  C21.05 CONFLUENCE OF DGB CHANNELS NEAR MID-SECTION 36
 274             KM         COMBINE HYDROGRAPH CP21G WITH HYDROGRAPH RR24.2
 275             KM         (FROM THE PIMA ROAD CULVERT)
 276             HC       2
                 *  ******************************************************************************

 277             KK    DAM1
 278             KM   UPPER, LARGER BASIN IN THE 2 BASIN SYSTEM
 279             KO       3
 280             RS       1    FLOW       0
 281             SV       0     108     227     359     503     662     835    1023    1228
 282             SE    2165    2170    2175    2180    2185    2190    2195    2200    2205
 283             SS    2195     700     3.2     1.5
                 *  2 - 36" RCP Culverts for outlet
 284             SL    2165    14.1      .6      .5
                 *  ******************************************************************************
                 *

 285             KK  RR24.3      CP
 286             KM   ROUTE THE TOTAL HYDROGRAPH FROM THE UPPER DETENTION BASIN TO THE LOWER BASIN
 287             KM   VIA A CONSTRUCTED/NATURAL CHANNEL
 288             KM   POINT 21.05.
 289             RS       1    FLOW      -1       0       0
 290             RC    .055    .040    .055    1600   .0238       0       0       0
 291             RX       0       1     101     107     122     128     228     229
 292             RY      10       8       3       0       0       3       8      10
                 *
                 *  ******************************************************************************

 293             KK    DAM2
 294             KM   LOWER, SMALLER BASIN IN THE 2 BASIN SYSTEM
 295             KO       3
 296             RS       1    FLOW       0
 297             SV       0      41     150     266     390     521     660     807
 298             SE    2123    2125    2130    2135    2140    2145    2150    2155
 299             SS    2145     200     3.2     1.5
                 *  2 - 36" RCP Culverts for outlet
 300             SL    2123    14.1      .6      .5
                 *  ******************************************************************************
                 *
```

```
 301          KK    R21G     CP
 302          KM        ROUTE CP21G(21.05)TO 21H WHICH IS 3100'
 303          RS       1    FLOW      -1       0       0
 304          RC    .055    .040    .055    1700   .0194       0       0       0
 305          RX       0      90     120     355     585     820     850     940
 306          RY       9       4     1.5       0       0     1.5       4       9
              *
1                                          HEC-1 INPUT                                                    PAGE  9

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

 307          KK     21H     SUB
 308          KM        RUNOFF FROM SUB-BASIN 21H
 309          BA   .0431       0       0
 310          LS       0      80     6.4       0       0       0
 311          UK     297   .0333     .20     100       0       0       0
 312          RK    4600   .0278    .045       0    TRAP      20       3
              *

 313          KK     26N
 314          KM        Runoff from sub-basin 26N
 315          BA   .6376       0       0
 316          LS       0      75    12.7       0
 317          UK     200   .0250     .20     100       0
 318          RK   12000   .0263    .045       0    TRAP      35      10
              *

 319          KK   CP21H   JOMAX RD
 320          KO       3
 321          HC       3
              *

 322          KK   RR21H      CP
 323          KM        ROUTE HYDROGRAPH AT CONCENTRATION POINT 21H   DOWNSTREAM FROM
 324          KM        JOMAX ROAD           THERE IS NO ADDITIONAL CONTRIBUTING
 325          KM        DRAINAGE AREA AT THIS CONCENTRATION POINT.  USED CHANNEL
 326          KM        GEOMETRY                          FROM REACH SIX
 327          KM            DEVELOPED BY C. LOVELY
 328          RS       1    FLOW      -1       0       0
 329          RC    .055    .040    .055    2390   .0188       0       0       0
 330          RX       0      90     120     355     585     820     850     940
 331          RY       9       4     1.5       0       0     1.5       4       9
              *

 332          KK     26S     SUB
 333          KM        RUNOFF FROM SUB-BASIN 26S
 334          BA  0.1672       0       0
 335          LS       0      75    12.7       0
 336          UK     200   .0250     .20     100       0       0       0
 337          RK    4000   .0263    .045       0    TRAP      35      10
              *

 338          KK  *APEX*      CP
 339          KM        COMBINE FLOW FROM SUB-BASIN 26 ,
 340          KM            AND ROUTED HYDROGRAPH FROM JOMAX ROAD.
 341          HC       2
              *
 342          KM        *********END SUBAREA 21 REVISIONS************

 343          KK   CP27A      CP AT HAPPY VALLEY RD
 344          KM        ROUTE FLOW FROM CONCENTRATION POINT APEX  TO 27A (HAPPY VALLEY
 345          KM        ROAD).  THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION PT.
 346          KM
 347          RS       1    FLOW      -1       0       0
 348          RC    .055    .040    .055    1600   .0196       0       0       0
```

```
1                                          HEC-1 INPUT                                          PAGE 10

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

           349          RX       0       1     201     211     261     271     471     472
           350          RY      10       4       2       0       0       2       4      10
                        *

           351          KK   CP27B      CP AT MILLER RD
           352          KM        ROUTE FLOW FROM CONCENTRATION POINT 27B TO 27C (MILLER ROAD).
           353          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
           354          RS       1    FLOW      -1       0       0
           355          RC    .055    .040    .055    3300   .0196       0       0       0
           356          RX       0       1     201     211     261     271     471     472
           357          RY      10       4       2       0       0       2       4      10
                        *

           358          KK   CP27C      CP AT PINNACLE PEAK RD
           359          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (PINNACLE PK ROAD).
           360          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
           361          RS       1    FLOW      -1       0       0
           362          RC    .055    .040    .055    3300   .0196       0       0       0
           363          RX       0       1     201     211     261     271     471     472
           364          RY      10       4       2       0       0       2       4      10
                        *

           365          KK   CP27D     CP AT SCOTTSDALE RD
           366          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (SCOTTSDALE ROAD)
           367          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
           368          RS       1    FLOW      -1       0       0
           369          RC    .055    .040    .055    1000   .0196       0       0       0
           370          RX       0       1     201     211     261     271     471     472
           371          RY      10       4       2       0       0       2       4      10
                        *

           372          KK      27     SUB
           373          KM        RUNOFF FROM SUB-BASIN 27
           374          BA  1.1913       0       0
           375          LS       0      75    12.7       0
           376          UK     200   .0250     .20     100       0       0       0
           377          RK    1500   .0263    .045       0    TRAP      35      10
                        *

           378          KK    CP27      CP AT SCOTTSDALE RD
           379          KO       3
           380          KM        COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
           381          KM        POINT 27D WITH SUB 27 .  TOTAL FLOW AT
           382          KM        SCOTTSDALE ROAD FOR FAN 4.
           383          HC       2
                        *
           384          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   49          16
               .
               .
   56          .          17
               .           .
               .           .
   62          .           .          18
               .           .           .
               .           .           .
```

```
 68        19A.......................
            V
            V
 71        19B
            .
            .
 77         .          15
            .           .
            .           .
 83        19C............
            V
            V
 86       19.1
            .
            .
 92         .          19
            .           .
            .           .
 99         .           .          20
            .           .           .
            .           .           .
105       CP20........................
            V
            V
109      RRCP20
            .
            .
115         .         21A
            .           .
            .           .
121      CP21A............
            V
            V
123      RR21A
            .
            .
129         .         21B
            .           .
            .           .
135      CP21B............
            V
            V
137      RR21B
            .
            .
143         .         21C
            .           .
            .           .
149      CP21C............
            V
            V
151      RR21C
            .
            .
157         .         21D
            .           .
            .           .
163      CP21D............
            V
            V
165      RR21D
            .
            .
171         .         21E
            .           .
            .           .
177      CP21E............
```

```
                V
                V
179         RR21E
                .
185             .        21F
                .          .
191         CP21F...........
                V
                V
193         RR21F
                .
199             .        21G
                .          .
205         CP21G...........
                .
207             .         22
                .          .
213             .          .        23
                .          .         .
219             .        24A...........
                .          V
                .          V
222             .       24.1
                .          .
228             .          .        24
                .          .         .
236             .     24.2A...........
                .          .
239             .          .       25N
                .          .         .
245             .          .         .        25S
                .          .         .         .
251             .          .     25.1...........
                .          .         .
254             .     24.2B...........
                .          V
                .          V
257             .    PIMARD
                .          V
                .          V
265             .    RR24.2
                .          .
273         C21.05..........
                V
                V
277           DAM1
                V
                V
285         RR24.3
                V
                V
293           DAM2
                V
```

```
                V
  301         R21G
                .
                .
  307           .          21H
                .           .
                .           .
  313           .           .          26N
                .           .           .
                .           .           .
  319        CP21H.......................
                V
                V
  322        RR21H
                .
                .
  332           .          26S
                .           .
                .           .
  338       *APEX*............
                V
                V
  343        CP27A
                V
                V
  351        CP27B
                V
                V
  358        CP27C
                V
                V
  365        CP27D
                .
                .
  372           .           27
                .           .
                .           .
  378         CP27............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN 09 1992              *
*            VERSION 4.0.3E            *
*                                      *
*  RUN DATE  01/21/99  TIME  16:35:30  *
*                                      *
****************************************
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*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748             *
*                                      *
****************************************
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FILE <RWDAM21F.DAT>
THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.

THE MODIFICIATION INCLUDE THE FOLLOWING:
1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
   TO CONCENTRATION POINT AT THE APEX OF 21F
2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE

NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
25S.

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                    100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
                    RAINFALL FROM NOAA ATLAS

                    FILE RAW4A.DAT
                    WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
                    FOR 22, 23, 24, 25N, AND 25S.  ROUTE COMBINED HYDROGRAPHS
                    22, 23, 24, 25N AND 25S TO 21G.  SUN-BASIN 26 COMBINED AT
                    THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
                    ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
                    INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
                    PROPOSED ROAD CROSSINGS.

                    REVISED BY GREINER 12-9-93 BY RON FERGUSON
                    REVISED BY C. J. LOVELY, COS, 3-9-94
                    Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
                       *Eliminate DSS Records
                       *Divide #26 into 26N & 26S; 26N is portion north of Jomax
                       *Add 26N @ CP21H and route with 21H to apex
                       *Add 26S @ apex
                       *Modify reach length in 26S & 26N to reflect division

                    ******************************************************************
                    * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
                    * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.      *
                    ******************************************************************

                 September 1998 - HDR Engineering Modified by adding 2 basins to the
                 September 1998 - center of Section 36 (Alternative No. 5, adjacent basins)
                 September 1998 - Filename <RAWALT5.DAT>

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

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

     IT          HYDROGRAPH TIME DATA
                        NMIN          5  MINUTES IN COMPUTATION INTERVAL
                       IDATE     3MAR94  STARTING DATE
                       ITIME       0000  STARTING TIME
                          NQ        500  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE     4MAR94  ENDING DATE
                      NDTIME       1735  ENDING TIME
                       ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL    0.08 HOURS
                      TOTAL TIME BASE   41.58 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
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
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MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0


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            **************
            *            *
 277 KK     *      DAM1  *
            *            *
            **************

 279 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           3  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

                HYDROGRAPH ROUTING DATA

 280 RS          STORAGE ROUTING
                       NSTPS           1  NUMBER OF SUBREACHES
                        ITYP        FLOW  TYPE OF INITIAL CONDITION
                      RSVRIC        0.00  INITIAL CONDITION
                           X        0.00 WORKING R AND D COEFFICIENT

 281 SV            STORAGE         0.0     108.0     227.0     359.0     503.0     662.0     835.0    1023.0    1228.0

 282 SE          ELEVATION     2165.00   2170.00   2175.00   2180.00   2185.00   2190.00   2195.00   2200.00   2205.00

 284 SL          LOW-LEVEL OUTLET
                       ELEVL     2165.00  ELEVATION AT CENTER OF OUTLET
                       CAREA       14.10  CROSS-SECTIONAL AREA
                        COQL        0.60  COEFFICIENT
                        EXPL        0.50  EXPONENT OF HEAD

 283 SS          SPILLWAY
                        CREL     2195.00  SPILLWAY CREST ELEVATION
                       SPWID      700.00  SPILLWAY WIDTH
                        COQW        3.20  WEIR COEFFICIENT
                        EXPW        1.50  EXPONENT OF HEAD
                                                        ***
                                          COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW       0.00     99.13    109.13    121.38    136.72    156.51    182.99    220.26    276.59    371.63
        ELEVATION    2165.00   2167.13   2167.59   2168.20   2169.06   2170.32   2172.27   2175.54   2181.62   2195.00

          OUTFLOW     444.21    944.76   2297.53   4926.77   9256.68  15711.51  24715.46  36692.74  52067.56  71264.13
        ELEVATION    2195.10   2195.40   2195.90   2196.60   2197.50   2198.60   2199.90   2201.40   2203.10   2205.00

                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00     46.11     55.88     69.12     87.71    108.00    115.64    162.12    227.00    241.21
          OUTFLOW       0.00     99.13    109.13    121.38    136.72    151.72    156.51    182.99    214.56    220.26
        ELEVATION    2165.00   2167.13   2167.59   2168.20   2169.06   2170.00   2170.32   2172.27   2175.00   2175.54
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          STORAGE    359.00    405.59    503.00    662.00    835.00    838.80    850.11    868.93    895.26    929.11
          OUTFLOW    262.78    276.59    303.43    339.25    371.63    444.23    944.73   2297.19   4926.70   9256.76
        ELEVATION   2180.00   2181.62   2185.00   2190.00   2195.00   2195.10   2195.40   2195.90   2196.60   2197.50

          STORAGE    970.46   1019.33   1023.00   1080.48   1150.14   1228.00
          OUTFLOW  15711.42  24714.69  25445.36  36692.66  52067.81  71264.14
        ELEVATION   2198.60   2199.90   2200.00   2201.40   2203.10   2205.00

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

                     HYDROGRAPH AT STATION     DAM1

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                              (CFS)
+    3578.      4.75          1054.        501.        361.        361.
                         (INCHES)        0.756       1.437       1.795       1.795
                          (AC-FT)         523.        993.       1240.       1240.

  PEAK STORAGE  TIME                      MAXIMUM AVERAGE STORAGE
                                    6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
     882.       4.75            843.        638.        445.        445.

  PEAK STAGE    TIME                        MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
   2196.24      4.75         2195.19     2189.02     2182.21     2182.21

                         CUMULATIVE AREA =   12.96 SQ MI


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


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            *            *
  293 KK    *     DAM2   *
            *            *
            **************

  295 KO          OUTPUT CONTROL VARIABLES
                        IPRNT          3  PRINT CONTROL
                        IPLOT          0  PLOT CONTROL
                        QSCAL         0.  HYDROGRAPH PLOT SCALE

                HYDROGRAPH ROUTING DATA

  296 RS          STORAGE ROUTING
                        NSTPS          1  NUMBER OF SUBREACHES
                         ITYP       FLOW  TYPE OF INITIAL CONDITION
                        RSVRIC       0.00  INITIAL CONDITION
                             X       0.00 WORKING R AND D COEFFICIENT

  297 SV            STORAGE        0.0      41.0     150.0     266.0     390.0     521.0     660.0     807.0

  298 SE          ELEVATION    2123.00   2125.00   2130.00   2135.00   2140.00   2145.00   2150.00   2155.00

  300 SL          LOW-LEVEL OUTLET
                        ELEVL    2123.00  ELEVATION AT CENTER OF OUTLET
                        CAREA      14.10  CROSS-SECTIONAL AREA
                         COQL       0.60  COEFFICIENT
                         EXPL       0.50  EXPONENT OF HEAD
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299 SS          SPILLWAY
                      CREL     2145.00  SPILLWAY CREST ELEVATION
                     SPWID      200.00  SPILLWAY WIDTH
                      COQW        3.20  WEIR COEFFICIENT
                      EXPW        1.50  EXPONENT OF HEAD
                                                  ***
                                   COMPUTED OUTFLOW-ELEVATION DATA

        OUTFLOW      0.00     98.64    107.95    119.20    133.07    150.60    173.44    204.45    248.96    318.24
      ELEVATION   2123.00   2125.11   2125.53   2126.09   2126.85   2127.93   2129.53   2132.08   2136.46   2145.00

        OUTFLOW    340.56    487.76    880.36   1638.90   2883.86   4735.76   7315.08  10742.31  15137.91  20622.39
      ELEVATION   2145.10   2145.41   2145.91   2146.61   2147.51   2148.61   2149.91   2151.41   2153.10   2155.00

                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

        STORAGE      0.00     41.00     43.47     52.58     64.68     81.26    104.80    139.85    150.00    198.25
        OUTFLOW      0.00     95.95     98.64    107.95    119.20    133.07    150.60    173.44    179.51    204.45
      ELEVATION   2123.00   2125.00   2125.11   2125.53   2126.09   2126.85   2127.93   2129.53   2130.00   2132.08

        STORAGE    266.00    302.30    390.00    521.00    523.90    532.33    546.30    565.80    590.83    621.39
        OUTFLOW    235.04    248.96    279.75    318.24    340.54    487.79    880.25   1639.04   2883.92   4735.55
      ELEVATION   2135.00   2136.46   2140.00   2145.00   2145.10   2145.41   2145.91   2146.61   2147.51   2148.61

        STORAGE    657.50    660.00    701.39    751.26    807.00
        OUTFLOW   7314.87   7507.97  10742.52  15137.80  20622.39
      ELEVATION   2149.91   2150.00   2151.41   2153.10   2155.00

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

                    HYDROGRAPH AT STATION     DAM2

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR     41.58-HR
+   (CFS)      (HR)
                          (CFS)
+     299.    22.00        299.        295.        256.        256.
                       (INCHES)      0.214       0.847       1.271       1.271
                        (AC-FT)      148.        586.        879.        879.

 PEAK STORAGE  TIME                          MAXIMUM AVERAGE STORAGE
                                    6-HR        24-HR       72-HR     41.58-HR
+  (AC-FT)     (HR)
     456.    22.08        455.        443.        371.        371.

 PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                    6-HR        24-HR       72-HR     41.58-HR
+   (FEET)     (HR)
  2142.50    22.08       2142.47     2142.02     2139.02     2139.02

                     CUMULATIVE AREA =   12.96 SQ MI


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


            **************
            *            *
319 KK      *     CP21H  *        JOMAX RD
            *            *
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  320 KO          OUTPUT CONTROL VARIABLES
                        IPRNT          3  PRINT CONTROL
                        IPLOT          0  PLOT CONTROL
                        QSCAL         0.  HYDROGRAPH PLOT SCALE

  321 HC          HYDROGRAPH COMBINATION
                        ICOMP          3  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0

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

                        HYDROGRAPH AT STATION    CP21H

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+     723.      3.50                301.        297.        272.        272.
                        (INCHES)    0.205       0.811       1.284       1.284
                         (AC-FT)    149.        590.        934.        934.

                        CUMULATIVE AREA =   13.64 SQ MI

MANE2 NPLAN,NSTM       1      0


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            *            *
  378 KK    *      CP27  *          CP AT SCOTTSDALE RD
            *            *
            **************

  379 KO          OUTPUT CONTROL VARIABLES
                        IPRNT          3  PRINT CONTROL
                        IPLOT          0  PLOT CONTROL
                        QSCAL         0.  HYDROGRAPH PLOT SCALE
                                 COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
                                 POINT 27D WITH SUB 27 .  TOTAL FLOW AT
                                 SCOTTSDALE ROAD FOR FAN 4.

  383 HC          HYDROGRAPH COMBINATION
                        ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
MANE2 NPLAN,NSTM       1      0

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

                        HYDROGRAPH AT STATION     CP27

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    1993.      3.17                486.        344.        301.        301.
                        (INCHES)    0.302       0.852       1.292       1.292
                         (AC-FT)    241.        681.        1034.       1034.

                        CUMULATIVE AREA =   15.00 SQ MI
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1

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	16	2595.	3.25	319.	81.	47.	1.46		
+	HYDROGRAPH AT	17	2114.	3.25	259.	65.	38.	1.19		
+	HYDROGRAPH AT	18	2357.	3.25	270.	68.	39.	1.26		
+	3 COMBINED AT	19A	7066.	3.25	848.	214.	124.	3.91		
+	ROUTED TO	19B	7034.	3.33	848.	214.	124.	3.91		
+									6.96	3.33
+	HYDROGRAPH AT	15	1848.	3.42	278.	70.	41.	1.37		
+	2 COMBINED AT	19C	8679.	3.33	1125.	284.	164.	5.28		
+	ROUTED TO	19.1	8266.	3.33	1125.	284.	164.	5.28		
+									6.02	3.33
+	HYDROGRAPH AT	19	431.	3.25	42.	11.	6.	0.19		
+	HYDROGRAPH AT	20	1052.	3.25	123.	31.	18.	0.57		
+	3 COMBINED AT	CP20	9603.	3.33	1290.	326.	188.	6.03		
+	ROUTED TO	RRCP20	8867.	3.42	1289.	326.	188.	6.03		
+									4.02	3.42
+	HYDROGRAPH AT	21A	763.	3.25	80.	20.	12.	0.42		
+	2 COMBINED AT	CP21A	9325.	3.42	1368.	346.	200.	6.45		
+	ROUTED TO	RR21A	9163.	3.50	1368.	346.	200.	6.45		
+									3.42	3.50
+	HYDROGRAPH AT	21B	497.	3.25	53.	13.	8.	0.28		
+	2 COMBINED AT	CP21B	9404.	3.50	1420.	359.	207.	6.73		
+	ROUTED TO	RR21B	8768.	3.58	1419.	359.	207.	6.73		
+									3.69	3.58

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+          HYDROGRAPH AT
                          21C      1207.   3.25      142.      36.      21.     0.75
+          2 COMBINED AT
                          CP21C    9344.   3.58     1560.     395.     228.     7.48
+          ROUTED TO
                          RR21C    7778.   3.75     1554.     395.     228.     7.48
+                                                                          4.07     3.75
+          HYDROGRAPH AT
                          21D      1447.   3.33      201.      51.      29.     1.06
+          2 COMBINED AT
                          CP21D    8537.   3.67     1754.     446.     257.     8.54
+          ROUTED TO
                          RR21D    8506.   3.75     1753.     446.     257.     8.54
+                                                                          4.13     3.75
+          HYDROGRAPH AT
                          21E       392.   3.33       49.      12.       7.     0.26
+          2 COMBINED AT
                          CP21E    8645.   3.75     1801.     458.     265.     8.79
+          ROUTED TO
                          RR21E    8393.   3.83     1799.     458.     265.     8.79
+                                                                          6.30     3.83
+          HYDROGRAPH AT
                          21F       644.   3.33       89.      22.      13.     0.47
+          2 COMBINED AT
                          CP21F    8636.   3.75     1886.     481.     278.     9.26
+          ROUTED TO
                          RR21F    8620.   3.83     1883.     481.     278.     9.26
+                                                                          2.68     3.83
+          HYDROGRAPH AT
                          21G        25.   3.33        3.       1.       0.     0.02
+          2 COMBINED AT
                          CP21G    8629.   3.83     1887.     482.     278.     9.28
+          HYDROGRAPH AT
                          22       2753.   3.25      304.      76.      44.     1.39
+          HYDROGRAPH AT
                          23        756.   3.25       87.      22.      13.     0.39
+          2 COMBINED AT
                          24A      3509.   3.25      391.      98.      57.     1.78
+          ROUTED TO
                          24.1     2849.   3.42      391.      98.      57.     1.78
+                                                                          5.53     3.42
+          HYDROGRAPH AT
                          24        683.   3.25       84.      21.      12.     0.49
+          2 COMBINED AT
                          24.2A    3382.   3.42      474.     120.      69.     2.27
           HYDROGRAPH AT
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+                    25N     1217.   3.42     175.     44.     26.    0.78
     HYDROGRAPH AT
+                    25S     1382.   3.25     151.     38.     22.    0.63
     2 COMBINED AT
+                   25.1     2363.   3.33     326.     82.     48.    1.41
     2 COMBINED AT
+                  24.2B     5490.   3.42     800.    202.    117.    3.68
     ROUTED TO
+                 PIMARD     5410.   3.42     800.    202.    117.    3.68
+                                                                   6.79     3.42
     ROUTED TO
+                 RR24.2     5164.   3.50     799.    202.    117.    3.68
+                                                                   6.90     3.50
     2 COMBINED AT
+                 C21.05    11894.   3.75    2683.    683.    395.   12.96
     ROUTED TO
+                    DAM1     3578.   4.75    1054.    501.    361.   12.96
+                                                                2196.24     4.75
     ROUTED TO
+                 RR24.3     3577.   4.75    1054.    501.    361.   12.96
+                                                                   6.08     4.75
     ROUTED TO
+                    DAM2      299.  22.00     299.    295.    256.   12.96
+                                                                2142.50    22.08
     ROUTED TO
+                    R21G      299.  22.17     299.    295.    255.   12.96
+                                                                   0.36    22.25
     HYDROGRAPH AT
+                    21H       62.   3.33       8.      2.      1.    0.04
     HYDROGRAPH AT
+                    26N      674.   3.50     109.     28.     16.    0.64
     3 COMBINED AT
+                   CP21H      723.   3.50     301.    297.    272.   13.64
     ROUTED TO
+                   RR21H      603.   3.58     299.    296.    270.   13.64
+                                                                   0.57     3.58
     HYDROGRAPH AT
+                    26S      230.   3.25      29.      7.      4.    0.17
     2 COMBINED AT
+                  *APEX*     719.   3.58     319.    302.    274.   13.81
     ROUTED TO
+                   CP27A      702.   3.67     318.    301.    274.   13.81
+                                                                   1.73     3.67
     ROUTED TO
+                   CP27B      669.   3.75     315.    301.    272.   13.81
+                                                                   1.68     3.75
     ROUTED TO
+                   CP27C      635.   3.83     313.    300.    271.   13.81
```

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+                                                                                                  1.64        3.83
        ROUTED TO
+                          CP27D       629.    3.83        313.        300.        271.      13.81
+                                                                                                  1.63        3.83
        HYDROGRAPH AT
+                             27      1984.    3.17        205.         52.         30.       1.19
        2 COMBINED AT
+                           CP27      1993.    3.17        486.        344.        301.      15.00
1
                                   SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                       (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                          INTERPOLATED TO
                                                                      COMPUTATION INTERVAL
          ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                   PEAK                                     PEAK

                              (MIN)     (CFS)     (MIN)      (IN)    (MIN)     (CFS)     (MIN)      (IN)
             16    MANE        3.31   2714.57    197.99      2.05     5.00   2595.35    195.00      2.06

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1602E+03 OUTFLOW=0.1596E+03 BASIN STORAGE=0.1487E-01 PERCENT ERROR=   0.4

             17    MANE        3.72   2179.71    195.53      2.05     5.00   2113.93    195.00      2.05

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1303E+03 OUTFLOW=0.1296E+03 BASIN STORAGE=0.1813E-01 PERCENT ERROR=   0.6

             18    MANE        3.06   2403.41    196.84      2.00     5.00   2357.00    195.00      2.00

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1353E+03 OUTFLOW=0.1346E+03 BASIN STORAGE=0.1762E-01 PERCENT ERROR=   0.5

             15    MANE        3.60   1852.02    207.71      1.91     5.00   1847.60    205.00      1.91

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1401E+03 OUTFLOW=0.1393E+03 BASIN STORAGE=0.1918E-01 PERCENT ERROR=   0.5

             19    MANE        1.73    440.63    193.75      2.09     5.00    430.55    195.00      2.09

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2089E+02 OUTFLOW=0.2083E+02 BASIN STORAGE=0.1376E-02 PERCENT ERROR=   0.3

             20    MANE        3.79   1104.65    196.23      2.02     5.00   1052.10    195.00      2.03

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6186E+02 OUTFLOW=0.6151E+02 BASIN STORAGE=0.5950E-02 PERCENT ERROR=   0.6

            21A    MANE        2.39    781.28    193.64      1.79     5.00    762.73    195.00      1.79

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4022E+02 OUTFLOW=0.4006E+02 BASIN STORAGE=0.4421E-02 PERCENT ERROR=   0.4

            21B    MANE        2.59    504.98    194.27      1.79     5.00    497.48    195.00      1.79

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2643E+02 OUTFLOW=0.2632E+02 BASIN STORAGE=0.2952E-02 PERCENT ERROR=   0.4
```

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          21C  MANE        3.26   1262.50    196.65      1.79      5.00   1206.94    195.00        1.78
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7164E+02 OUTFLOW=0.7124E+02 BASIN STORAGE=0.9548E-02 PERCENT ERROR=   0.5
          21D  MANE        3.13   1492.11    200.84      1.79      5.00   1447.37    200.00        1.79
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1014E+03 OUTFLOW=0.1009E+03 BASIN STORAGE=0.1927E-01 PERCENT ERROR=   0.5
          21E  MANE        3.07    409.14    198.46      1.79      5.00    391.91    200.00        1.79
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2461E+02 OUTFLOW=0.2448E+02 BASIN STORAGE=0.4121E-02 PERCENT ERROR=   0.5
          21F  MANE        4.37    667.83    201.44      1.78      5.00    644.11    200.00        1.78
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4492E+02 OUTFLOW=0.4457E+02 BASIN STORAGE=0.8835E-02 PERCENT ERROR=   0.8
          21G  MANE        4.21     25.33    199.36      1.78      5.00     25.13    200.00        1.79
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1647E+01 OUTFLOW=0.1637E+01 BASIN STORAGE=0.2774E-03 PERCENT ERROR=   0.6
           22  MANE        3.74   2772.23    194.54      2.05      5.00   2752.96    195.00        2.05
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1522E+03 OUTFLOW=0.1514E+03 BASIN STORAGE=0.1237E-01 PERCENT ERROR=   0.5
           23  MANE        4.00    758.21    194.26      2.07      5.00    755.94    195.00        2.06
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4372E+02 OUTFLOW=0.4348E+02 BASIN STORAGE=0.3485E-02 PERCENT ERROR=   0.5
           24  MANE        2.81    712.57    195.93      1.60      5.00    683.20    195.00        1.60
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4211E+02 OUTFLOW=0.4189E+02 BASIN STORAGE=0.6065E-02 PERCENT ERROR=   0.5
          25N  MANE        4.31   1247.82    204.02      2.11      5.00   1216.63    205.00        2.11
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8859E+02 OUTFLOW=0.8801E+02 BASIN STORAGE=0.1552E-01 PERCENT ERROR=   0.6
          25S  MANE        2.95   1387.24    195.20      2.26      5.00   1382.42    195.00        2.26
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7570E+02 OUTFLOW=0.7535E+02 BASIN STORAGE=0.9688E-02 PERCENT ERROR=   0.5
          21H  MANE        4.20     62.60    199.65      1.78      5.00     62.34    200.00        1.79
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4128E+01 OUTFLOW=0.4098E+01 BASIN STORAGE=0.7793E-03 PERCENT ERROR=   0.7
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              26N  MANE        4.38    677.78    209.77      1.61      5.00    673.89    210.00       1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5502E+02 OUTFLOW=0.5473E+02 BASIN STORAGE=0.9032E-02 PERCENT ERROR=   0.5

              26S  MANE        3.18    239.32    195.89      1.61      5.00    229.95    195.00       1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1443E+02 OUTFLOW=0.1437E+02 BASIN STORAGE=0.1797E-02 PERCENT ERROR=   0.4

               27  MANE        0.62   2007.62    190.77      1.61      5.00   1984.32    190.00       1.62

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1028E+03 OUTFLOW=0.1026E+03 BASIN STORAGE=0.1039E-01 PERCENT ERROR=   0.2


*** NORMAL END OF HEC-1 ***
```

```
1****************************************                    ****************************************
 *                                      *                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *   U.S. ARMY CORPS OF ENGINEERS       *
 *             JUN 09 1992              *                    *   HYDROLOGIC ENGINEERING CENTER      *
 *           VERSION 4.0.3E             *                    *         609 SECOND STREET            *
 *                                      *                    *      DAVIS, CALIFORNIA 95616         *
 *  RUN DATE  01/21/99  TIME  16:36:42  *                    *          (916) 551-1748              *
 *                                      *                    *                                      *
 ****************************************                    ****************************************


                                        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. THIS IS THE FORTRAN77 VERSION
          NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
          DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
          KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                                   HEC-1 INPUT                                                PAGE  1

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

          1           ID        FILE <RWDAM21F.DAT>
          2           ID        THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
          3           ID        THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
          4           ID
          5           ID        THE MODIFICIATION INCLUDE THE FOLLOWING:
          6           ID        1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
          7           ID           TO CONCENTRATION POINT AT THE APEX OF 21F
          8           ID        2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE
          9           ID
         10           ID        NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
         11           ID        1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
         12           ID        MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
         13           ID        25S.
         14           ID
         15           ID        100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
         16           ID        RAINFALL FROM NOAA ATLAS
         17           ID
         18           ID        FILE RAW4A.DAT
         19           ID        WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
         20           ID        FOR 22, 23, 24, 25N, AND 25S.  ROUTE COMBINED HYDROGRAPHS
         21           ID        22, 23, 24, 25N AND 25S TO 21G.  SUN-BASIN 26 COMBINED AT
         22           ID        THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
         23           ID        ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
         24           ID        INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
         25           ID        PROPOSED ROAD CROSSINGS.
         26           ID
         27           ID        REVISED BY GREINER 12-9-93 BY RON FERGUSON
         28           ID        REVISED BY C. J. LOVELY, COS, 3-9-94
         29           ID        Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
         30           ID           *Eliminate DSS Records
```

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31          ID          *Divide #26 into 26N & 26S; 26N is portion north of Jomax
32          ID          *Add 26N @ CP21H and route with 21H to apex
33          ID          *Add 26S @ apex
34          ID          *Modify reach length in 26S & 26N to reflect division
35          ID
36          ID       ****************************************************************
37          ID       * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
38          ID       * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.      *
39          ID       ****************************************************************
40          ID
41          ID    September 1998 - HDR Engineering Modified by adding 2 basins to the
42          ID    September 1998 - center of Section 36 (Alternative No. 6, separated basins)
43          ID    September 1998 - Filename <RAWALT6.DAT>
44          ID
45          ID
46          ID   ***********************************************************************
            *DIAGRAM
47          IT       5 03MAR94       0     500
48          IO       5       0       0       0
            *
1                                   HEC-1 INPUT                                    PAGE  2

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

49          KK      16     SUB
50          KM        RUNOFF FROM SUB-BASIN 16
51          BA  1.4570
52          PH       0      13    0.77    1.51    2.65    3.00    3.23    3.66
53          LS       0      83     9.8       0       0       0       0       0
54          UK     217   .0581     .20     100
55          RK   14800   .0216    .045       0    TRAP      25       3
            *

56          KK      17     SUB
57          KM        RUNOFF FROM SUB-BASIN 17
58          BA  1.1851       0       0
59          LS       0      83     9.8
60          UK     285   .0421     .20     100       0       0       0
61          RK   12200   .0254    .045       0    TRAP      25       3
            *

62          KK      18     SUB
63          KM        RUNOFF FROM SUB-BASIN 18
64          BA  1.2641
65          LS       0      83     6.5       0
66          UK     285   .0421     .20     100       0       0       0
67          RK   10840   .0259    .045       0    TRAP      25       3
            *

68          KK     19A      CP
69          KM        COMBINE HYDROGRAPHS SUB16, SUB17 AND SUB18
70          HC       3
            *

71          KK     19B      CP
72          KM        ROUTE CP19A TO CP19B
73          RS       1    FLOW      -1       0       0
74          RC    .055    .040    .055    1100   .0155       0       0       0
75          RX       0       1     126     132     167     173     298     299
76          RY      10       8       3       0       0       3       8      10
            *

77          KK      15     SUB
78          KM        RUNOFF FROM SUBBASIN 15
79          BA  1.3702       0       0
80          LS       0      82     5.4       0
```

```
 81          UK     217   .0581     .20     100       0       0       0
 82          RK   21200   .0236    .045       0    TRAP      25       3
             *

 83          KK     19C      CP
 84          KM        COMBINE HYDROGRAPHS SUB15 & CP19B
 85          HC       2
             *
1                                        HEC-1 INPUT                                          PAGE  3

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

 86          KK    19.1      CP
 87          KM        ROUTE CP 19C TO 19.1
 88          RS       1    FLOW      -1       0       0
 89          RC    .055    .040    .055    1800   .0200       0       0
 90          RX       0       1     151     166     216     231     381     382
 91          RY      10       9       3       0       0       3       9      10
             *

 92          KK      19     SUB
 93          KM        RUNOFF FROM SUB-BASIN 19
 94          BA  0.1872
 95          LS       0      84     7.2       0
 96          UK     275   .0800     .20     100       0       0       0
 97          RK    3730   .0352    .045    .160    TRAP      15       3
 98          RK    1800   .0200    .045       0    TRAP      50      30
             *

 99          KK      20     SUB
100          KM        RUNOFF FROM SUB-BASIN 20
101          BA  0.5698       0       0
102          LS       0      84     3.6       0
103          UK     300   .0750     .20     100       0       0       0
104          RK    9640   .0197    .045       0    TRAP      15       3
             *

105          KK    CP20      CP
106          KM        COMBINE SUB 19, SUB 20 AND CP 19.1
107          HC       3
             *
108          KM    *******BEGIN SUBAREA 21 BREAKDOWN-3/94 REVISIONS*****

109          KK  RRCP20      CP
110          KM        ROUTE CP20 TO CP 21A, WHICH IS 4600'
111          RS       1    FLOW      -1       0       0
112          RC    .055    .040    .055    4600   .0217       0       0       0
113          RX       0      30      60      85     195     220     250     280
114          RY      10       4       1       0       0       1       4      10
             *

115          KK     21A     SUB
116          KM        RUNOFF FROM SUB-BASIN 21A
117          BA     .42       0       0
118          LS       0      80     6.4       0       0       0
119          UK     297   .0558     .20     100       0       0       0
120          RK    6400   .0344    .045       0    TRAP      10       3
             *

121          KK   CP21A
122          HC       2
             *
1                                        HEC-1 INPUT                                          PAGE  4

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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```
 123          KK   RR21A       CP
 124          KM        ROUTE CP21A TO 21B    WHICH IS 960'
 125          RS       1    FLOW      -1       0       0
 126          RC    .055    .040    .055     960   .0156       0       0       0
 127          RX       0      10      60     205     295     440     490     500
 128          RY       6       4       2       0       0       2       4       6
              *

 129          KK     21B     SUB
 130          KM        RUNOFF FROM SUB-BASIN 21B
 131          BA   0.276       0       0
 132          LS       0      80     6.4       0       0       0
 133          UK     297   .0558     .20     100       0       0       0
 134          RK    6300   .0381    .045       0    TRAP      10       3
              *

 135          KK   CP21B
 136          HC       2
              *

 137          KK   RR21B       CP
 138          KM        ROUTE CP21B TO 21C    WHICH IS 4400'
 139          RS       1    FLOW      -1       0       0
 140          RC    .055    .040    .055    4400   .0205       0       0       0
 141          RX       0      10      60     205     295     440     490     500
 142          RY       6       4       2       0       0       2       4       6
              *

 143          KK     21C     SUB
 144          KM        RUNOFF FROM SUB-BASIN 21C
 145          BA    .748       0       0
 146          LS       0      80     6.4       0       0       0
 147          UK     297   .0558     .20     100       0       0       0
 148          RK    9900   .0328    .045       0    TRAP      20       3
              *

 149          KK   CP21C
 150          HC       2
              *

 151          KK   RR21C       CP
 152          KM        ROUTE CP21C TO 21D    WHICH IS 5700'
 153          RS       1    FLOW      -1       0       0
 154          RC    .055    .040    .055    5700   .0181       0       0       0
 155          RX       0      20     175     210     300     335     490     510
 156          RY     5.5     3.5     2.5       0       0     2.5     3.5     5.5
              *

 157          KK     21D     SUB
 158          KM        RUNOFF FROM SUB-BASIN 21D
 159          BA   1.059       0       0
 160          LS       0      80     6.4       0       0       0
 161          UK     297   .0558     .20     100       0       0       0
 162          RK   14500   .0252    .045       0    TRAP      30       3
              *
```



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

 163          KK   CP21D
 164          HC       2
              *

 165          KK   RR21D       CP
 166          KM        ROUTE CP21D TO 21E    WHICH IS 1100'
```

```
167          RS       1    FLOW      -1       0       0
168          RC    .055    .040    .055    1100   .0200       0       0       0
169          RX       0      20     175     210     300     335     490     510
170          RY     5.5     3.5     2.5       0       0     2.5     3.5     5.5
             *

171          KK     21E     SUB
172          KM        RUNOFF FROM SUB-BASIN 21E
173          BA   0.257       0       0
174          LS       0      80     6.4       0       0       0
175          UK     297   .0333     .20     100       0       0       0
176          RK    6600   .0288    .045       0    TRAP      15       3
             *

177          KK   CP21E
178          HC       2
             *

179          KK   RR21E      CP
180          KM        ROUTE CP21E TO 21F    WHICH IS 2800'
181          RS       1    FLOW      -1       0       0
182          RC    .055    .040    .055    2800   .0143       0       0       0
183          RX       0      70     170     180     230     240     340     410
184          RY    10.5     4.5     3.5       0       0     3.5     4.5    10.5
             *

185          KK     21F     SUB
186          KM        RUNOFF FROM SUB-BASIN 21F
187          BA   0.469       0       0
188          LS       0      80     6.4       0       0       0
189          UK     297   .0333     .20     100       0       0       0
190          RK   10400   .0279    .045       0    TRAP      20       3
             *

191          KK   CP21F
192          HC       2
             *

193          KK   RR21F      CP
194          KM   ROUTE CP21F TO 21G (1900' DOWNSTREAM)
195          RS       1    FLOW      -1       0       0
196          RC    .055    .040    .055    1900   .0158       0       0       0
197          RX       0      20      70     345     455     730     780     800
198          RY      10       8       2       0       0       2       8      10
             *
```



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

199          KK     21G     SUB
200          KM   RUNOFF FROM SUB-BASIN 21G
201          BA   .0172       0       0
202          LS       0      80     6.4       0       0       0
203          UK     297   .0333     .20     100       0       0       0
204          RK    4000   .0300    .045       0    TRAP      10       3
             *

205          KK   CP21G
206          HC       2
             *

207          KK      22     SUB
208          KM       RUNOFF FROM SUB-BASIN 22
209          BA  1.3860
210          LS       0      84     5.1       0
211          UK     225   .0590     .20     100       0       0       0       0
```

```
 212          RK   13000   .0238    .045       0    TRAP      25       3
              *

 213          KK      23     SUB
 214          KM        RUNOFF FROM SUB-BASIN 23
 215          BA  0.3945       0       0
 216          LS       0      84     6.3       0
 217          UK     225   .0590     .20     100       0       0       0
 218          RK   10200   .0304    .045       0    TRAP      20       3
              *

 219          KK     24A      CP
 220          KM        COMBINE HYDROGRAPHS FOR SUB 22 AND SUB 23
 221          HC       2
              *

 222          KK    24.1      CP
 223          KM        ROUTE CP 24A TO CP 24.1
 224          RS       3    FLOW      -1       0       0
 225          RC    .055    .040    .055    6800   .0257       0       0       0
 226          RX       0       1     101     107     122     128     228     229
 227          RY      10       8       3       0       0       3       8      10
              *

 228          KK      24     SUB
 229          KM        RUNOFF FROM SUB-BASIN 24
 230          KM        DRAINAGE AREA CHANGED TO MATCH VALUE USED BY MICHAEL BAKER
 231          KM        Jr., INC.
 232          BA  0.4907       0       0
 233          LS       0      77     6.8       0
 234          UK     295   .0438     .20     100       0       0       0
 235          RK    6800   .0257    .045       0    TRAP      15       3
              *
```



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

 236          KK   24.2A      CP
 237          KM        COMBINE SUB 24 & CP 24.1 - APEX
 238          HC       2
              *

 239          KK     25N       SUB
 240          KM        RUNOFF FROM SUB-BASIN 25N - APEX
 241          BA  0.7834       0       0       0       0       0       0       0
 242          LS       0      84     9.0       0
 243          UK     295   .0438     .20     100       0       0       0
 244          RK   16700   .0302    .045       0    TRAP      25       3
              *

 245          KK     25S      SUB
 246          KM        RUNOFF FROM SUB-BASIN 25S - APEX
 247          BA  0.6256       0       0       0       0       0       0       0
 248          LS       0      86     9.0       0
 249          UK     295   .0438     .20     100       0       0       0
 250          RK    8900   .0278    .045       0    TRAP      25       3
              *

 251          KK    25.1      CP
 252          KM        COMBINE HYDROGRAPHS FOR SUB-BASINS 25N AND 25S
 253          HC       2
              *

 254          KK   24.2B      CP
 255          KM        COMBINE TOTAL HYDROGRAPH 24.2A WITH 25.1
 256          HC       2
```

```
                 *

257              KK  PIMARD      CP
258              KM   ROUTE THE TOTAL HYDROGRAPH AT THE CONCENTRATION POINT
259              KM   24.2B TO THE CULVERT AT THE PIMA ROAD. THERE IS NO
260              KM   CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
261              RS       1    FLOW      -1       0       0
262              RC    .055    .040    .055    2000   .0287       0       0       0
263              RX       0       1     101     107     122     128     228     229
264              RY      10       8       3       0       0       3       8      10
                 *

265              KK  RR24.2      CP
266              KM   ROUTE THE TOTAL HYDROGRAPH AT CONCENTRATION POINT
267              KM   24.2B FROM THE CULVERT UNDER PIMA ROAD TO CONCENTRATION
268              KM   POINT 21.05.
269              RS       1    FLOW      -1       0       0
270              RC    .055    .040    .055    3050   .0238       0       0       0
271              RX       0       1     101     107     122     128     228     229
272              RY      10       8       3       0       0       3       8      10
                 *
                 *
1                                          HEC-1 INPUT                                          PAGE  8

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

273              KK  C21.05 CONFLUENCE OF DGB CHANNELS NEAR MID-SECTION 36
274              KM         COMBINE HYDROGRAPH CP21G WITH HYDROGRAPH RR24.2
275              KM         (FROM THE PIMA ROAD CULVERT)
276              HC       2
                 *  ******************************************************************************

277              KK    DAM1
278              KM   UPPER, LARGER BASIN IN THE 2 BASIN SYSTEM
279              KO       3
280              RS       1    FLOW       0
281              SV       0     108     227     359     503     662     835    1023    1228
282              SE    2165    2170    2175    2180    2185    2190    2195    2200    2205
283              SS    2195     700     3.2     1.5
                 *  2 - 36" RCP Culverts for outlet
284              SL    2165    14.1      .6      .5
                 *  ******************************************************************************
                 *
                 *  ******************************************************************************

285              KK    DAM2
286              KM   LOWER, SMALLER BASIN IN THE 2 BASIN SYSTEM
287              KO       3
288              RS       1    FLOW       0
289              SV       0      31     114     204     299     401     509     623     744
290              SE    2138    2140    2145    2150    2155    2160    2165    2170    2175
291              SS    2165     200     3.2     1.5
                 *  2 - 36" RCP Culverts for outlet
292              SL    2138    14.1      .6      .5
                 *  ******************************************************************************
                 *

293              KK    R21G      CP
294              KM        ROUTE CP21G(21.05)TO 21H
295              RS       1    FLOW      -1       0       0
296              RC    .055    .040    .055    2500   .0194       0       0       0
297              RX       0      90     120     355     585     820     850     940
298              RY       9       4     1.5       0       0     1.5       4       9
                 *

299              KK     21H     SUB
```

```
 300          KM        RUNOFF FROM SUB-BASIN 21H
 301          BA   .0431       0       0
 302          LS       0      80     6.4       0       0       0
 303          UK     297   .0333     .20     100       0       0       0
 304          RK    4600   .0278    .045       0    TRAP      20       3
              *

 305          KK     26N
 306          KM       Runoff from sub-basin 26N
 307          BA   .6376       0       0
 308          LS       0      75    12.7       0
 309          UK     200   .0250     .20     100       0
 310          RK   12000   .0263    .045       0    TRAP      35      10
              *
1                                          HEC-1 INPUT                                                    PAGE  9

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

 311          KK   CP21H   JOMAX RD
 312          KO       3
 313          HC       3
              *

 314          KK   RR21H      CP
 315          KM        ROUTE HYDROGRAPH AT CONCENTRATION POINT 21H   DOWNSTREAM FROM
 316          KM        JOMAX ROAD           THERE IS NO ADDITIONAL CONTRIBUTING
 317          KM        DRAINAGE AREA AT THIS CONCENTRATION POINT.  USED CHANNEL
 318          KM        GEOMETRY                          FROM REACH SIX
 319          KM             DEVELOPED BY C. LOVELY
 320          RS       1    FLOW      -1       0       0
 321          RC    .055    .040    .055    2390   .0188       0       0       0
 322          RX       0      90     120     355     585     820     850     940
 323          RY       9       4     1.5       0       0     1.5       4       9
              *

 324          KK     26S     SUB
 325          KM       RUNOFF FROM SUB-BASIN 26S
 326          BA  0.1672       0       0
 327          LS       0      75    12.7       0
 328          UK     200   .0250     .20     100       0       0       0
 329          RK    4000   .0263    .045       0    TRAP      35      10
              *

 330          KK  *APEX*      CP
 331          KM        COMBINE FLOW FROM SUB-BASIN 26 ,
 332          KM            AND ROUTED HYDROGRAPH FROM JOMAX ROAD.
 333          HC       2
              *
 334          KM        *********END SUBAREA 21 REVISIONS************

 335          KK   CP27A      CP AT HAPPY VALLEY RD
 336          KM        ROUTE FLOW FROM CONCENTRATION POINT APEX  TO 27A (HAPPY VALLEY
 337          KM        ROAD).  THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION PT.
 338          KM
 339          RS       1    FLOW      -1       0       0
 340          RC    .055    .040    .055    1600   .0196       0       0       0
 341          RX       0       1     201     211     261     271     471     472
 342          RY      10       4       2       0       0       2       4      10
              *

 343          KK   CP27B      CP AT MILLER RD
 344          KM        ROUTE FLOW FROM CONCENTRATION POINT 27B TO 27C (MILLER ROAD).
 345          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
 346          RS       1    FLOW      -1       0       0
 347          RC    .055    .040    .055    3300   .0196       0       0       0
 348          RX       0       1     201     211     261     271     471     472
```

```
          349          RY      10       4       2       0       0       2       4      10
                       *
1                                                HEC-1 INPUT                                                    PAGE 10

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

          350          KK   CP27C      CP AT PINNACLE PEAK RD
          351          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (PINNACLE PK ROAD).
          352          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
          353          RS       1    FLOW      -1       0       0
          354          RC    .055    .040    .055    3300   .0196       0       0       0
          355          RX       0       1     201     211     261     271     471     472
          356          RY      10       4       2       0       0       2       4      10
                       *

          357          KK   CP27D      CP AT SCOTTSDALE RD
          358          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (SCOTTSDALE ROAD)
          359          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
          360          RS       1    FLOW      -1       0       0
          361          RC    .055    .040    .055    1000   .0196       0       0       0
          362          RX       0       1     201     211     261     271     471     472
          363          RY      10       4       2       0       0       2       4      10
                       *

          364          KK      27     SUB
          365          KM        RUNOFF FROM SUB-BASIN 27
          366          BA  1.1913       0       0
          367          LS       0      75    12.7       0
          368          UK     200   .0250     .20     100       0       0       0
          369          RK    1500   .0263    .045       0    TRAP      35      10
                       *

          370          KK    CP27      CP AT SCOTTSDALE RD
          371          KO       3
          372          KM        COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
          373          KM        POINT 27D WITH SUB 27 .  TOTAL FLOW AT
          374          KM        SCOTTSDALE ROAD FOR FAN 4.
          375          HC       2
                       *
          376          ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    49          16
                 .
                 .
    56           .          17
                 .           .
                 .           .
    62           .           .          18
                 .           .           .
                 .           .           .
    68         19A.......................
                 V
                 V
    71         19B
                 .
                 .
    77           .          15
                 .           .
                 .           .
    83         19C............
```

```
                V
                V
 86          19.1
                .
                .
 92             .          19
                .           .
                .           .
 99             .           .          20
                .           .           .
                .           .           .
105          CP20.......................
                V
                V
109        RRCP20
                .
                .
115             .         21A
                .           .
                .           .
121         CP21A............
                V
                V
123         RR21A
                .
                .
129             .         21B
                .           .
                .           .
135         CP21B............
                V
                V
137         RR21B
                .
                .
143             .         21C
                .           .
                .           .
149         CP21C............
                V
                V
151         RR21C
                .
                .
157             .         21D
                .           .
                .           .
163         CP21D............
                V
                V
165         RR21D
                .
                .
171             .         21E
                .           .
                .           .
177         CP21E............
                V
                V
179         RR21E
                .
                .
185             .         21F
                .           .
                .           .
191         CP21F............
                V
```

```
                V
193        RR21F
                .
                .
199             .          21G
                .           .
                .           .
205        CP21G............
                .
                .
207             .           22
                .           .
                .           .
213             .           .          23
                .           .           .
                .           .           .
219             .          24A...........
                .            V
                .            V
222             .         24.1
                .           .
                .           .
228             .           .          24
                .           .           .
                .           .           .
236             .       24.2A...........
                .           .
                .           .
239             .           .         25N
                .           .           .
                .           .           .
245             .           .           .         25S
                .           .           .           .
                .           .           .           .
251             .           .       25.1............
                .           .           .
                .           .           .
254             .       24.2B...........
                .            V
                .            V
257             .      PIMARD
                .            V
                .            V
265             .      RR24.2
                .           .
                .           .
273        C21.05............
                V
                V
277         DAM1
                V
                V
285         DAM2
                V
                V
293         R21G
                .
                .
299             .          21H
                .           .
                .           .
305             .           .         26N
                .           .           .
                .           .           .
311        CP21H........................
                V
                V
```

```
  314       RR21H
                .
                .
  324           .          26S
                .            .
                .            .
  330      *APEX*............
                V
                V
  335       CP27A
                V
                V
  343       CP27B
                V
                V
  350       CP27C
                V
                V
  357       CP27D
                .
                .
  364           .           27
                .            .
                .            .
  370        CP27............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN 09 1992              *
*           VERSION 4.0.3E             *
*                                      *
*  RUN DATE  01/21/99  TIME  16:36:42  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 551-1748              *
*                                      *
****************************************
```

FILE <RWDAM21F.DAT>
THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.

THE MODIFICIATION INCLUDE THE FOLLOWING:
1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
   TO CONCENTRATION POINT AT THE APEX OF 21F
2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE

NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
25S.

100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
RAINFALL FROM NOAA ATLAS

FILE RAW4A.DAT
WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
FOR 22, 23, 24, 25N, AND 25S. ROUTE COMBINED HYDROGRAPHS
22, 23, 24, 25N AND 25S TO 21G. SUN-BASIN 26 COMBINED AT
THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
PROPOSED ROAD CROSSINGS.

```
                                REVISED BY GREINER 12-9-93 BY RON FERGUSON
                                REVISED BY C. J. LOVELY, COS, 3-9-94
                                Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
                                   *Eliminate DSS Records
                                   *Divide #26 into 26N & 26S; 26N is portion north of Jomax
                                   *Add 26N @ CP21H and route with 21H to apex
                                   *Add 26S @ apex
                                   *Modify reach length in 26S & 26N to reflect division

                                ******************************************************************
                                * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
                                * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.      *
                                ******************************************************************

                            September 1998 - HDR Engineering Modified by adding 2 basins to the
                            September 1998 - center of Section 36 (Alternative No. 6, separated basins)
                            September 1998 - Filename <RAWALT6.DAT>

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

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

      IT          HYDROGRAPH TIME DATA
                         NMIN           5  MINUTES IN COMPUTATION INTERVAL
                        IDATE      3MAR94  STARTING DATE
                        ITIME        0000  STARTING TIME
                           NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                       NDDATE      4MAR94  ENDING DATE
                       NDTIME        1735  ENDING TIME
                        ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL    0.08 HOURS
                       TOTAL TIME BASE   41.58 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
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0

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

```
                **************
                *            *
277 KK          *     DAM1   *
                *            *
                **************

279 KO              OUTPUT CONTROL VARIABLES
                          IPRNT          3  PRINT CONTROL
                          IPLOT          0  PLOT CONTROL
                          QSCAL         0.  HYDROGRAPH PLOT SCALE

                  HYDROGRAPH ROUTING DATA

280 RS              STORAGE ROUTING
                          NSTPS          1  NUMBER OF SUBREACHES
                           ITYP       FLOW  TYPE OF INITIAL CONDITION
                          RSVRIC       0.00  INITIAL CONDITION
                               X       0.00 WORKING R AND D COEFFICIENT

281 SV                STORAGE        0.0     108.0     227.0     359.0     503.0     662.0     835.0    1023.0    1228.0

282 SE              ELEVATION     2165.00   2170.00   2175.00   2180.00   2185.00   2190.00   2195.00   2200.00   2205.00

284 SL              LOW-LEVEL OUTLET
                          ELEVL     2165.00  ELEVATION AT CENTER OF OUTLET
                          CAREA       14.10  CROSS-SECTIONAL AREA
                           COQL        0.60  COEFFICIENT
                           EXPL        0.50  EXPONENT OF HEAD

283 SS              SPILLWAY
                           CREL     2195.00  SPILLWAY CREST ELEVATION
                          SPWID      700.00  SPILLWAY WIDTH
                           COQW        3.20  WEIR COEFFICIENT
                           EXPW        1.50  EXPONENT OF HEAD
                                                          ***
                                          COMPUTED OUTFLOW-ELEVATION DATA

            OUTFLOW       0.00     99.13    109.13    121.38    136.72    156.51    182.99    220.26    276.59    371.63
          ELEVATION    2165.00   2167.13   2167.59   2168.20   2169.06   2170.32   2172.27   2175.54   2181.62   2195.00

            OUTFLOW     444.21    944.76   2297.53   4926.77   9256.68  15711.51  24715.46  36692.74  52067.56  71264.13
          ELEVATION    2195.10   2195.40   2195.90   2196.60   2197.50   2198.60   2199.90   2201.40   2203.10   2205.00

                                       COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

            STORAGE       0.00     46.11     55.88     69.12     87.71    108.00    115.64    162.12    227.00    241.21
            OUTFLOW       0.00     99.13    109.13    121.38    136.72    151.72    156.51    182.99    214.56    220.26
          ELEVATION    2165.00   2167.13   2167.59   2168.20   2169.06   2170.00   2170.32   2172.27   2175.00   2175.54

            STORAGE     359.00    405.59    503.00    662.00    835.00    838.80    850.11    868.93    895.26    929.11
            OUTFLOW     262.78    276.59    303.43    339.25    371.63    444.23    944.73   2297.19   4926.70   9256.76
          ELEVATION    2180.00   2181.62   2185.00   2190.00   2195.00   2195.10   2195.40   2195.90   2196.60   2197.50

            STORAGE     970.46   1019.33   1023.00   1080.48   1150.14   1228.00
            OUTFLOW   15711.42  24714.69  25445.36  36692.66  52067.81  71264.14
          ELEVATION    2198.60   2199.90   2200.00   2201.40   2203.10   2205.00

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

                        HYDROGRAPH AT STATION     DAM1

PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
```

```
                                        6-HR        24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                                  (CFS)
+    3578.      4.75                 1054.        501.        361.        361.
                            (INCHES)  0.756       1.437       1.795       1.795
                             (AC-FT)   523.        993.       1240.       1240.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                        6-HR        24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
      882.      4.75                  843.        638.        445.        445.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                        6-HR        24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
   2196.24      4.75                2195.19     2189.02     2182.21     2182.21

                            CUMULATIVE AREA =   12.96 SQ MI


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


            **************
            *            *
  285 KK    *      DAM2  *
            *            *
            **************

  287 KO          OUTPUT CONTROL VARIABLES
                        IPRNT          3  PRINT CONTROL
                        IPLOT          0  PLOT CONTROL
                        QSCAL         0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

  288 RS          STORAGE ROUTING
                        NSTPS          1  NUMBER OF SUBREACHES
                         ITYP       FLOW  TYPE OF INITIAL CONDITION
                       RSVRIC       0.00  INITIAL CONDITION
                            X       0.00 WORKING R AND D COEFFICIENT

  289 SV            STORAGE        0.0      31.0     114.0     204.0     299.0     401.0     509.0     623.0     744.0

  290 SE          ELEVATION     2138.00   2140.00   2145.00   2150.00   2155.00   2160.00   2165.00   2170.00   2175.00

  292 SL          LOW-LEVEL OUTLET
                        ELEVL     2138.00  ELEVATION AT CENTER OF OUTLET
                        CAREA       14.10  CROSS-SECTIONAL AREA
                         COQL        0.60  COEFFICIENT
                         EXPL        0.50  EXPONENT OF HEAD

  291 SS          SPILLWAY
                         CREL     2165.00  SPILLWAY CREST ELEVATION
                        SPWID      200.00  SPILLWAY WIDTH
                         COQW        3.20  WEIR COEFFICIENT
                         EXPW        1.50  EXPONENT OF HEAD
                                                          ***
                                          COMPUTED OUTFLOW-ELEVATION DATA

           OUTFLOW       0.00     98.97    108.75    120.67    135.52    154.55    179.80    214.90    267.03    352.55
         ELEVATION    2138.00   2140.13   2140.57   2141.16   2141.99   2143.19   2145.02   2148.03   2153.49   2165.00
```

```
          OUTFLOW    374.67    521.33    913.15   1670.76   2914.76   4765.75   7344.31  10771.04  15166.50  20651.29
        ELEVATION   2165.10   2165.41   2165.91   2166.61   2167.51   2168.61   2169.91   2171.41   2173.10   2175.00

                                          COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE      0.00     31.00     33.12     40.44     50.30     64.03     83.93    114.00    114.40    168.57
          OUTFLOW      0.00     95.95     98.97    108.75    120.67    135.52    154.55    179.51    179.80    214.90
        ELEVATION   2138.00   2140.00   2140.13   2140.57   2141.16   2141.99   2143.19   2145.00   2145.02   2148.03

          STORAGE    204.00    270.30    299.00    401.00    509.00    511.37    518.28    529.72    545.72    566.24
          OUTFLOW    235.04    267.03    279.75    318.24    352.55    374.70    521.37    913.04   1670.78   2914.73
        ELEVATION   2150.00   2153.49   2155.00   2160.00   2165.00   2165.10   2165.41   2165.91   2166.61   2167.51

          STORAGE    591.32    620.92    623.00    657.05    698.11    744.00
          OUTFLOW   4765.79   7344.10   7539.23  10771.27  15166.19  20651.29
        ELEVATION   2168.61   2169.91   2170.00   2171.41   2173.10   2175.00

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

                    HYDROGRAPH AT STATION     DAM2

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                              (CFS)
+     324.      17.83          324.        320.        276.        276.
                         (INCHES)        0.232       0.918       1.370       1.370
                          (AC-FT)         160.        634.        947.        947.

  PEAK STORAGE  TIME                       MAXIMUM AVERAGE STORAGE
                                    6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
     418.      17.83                418.        406.        336.        336.

  PEAK STAGE    TIME                        MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
   2160.81     17.83             2160.77     2160.24     2156.53     2156.53

                    CUMULATIVE AREA =   12.96 SQ MI


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


            **************
            *            *
  311 KK    *     CP21H  *        JOMAX RD
            *            *
            **************

  312 KO          OUTPUT CONTROL VARIABLES
                        IPRNT          3  PRINT CONTROL
                        IPLOT          0  PLOT CONTROL
                        QSCAL         0.  HYDROGRAPH PLOT SCALE

  313 HC          HYDROGRAPH COMBINATION
                        ICOMP          3  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0

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

```
                    HYDROGRAPH AT STATION    CP21H
  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                              (CFS)
+     724.      3.50            324.        322.        291.        291.
                         (INCHES)      0.221       0.878       1.375       1.375
                          (AC-FT)       160.        639.       1000.       1000.

                         CUMULATIVE AREA =   13.64 SQ MI

MANE2 NPLAN,NSTM       1      0


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


            **************
            *            *
  370 KK    *      CP27  *          CP AT SCOTTSDALE RD
            *            *
            **************

  371 KO          OUTPUT CONTROL VARIABLES
                        IPRNT           3  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE
                                 COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
                                 POINT 27D WITH SUB 27 .  TOTAL FLOW AT
                                 SCOTTSDALE ROAD FOR FAN 4.

  375 HC          HYDROGRAPH COMBINATION
                        ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM       1      0
      ***             ***            ***            ***            ***

                    HYDROGRAPH AT STATION     CP27
  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                              (CFS)
+    1993.      3.17            504.        368.        320.        320.
                         (INCHES)      0.312       0.912       1.374       1.374
                          (AC-FT)       250.        730.       1099.       1099.

                         CUMULATIVE AREA =   15.00 SQ MI

1
                                          RUNOFF SUMMARY
                                     FLOW IN CUBIC FEET PER SECOND
                                   TIME IN HOURS,  AREA IN SQUARE MILES

                                 PEAK   TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN     MAXIMUM     TIME OF
        OPERATION       STATION  FLOW    PEAK                                           AREA      STAGE     MAX STAGE
+                                                     6-HOUR     24-HOUR     72-HOUR

        HYDROGRAPH AT
+                          16    2595.   3.25          319.        81.         47.       1.46

        HYDROGRAPH AT
```

```
+                    17    2114.  3.25    259.    65.    38.   1.19
      HYDROGRAPH AT
+                    18    2357.  3.25    270.    68.    39.   1.26
      3 COMBINED AT
+                   19A    7066.  3.25    848.   214.   124.   3.91
      ROUTED TO
+                   19B    7034.  3.33    848.   214.   124.   3.91
+                                                              6.96     3.33
      HYDROGRAPH AT
+                    15    1848.  3.42    278.    70.    41.   1.37
      2 COMBINED AT
+                   19C    8679.  3.33   1125.   284.   164.   5.28
      ROUTED TO
+                  19.1    8266.  3.33   1125.   284.   164.   5.28
+                                                              6.02     3.33
      HYDROGRAPH AT
+                    19     431.  3.25     42.    11.     6.   0.19
      HYDROGRAPH AT
+                    20    1052.  3.25    123.    31.    18.   0.57
      3 COMBINED AT
+                  CP20    9603.  3.33   1290.   326.   188.   6.03
      ROUTED TO
+                 RRCP20   8867.  3.42   1289.   326.   188.   6.03
+                                                              4.02     3.42
      HYDROGRAPH AT
+                   21A     763.  3.25     80.    20.    12.   0.42
      2 COMBINED AT
+                 CP21A    9325.  3.42   1368.   346.   200.   6.45
      ROUTED TO
+                 RR21A    9163.  3.50   1368.   346.   200.   6.45
+                                                              3.42     3.50
      HYDROGRAPH AT
+                   21B     497.  3.25     53.    13.     8.   0.28
      2 COMBINED AT
+                 CP21B    9404.  3.50   1420.   359.   207.   6.73
      ROUTED TO
+                 RR21B    8768.  3.58   1419.   359.   207.   6.73
+                                                              3.69     3.58
      HYDROGRAPH AT
+                   21C    1207.  3.25    142.    36.    21.   0.75
      2 COMBINED AT
+                 CP21C    9344.  3.58   1560.   395.   228.   7.48
      ROUTED TO
+                 RR21C    7778.  3.75   1554.   395.   228.   7.48
+                                                              4.07     3.75
      HYDROGRAPH AT
+                   21D    1447.  3.33    201.    51.    29.   1.06
```

+	2 COMBINED AT	CP21D	8537.	3.67	1754.	446.	257.	8.54		
+	ROUTED TO	RR21D	8506.	3.75	1753.	446.	257.	8.54	4.13	3.75
+	HYDROGRAPH AT	21E	392.	3.33	49.	12.	7.	0.26		
+	2 COMBINED AT	CP21E	8645.	3.75	1801.	458.	265.	8.79		
+	ROUTED TO	RR21E	8393.	3.83	1799.	458.	265.	8.79	6.30	3.83
+	HYDROGRAPH AT	21F	644.	3.33	89.	22.	13.	0.47		
+	2 COMBINED AT	CP21F	8636.	3.75	1886.	481.	278.	9.26		
+	ROUTED TO	RR21F	8620.	3.83	1883.	481.	278.	9.26	2.68	3.83
+	HYDROGRAPH AT	21G	25.	3.33	3.	1.	0.	0.02		
+	2 COMBINED AT	CP21G	8629.	3.83	1887.	482.	278.	9.28		
+	HYDROGRAPH AT	22	2753.	3.25	304.	76.	44.	1.39		
+	HYDROGRAPH AT	23	756.	3.25	87.	22.	13.	0.39		
+	2 COMBINED AT	24A	3509.	3.25	391.	98.	57.	1.78		
+	ROUTED TO	24.1	2849.	3.42	391.	98.	57.	1.78	5.53	3.42
+	HYDROGRAPH AT	24	683.	3.25	84.	21.	12.	0.49		
+	2 COMBINED AT	24.2A	3382.	3.42	474.	120.	69.	2.27		
+	HYDROGRAPH AT	25N	1217.	3.42	175.	44.	26.	0.78		
+	HYDROGRAPH AT	25S	1382.	3.25	151.	38.	22.	0.63		
+	2 COMBINED AT	25.1	2363.	3.33	326.	82.	48.	1.41		
+	2 COMBINED AT	24.2B	5490.	3.42	800.	202.	117.	3.68		
+	ROUTED TO	PIMARD	5410.	3.42	800.	202.	117.	3.68		

```
+                                                                                                  6.79        3.42
          ROUTED TO
+                        RR24.2     5164.    3.50       799.       202.       117.      3.68
+                                                                                                  6.90        3.50
          2 COMBINED AT
+                        C21.05    11894.    3.75      2683.       683.       395.     12.96
          ROUTED TO
+                          DAM1     3578.    4.75      1054.       501.       361.     12.96
+                                                                                               2196.24        4.75
          ROUTED TO
+                          DAM2      324.   17.83       324.       320.       276.     12.96
+                                                                                               2160.81       17.83
          ROUTED TO
+                          R21G      324.   18.08       324.       320.       274.     12.96
+                                                                                                  0.39       18.17
          HYDROGRAPH AT
+                          21H       62.    3.33         8.         2.         1.      0.04
          HYDROGRAPH AT
+                          26N      674.    3.50       109.        28.        16.      0.64
          3 COMBINED AT
+                        CP21H      724.    3.50       324.       322.       291.     13.64
          ROUTED TO
+                        RR21H      604.    3.58       324.       321.       289.     13.64
+                                                                                                  0.57        3.58
          HYDROGRAPH AT
+                          26S      230.    3.25        29.         7.         4.      0.17
          2 COMBINED AT
+                        *APEX*     720.    3.58       339.       326.       293.     13.81
          ROUTED TO
+                        CP27A      703.    3.67       338.       326.       293.     13.81
+                                                                                                  1.73        3.67
          ROUTED TO
+                        CP27B      671.    3.75       336.       326.       292.     13.81
+                                                                                                  1.68        3.75
          ROUTED TO
+                        CP27C      637.    3.83       333.       325.       290.     13.81
+                                                                                                  1.64        3.83
          ROUTED TO
+                        CP27D      630.    3.83       333.       325.       290.     13.81
+                                                                                                  1.63        3.83
          HYDROGRAPH AT
+                           27     1984.    3.17       205.        52.        30.      1.19
          2 COMBINED AT
+                         CP27     1993.    3.17       504.       368.       320.     15.00
1
                                   SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                      (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                          INTERPOLATED TO
                                                                       COMPUTATION INTERVAL
   ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
```

```
                                          PEAK                                  PEAK
                              (MIN)    (CFS)    (MIN)    (IN)    (MIN)    (CFS)    (MIN)    (IN)
          16  MANE             3.31  2714.57   197.99    2.05     5.00  2595.35   195.00    2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1602E+03 OUTFLOW=0.1596E+03 BASIN STORAGE=0.1487E-01 PERCENT ERROR=   0.4

          17  MANE             3.72  2179.71   195.53    2.05     5.00  2113.93   195.00    2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1303E+03 OUTFLOW=0.1296E+03 BASIN STORAGE=0.1813E-01 PERCENT ERROR=   0.6

          18  MANE             3.06  2403.41   196.84    2.00     5.00  2357.00   195.00    2.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1353E+03 OUTFLOW=0.1346E+03 BASIN STORAGE=0.1762E-01 PERCENT ERROR=   0.5

          15  MANE             3.60  1852.02   207.71    1.91     5.00  1847.60   205.00    1.91

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1401E+03 OUTFLOW=0.1393E+03 BASIN STORAGE=0.1918E-01 PERCENT ERROR=   0.5

          19  MANE             1.73   440.63   193.75    2.09     5.00   430.55   195.00    2.09

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2089E+02 OUTFLOW=0.2083E+02 BASIN STORAGE=0.1376E-02 PERCENT ERROR=   0.3

          20  MANE             3.79  1104.65   196.23    2.02     5.00  1052.10   195.00    2.03

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6186E+02 OUTFLOW=0.6151E+02 BASIN STORAGE=0.5950E-02 PERCENT ERROR=   0.6

         21A  MANE             2.39   781.28   193.64    1.79     5.00   762.73   195.00    1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4022E+02 OUTFLOW=0.4006E+02 BASIN STORAGE=0.4421E-02 PERCENT ERROR=   0.4

         21B  MANE             2.59   504.98   194.27    1.79     5.00   497.48   195.00    1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2643E+02 OUTFLOW=0.2632E+02 BASIN STORAGE=0.2952E-02 PERCENT ERROR=   0.4

         21C  MANE             3.26  1262.50   196.65    1.79     5.00  1206.94   195.00    1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7164E+02 OUTFLOW=0.7124E+02 BASIN STORAGE=0.9548E-02 PERCENT ERROR=   0.5

         21D  MANE             3.13  1492.11   200.84    1.79     5.00  1447.37   200.00    1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1014E+03 OUTFLOW=0.1009E+03 BASIN STORAGE=0.1927E-01 PERCENT ERROR=   0.5

         21E  MANE             3.07   409.14   198.46    1.79     5.00   391.91   200.00    1.79
```

```
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2461E+02 OUTFLOW=0.2448E+02 BASIN STORAGE=0.4121E-02 PERCENT ERROR=   0.5

              21F  MANE        4.37    667.83    201.44      1.78      5.00    644.11    200.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4492E+02 OUTFLOW=0.4457E+02 BASIN STORAGE=0.8835E-02 PERCENT ERROR=   0.8

              21G  MANE        4.21     25.33    199.36      1.78      5.00     25.13    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1647E+01 OUTFLOW=0.1637E+01 BASIN STORAGE=0.2774E-03 PERCENT ERROR=   0.6

               22  MANE        3.74   2772.23    194.54      2.05      5.00   2752.96    195.00        2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1522E+03 OUTFLOW=0.1514E+03 BASIN STORAGE=0.1237E-01 PERCENT ERROR=   0.5

               23  MANE        4.00    758.21    194.26      2.07      5.00    755.94    195.00        2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4372E+02 OUTFLOW=0.4348E+02 BASIN STORAGE=0.3485E-02 PERCENT ERROR=   0.5

               24  MANE        2.81    712.57    195.93      1.60      5.00    683.20    195.00        1.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4211E+02 OUTFLOW=0.4189E+02 BASIN STORAGE=0.6065E-02 PERCENT ERROR=   0.5

              25N  MANE        4.31   1247.82    204.02      2.11      5.00   1216.63    205.00        2.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8859E+02 OUTFLOW=0.8801E+02 BASIN STORAGE=0.1552E-01 PERCENT ERROR=   0.6

              25S  MANE        2.95   1387.24    195.20      2.26      5.00   1382.42    195.00        2.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7570E+02 OUTFLOW=0.7535E+02 BASIN STORAGE=0.9688E-02 PERCENT ERROR=   0.5

              21H  MANE        4.20     62.60    199.65      1.78      5.00     62.34    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4128E+01 OUTFLOW=0.4098E+01 BASIN STORAGE=0.7793E-03 PERCENT ERROR=   0.7

              26N  MANE        4.38    677.78    209.77      1.61      5.00    673.89    210.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5502E+02 OUTFLOW=0.5473E+02 BASIN STORAGE=0.9032E-02 PERCENT ERROR=   0.5

              26S  MANE        3.18    239.32    195.89      1.61      5.00    229.95    195.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1443E+02 OUTFLOW=0.1437E+02 BASIN STORAGE=0.1797E-02 PERCENT ERROR=   0.4

               27  MANE        0.62   2007.62    190.77      1.61      5.00   1984.32    190.00        1.62

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1028E+03 OUTFLOW=0.1026E+03 BASIN STORAGE=0.1039E-01 PERCENT ERROR=   0.2
```

*** NORMAL END OF HEC-1 ***

```
1****************************************                    ****************************************
 *                                      *                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *    U.S. ARMY CORPS OF ENGINEERS      *
 *             JUN 09 1992              *                    *    HYDROLOGIC ENGINEERING CENTER     *
 *           VERSION 4.0.3E             *                    *          609 SECOND STREET           *
 *                                      *                    *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE  01/21/99  TIME  16:41:04  *                    *           (916) 551-1748             *
 *                                      *                    *                                      *
 ****************************************                    ****************************************


                                    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. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                          HEC-1 INPUT                                          PAGE  1

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

        1           ID        FILE <RWDAM21F.DAT>
        2           ID        THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
        3           ID        THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
        4           ID
        5           ID        THE MODIFICIATION INCLUDE THE FOLLOWING:
        6           ID        1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
        7           ID           TO CONCENTRATION POINT AT THE APEX OF 21F
        8           ID        2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE
        9           ID
       10           ID        NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
       11           ID        1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
       12           ID        MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
       13           ID        25S.
       14           ID
       15           ID        100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
       16           ID        RAINFALL FROM NOAA ATLAS
       17           ID
       18           ID        FILE RAW4A.DAT
       19           ID        WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
       20           ID        FOR 22, 23, 24, 25N, AND 25S.  ROUTE COMBINED HYDROGRAPHS
       21           ID        22, 23, 24, 25N AND 25S TO 21G.  SUN-BASIN 26 COMBINED AT
       22           ID        THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
       23           ID        ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
       24           ID        INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
       25           ID        PROPOSED ROAD CROSSINGS.
       26           ID
       27           ID        REVISED BY GREINER 12-9-93 BY RON FERGUSON
       28           ID        REVISED BY C. J. LOVELY, COS, 3-9-94
       29           ID        Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
       30           ID           *Eliminate DSS Records
```

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          31          ID          *Divide #26 into 26N & 26S; 26N is portion north of Jomax
          32          ID          *Add 26N @ CP21H and route with 21H to apex
          33          ID          *Add 26S @ apex
          34          ID          *Modify reach length in 26S & 26N to reflect division
          35          ID
          36          ID       ******************************************************************
          37          ID       * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
          38          ID       * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.       *
          39          ID       ******************************************************************
          40          ID
          41          ID    September 1998 - HDR Engineering Modified by adding 2 basins to the
          42          ID    September 1998 - center of Section 36 (Alternative No. 6A, separated basins)
          43          ID    September 1998 - Modified Alt. 6 by raising the weir by 2 feet, expanding
          44          ID    September 1998 - basin area.
          45          ID    September 1998 - Filename <RAWALT6A.DAT>
          46          ID
          47          ID
          48          ID   ***********************************************************************
                      *DIAGRAM
          49          IT       5 03MAR94       0     500
          50          IO       5       0       0       0
                      *
1                                                HEC-1 INPUT                                          PAGE  2

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

          51          KK      16     SUB
          52          KM        RUNOFF FROM SUB-BASIN 16
          53          BA  1.4570
          54          PH       0      13    0.77    1.51    2.65    3.00    3.23    3.66
          55          LS       0      83     9.8       0       0       0       0       0
          56          UK     217   .0581     .20     100
          57          RK   14800   .0216    .045       0    TRAP      25       3
                      *

          58          KK      17     SUB
          59          KM        RUNOFF FROM SUB-BASIN 17
          60          BA  1.1851       0       0
          61          LS       0      83     9.8
          62          UK     285   .0421     .20     100       0       0       0
          63          RK   12200   .0254    .045       0    TRAP      25       3
                      *

          64          KK      18     SUB
          65          KM        RUNOFF FROM SUB-BASIN 18
          66          BA  1.2641
          67          LS       0      83     6.5       0
          68          UK     285   .0421     .20     100       0       0       0
          69          RK   10840   .0259    .045       0    TRAP      25       3
                      *

          70          KK     19A      CP
          71          KM        COMBINE HYDROGRAPHS SUB16, SUB17 AND SUB18
          72          HC       3
                      *

          73          KK     19B      CP
          74          KM        ROUTE CP19A TO CP19B
          75          RS       1    FLOW      -1       0       0
          76          RC    .055    .040    .055    1100   .0155       0       0       0
          77          RX       0       1     126     132     167     173     298     299
          78          RY      10       8       3       0       0       3       8      10
                      *

          79          KK      15     SUB
          80          KM        RUNOFF FROM SUBBASIN 15
```

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          81          BA  1.3702       0       0
          82          LS       0      82     5.4       0
          83          UK     217   .0581     .20     100       0       0       0
          84          RK   21200   .0236    .045       0    TRAP      25       3
                      *

          85          KK     19C      CP
          86          KM        COMBINE HYDROGRAPHS SUB15 & CP19B
          87          HC       2
                      *
1                                          HEC-1 INPUT                                                    PAGE  3

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

          88          KK    19.1      CP
          89          KM        ROUTE CP 19C TO 19.1
          90          RS       1    FLOW      -1       0       0
          91          RC    .055    .040    .055    1800   .0200       0       0
          92          RX       0       1     151     166     216     231     381     382
          93          RY      10       9       3       0       0       3       9      10
                      *

          94          KK      19     SUB
          95          KM        RUNOFF FROM SUB-BASIN 19
          96          BA  0.1872
          97          LS       0      84     7.2       0
          98          UK     275   .0800     .20     100       0       0       0
          99          RK    3730   .0352    .045    .160    TRAP      15       3
         100          RK    1800   .0200    .045       0    TRAP      50      30
                      *

         101          KK      20     SUB
         102          KM        RUNOFF FROM SUB-BASIN 20
         103          BA  0.5698       0       0
         104          LS       0      84     3.6       0
         105          UK     300   .0750     .20     100       0       0       0
         106          RK    9640   .0197    .045       0    TRAP      15       3
                      *

         107          KK    CP20      CP
         108          KM        COMBINE SUB 19, SUB 20 AND CP 19.1
         109          HC       3
                      *
         110          KM    *******BEGIN SUBAREA 21 BREAKDOWN-3/94 REVISIONS*****

         111          KK  RRCP20      CP
         112          KM        ROUTE CP20 TO CP 21A, WHICH IS 4600'
         113          RS       1    FLOW      -1       0       0
         114          RC    .055    .040    .055    4600   .0217       0       0       0
         115          RX       0      30      60      85     195     220     250     280
         116          RY      10       4       1       0       0       1       4      10
                      *

         117          KK     21A     SUB
         118          KM        RUNOFF FROM SUB-BASIN 21A
         119          BA     .42       0       0
         120          LS       0      80     6.4       0       0       0
         121          UK     297   .0558     .20     100       0       0       0
         122          RK    6400   .0344    .045       0    TRAP      10       3
                      *

         123          KK   CP21A
         124          HC       2
                      *
1                                          HEC-1 INPUT                                                    PAGE  4
```

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

 125          KK   RR21A      CP
 126          KM        ROUTE CP21A TO 21B    WHICH IS 960'
 127          RS       1    FLOW      -1       0       0
 128          RC    .055    .040    .055     960   .0156       0       0       0
 129          RX       0      10      60     205     295     440     490     500
 130          RY       6       4       2       0       0       2       4       6
              *

 131          KK     21B     SUB
 132          KM        RUNOFF FROM SUB-BASIN 21B
 133          BA   0.276       0       0
 134          LS       0      80     6.4       0       0       0
 135          UK     297   .0558     .20     100       0       0       0
 136          RK    6300   .0381    .045       0    TRAP      10       3
              *

 137          KK   CP21B
 138          HC       2
              *

 139          KK   RR21B      CP
 140          KM        ROUTE CP21B TO 21C    WHICH IS 4400'
 141          RS       1    FLOW      -1       0       0
 142          RC    .055    .040    .055    4400   .0205       0       0       0
 143          RX       0      10      60     205     295     440     490     500
 144          RY       6       4       2       0       0       2       4       6
              *

 145          KK     21C     SUB
 146          KM        RUNOFF FROM SUB-BASIN 21C
 147          BA    .748       0       0
 148          LS       0      80     6.4       0       0       0
 149          UK     297   .0558     .20     100       0       0       0
 150          RK    9900   .0328    .045       0    TRAP      20       3
              *

 151          KK   CP21C
 152          HC       2
              *

 153          KK   RR21C      CP
 154          KM        ROUTE CP21C TO 21D    WHICH IS 5700'
 155          RS       1    FLOW      -1       0       0
 156          RC    .055    .040    .055    5700   .0181       0       0       0
 157          RX       0      20     175     210     300     335     490     510
 158          RY     5.5     3.5     2.5       0       0     2.5     3.5     5.5
              *

 159          KK     21D     SUB
 160          KM        RUNOFF FROM SUB-BASIN 21D
 161          BA   1.059       0       0
 162          LS       0      80     6.4       0       0       0
 163          UK     297   .0558     .20     100       0       0       0
 164          RK   14500   .0252    .045       0    TRAP      30       3
              *
```



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

 165          KK   CP21D
 166          HC       2
              *
```

```
 167          KK   RR21D      CP
 168          KM        ROUTE CP21D TO 21E    WHICH IS 1100'
 169          RS       1    FLOW      -1       0       0
 170          RC    .055    .040    .055    1100   .0200       0       0       0
 171          RX       0      20     175     210     300     335     490     510
 172          RY     5.5     3.5     2.5       0       0     2.5     3.5     5.5
              *

 173          KK     21E     SUB
 174          KM        RUNOFF FROM SUB-BASIN 21E
 175          BA   0.257       0       0
 176          LS       0      80     6.4       0       0       0
 177          UK     297   .0333     .20     100       0       0       0
 178          RK    6600   .0288    .045       0    TRAP      15       3
              *

 179          KK   CP21E
 180          HC       2
              *

 181          KK   RR21E      CP
 182          KM        ROUTE CP21E TO 21F    WHICH IS 2800'
 183          RS       1    FLOW      -1       0       0
 184          RC    .055    .040    .055    2800   .0143       0       0       0
 185          RX       0      70     170     180     230     240     340     410
 186          RY    10.5     4.5     3.5       0       0     3.5     4.5    10.5
              *

 187          KK     21F     SUB
 188          KM        RUNOFF FROM SUB-BASIN 21F
 189          BA   0.469       0       0
 190          LS       0      80     6.4       0       0       0
 191          UK     297   .0333     .20     100       0       0       0
 192          RK   10400   .0279    .045       0    TRAP      20       3
              *

 193          KK   CP21F
 194          HC       2
              *

 195          KK   RR21F      CP
 196          KM   ROUTE CP21F TO 21G (1900' DOWNSTREAM)
 197          RS       1    FLOW      -1       0       0
 198          RC    .055    .040    .055    1900   .0158       0       0       0
 199          RX       0      20      70     345     455     730     780     800
 200          RY      10       8       2       0       0       2       8      10
              *
```



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

 201          KK     21G     SUB
 202          KM   RUNOFF FROM SUB-BASIN 21G
 203          BA   .0172       0       0
 204          LS       0      80     6.4       0       0       0
 205          UK     297   .0333     .20     100       0       0       0
 206          RK    4000   .0300    .045       0    TRAP      10       3
              *

 207          KK   CP21G
 208          HC       2
              *

 209          KK      22     SUB
 210          KM       RUNOFF FROM SUB-BASIN 22
 211          BA  1.3860
```

```
 212          LS       0      84     5.1       0
 213          UK     225   .0590     .20     100       0       0       0       0
 214          RK   13000   .0238    .045       0    TRAP      25       3
              *

 215          KK      23     SUB
 216          KM         RUNOFF FROM SUB-BASIN 23
 217          BA  0.3945       0       0
 218          LS       0      84     6.3       0
 219          UK     225   .0590     .20     100       0       0       0
 220          RK   10200   .0304    .045       0    TRAP      20       3
              *

 221          KK     24A      CP
 222          KM         COMBINE HYDROGRAPHS FOR SUB 22 AND SUB 23
 223          HC       2
              *

 224          KK    24.1      CP
 225          KM         ROUTE CP 24A TO CP 24.1
 226          RS       3    FLOW      -1       0       0
 227          RC    .055    .040    .055    6800   .0257       0       0       0
 228          RX       0       1     101     107     122     128     228     229
 229          RY      10       8       3       0       0       3       8      10
              *

 230          KK      24     SUB
 231          KM         RUNOFF FROM SUB-BASIN 24
 232          KM         DRAINAGE AREA CHANGED TO MATCH VALUE USED BY MICHAEL BAKER
 233          KM         Jr., INC.
 234          BA  0.4907       0       0
 235          LS       0      77     6.8       0
 236          UK     295   .0438     .20     100       0       0       0
 237          RK    6800   .0257    .045       0    TRAP      15       3
              *
1                                          HEC-1 INPUT                                          PAGE  7

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

 238          KK   24.2A      CP
 239          KM         COMBINE SUB 24 & CP 24.1 - APEX
 240          HC       2
              *

 241          KK     25N       SUB
 242          KM         RUNOFF FROM SUB-BASIN 25N - APEX
 243          BA  0.7834       0       0       0       0       0       0       0
 244          LS       0      84     9.0       0
 245          UK     295   .0438     .20     100       0       0       0
 246          RK   16700   .0302    .045       0    TRAP      25       3
              *

 247          KK     25S     SUB
 248          KM         RUNOFF FROM SUB-BASIN 25S - APEX
 249          BA  0.6256       0       0       0       0       0       0       0
 250          LS       0      86     9.0       0
 251          UK     295   .0438     .20     100       0       0       0
 252          RK    8900   .0278    .045       0    TRAP      25       3
              *

 253          KK    25.1      CP
 254          KM         COMBINE HYDROGRAPHS FOR SUB-BASINS 25N AND 25S
 255          HC       2
              *

 256          KK   24.2B      CP
```

```
 257          KM        COMBINE TOTAL HYDROGRAPH 24.2A WITH 25.1
 258          HC       2
              *

 259          KK  PIMARD      CP
 260          KM   ROUTE THE TOTAL HYDROGRAPH AT THE CONCENTRATION POINT
 261          KM   24.2B TO THE CULVERT AT THE PIMA ROAD. THERE IS NO
 262          KM   CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
 263          RS       1    FLOW      -1       0       0
 264          RC    .055    .040    .055    2000   .0287       0       0       0
 265          RX       0       1     101     107     122     128     228     229
 266          RY      10       8       3       0       0       3       8      10
              *

 267          KK  RR24.2      CP
 268          KM   ROUTE THE TOTAL HYDROGRAPH AT CONCENTRATION POINT
 269          KM   24.2B FROM THE CULVERT UNDER PIMA ROAD TO CONCENTRATION
 270          KM   POINT 21.05.
 271          RS       1    FLOW      -1       0       0
 272          RC    .055    .040    .055    3050   .0238       0       0       0
 273          RX       0       1     101     107     122     128     228     229
 274          RY      10       8       3       0       0       3       8      10
              *
              *
1                                        HEC-1 INPUT                                          PAGE  8

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

 275          KK  C21.05 CONFLUENCE OF DGB CHANNELS NEAR MID-SECTION 36
 276          KM         COMBINE HYDROGRAPH CP21G WITH HYDROGRAPH RR24.2
 277          KM         (FROM THE PIMA ROAD CULVERT)
 278          HC       2
              *  ******************************************************************************

 279          KK    DAM1
 280          KM   UPPER, LARGER BASIN IN THE 2 BASIN SYSTEM
 281          KO       3
 282          RS       1    FLOW       0
 283          SV       0      33     215     413     628     860    1111    1381
 284          SE    2176    2177    2182    2187    2192    2197    2202    2207
 285          SS    2197     700     3.2     1.5
              *  2 - 36" RCP Culverts for outlet
 286          SL    2176    14.1      .6      .5
              *  ******************************************************************************
              *
              *  ******************************************************************************

 287          KK    DAM2
 288          KM   LOWER, SMALLER BASIN IN THE 2 BASIN SYSTEM
 289          KO       3
 290          RS       1    FLOW       0
 291          SV       0      90     185     287     395     509     630
 292          SE    2147    2152    2157    2162    2167    2172    2177
 293          SS    2167     200     3.2     1.5
              *  2 - 36" RCP Culverts for outlet
 294          SL    2147    14.1      .6      .5
              *  ******************************************************************************
              *

 295          KK    R21G     CP
 296          KM     ROUTE CP21G(21.05)TO 21H
 297          RS       1    FLOW      -1       0       0
 298          RC    .055    .040    .055    2500   .0194       0       0       0
 299          RX       0      90     120     355     585     820     850     940
 300          RY       9       4     1.5       0       0     1.5       4       9
              *
```

```
 301          KK     21H     SUB
 302          KM        RUNOFF FROM SUB-BASIN 21H
 303          BA   .0431       0       0
 304          LS       0      80     6.4       0       0       0
 305          UK     297   .0333     .20     100       0       0       0
 306          RK    4600   .0278    .045       0    TRAP      20       3
              *

 307          KK     26N
 308          KM       Runoff from sub-basin 26N
 309          BA   .6376       0       0
 310          LS       0      75    12.7       0
 311          UK     200   .0250     .20     100       0
 312          RK   12000   .0263    .045       0    TRAP      35      10
              *
1                                          HEC-1 INPUT                                                PAGE  9

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

 313          KK   CP21H   JOMAX RD
 314          KO       3
 315          HC       3
              *

 316          KK   RR21H      CP
 317          KM        ROUTE HYDROGRAPH AT CONCENTRATION POINT 21H   DOWNSTREAM FROM
 318          KM        JOMAX ROAD          THERE IS NO ADDITIONAL CONTRIBUTING
 319          KM        DRAINAGE AREA AT THIS CONCENTRATION POINT.  USED CHANNEL
 320          KM        GEOMETRY                          FROM REACH SIX
 321          KM             DEVELOPED BY C. LOVELY
 322          RS       1    FLOW      -1       0       0
 323          RC    .055    .040    .055    2390   .0188       0       0       0
 324          RX       0      90     120     355     585     820     850     940
 325          RY       9       4     1.5       0       0     1.5       4       9
              *

 326          KK     26S     SUB
 327          KM       RUNOFF FROM SUB-BASIN 26S
 328          BA  0.1672       0       0
 329          LS       0      75    12.7       0
 330          UK     200   .0250     .20     100       0       0       0
 331          RK    4000   .0263    .045       0    TRAP      35      10
              *

 332          KK  *APEX*      CP
 333          KM        COMBINE FLOW FROM SUB-BASIN 26 ,
 334          KM            AND ROUTED HYDROGRAPH FROM JOMAX ROAD.
 335          HC       2
              *
 336          KM        *********END SUBAREA 21 REVISIONS************

 337          KK   CP27A      CP AT HAPPY VALLEY RD
 338          KM        ROUTE FLOW FROM CONCENTRATION POINT APEX  TO 27A (HAPPY VALLEY
 339          KM        ROAD).  THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION PT.
 340          KM
 341          RS       1    FLOW      -1       0       0
 342          RC    .055    .040    .055    1600   .0196       0       0       0
 343          RX       0       1     201     211     261     271     471     472
 344          RY      10       4       2       0       0       2       4      10
              *

 345          KK   CP27B      CP AT MILLER RD
 346          KM        ROUTE FLOW FROM CONCENTRATION POINT 27B TO 27C (MILLER ROAD).
 347          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
 348          RS       1    FLOW      -1       0       0
```

```
          349          RC    .055    .040    .055    3300   .0196       0       0       0
          350          RX       0       1     201     211     261     271     471     472
          351          RY      10       4       2       0       0       2       4      10
                       *
1                                                HEC-1 INPUT                                                PAGE 10

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

          352          KK   CP27C      CP AT PINNACLE PEAK RD
          353          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (PINNACLE PK ROAD).
          354          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
          355          RS       1    FLOW      -1       0       0
          356          RC    .055    .040    .055    3300   .0196       0       0       0
          357          RX       0       1     201     211     261     271     471     472
          358          RY      10       4       2       0       0       2       4      10
                       *

          359          KK   CP27D      CP AT SCOTTSDALE RD
          360          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (SCOTTSDALE ROAD)
          361          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
          362          RS       1    FLOW      -1       0       0
          363          RC    .055    .040    .055    1000   .0196       0       0       0
          364          RX       0       1     201     211     261     271     471     472
          365          RY      10       4       2       0       0       2       4      10
                       *

          366          KK      27     SUB
          367          KM        RUNOFF FROM SUB-BASIN 27
          368          BA  1.1913       0       0
          369          LS       0      75    12.7       0
          370          UK     200   .0250     .20     100       0       0       0
          371          RK    1500   .0263    .045       0    TRAP      35      10
                       *

          372          KK    CP27      CP AT SCOTTSDALE RD
          373          KO       3
          374          KM        COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
          375          KM        POINT 27D WITH SUB 27 .  TOTAL FLOW AT
          376          KM        SCOTTSDALE ROAD FOR FAN 4.
          377          HC       2
                       *
          378          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    51          16
                 .
                 .
    58           .          17
                 .           .
                 .           .
    64           .           .          18
                 .           .           .
                 .           .           .
    70          19A.......................
                 V
                 V
    73          19B
                 .
                 .
    79           .          15
                 .           .
```

```
 85          .           .
           19C............
             V
             V
 88        19.1
             .
             .
 94          .          19
             .           .
             .           .
101          .           .          20
             .           .           .
             .           .           .
107       CP20........................
             V
             V
111      RRCP20
             .
             .
117          .         21A
             .           .
             .           .
123      CP21A............
             V
             V
125      RR21A
             .
             .
131          .         21B
             .           .
             .           .
137      CP21B............
             V
             V
139      RR21B
             .
             .
145          .         21C
             .           .
             .           .
151      CP21C............
             V
             V
153      RR21C
             .
             .
159          .         21D
             .           .
             .           .
165      CP21D............
             V
             V
167      RR21D
             .
             .
173          .         21E
             .           .
             .           .
179      CP21E............
             V
             V
181      RR21E
             .
             .
187          .         21F
             .           .
             .           .
```

```
193      CP21F............
             V
             V
195      RR21F
             .
             .
201          .        21G
             .          .
             .          .
207      CP21G............
             .
             .
209          .         22
             .          .
             .          .
215          .          .         23
             .          .          .
             .          .          .
221          .        24A............
             .          V
             .          V
224          .       24.1
             .          .
             .          .
230          .          .         24
             .          .          .
             .          .          .
238          .     24.2A............
             .          .
             .          .
241          .          .        25N
             .          .          .
             .          .          .
247          .          .          .        25S
             .          .          .          .
             .          .          .          .
253          .          .      25.1............
             .          .          .
             .          .          .
256          .     24.2B............
             .          V
             .          V
259          .    PIMARD
             .          V
             .          V
267          .    RR24.2
             .          .
             .          .
275      C21.05...........
             V
             V
279        DAM1
             V
             V
287        DAM2
             V
             V
295        R21G
             .
             .
301          .        21H
             .          .
             .          .
307          .          .        26N
             .          .          .
             .          .          .
313      CP21H........................
```

```
                V
                V
  316        RR21H
                .
                .
  326           .          26S
                .            .
                .            .
  332       *APEX*............
                V
                V
  337        CP27A
                V
                V
  345        CP27B
                V
                V
  352        CP27C
                V
                V
  359        CP27D
                .
                .
  366           .           27
                .            .
                .            .
  372         CP27............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN 09 1992              *
*           VERSION 4.0.3E             *
*                                      *
*  RUN DATE  01/21/99  TIME  16:41:04  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 551-1748              *
*                                      *
****************************************
```

FILE <RWDAM21F.DAT>
THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.

THE MODIFICIATION INCLUDE THE FOLLOWING:
1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
   TO CONCENTRATION POINT AT THE APEX OF 21F
2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE

NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
25S.

100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
RAINFALL FROM NOAA ATLAS

FILE RAW4A.DAT
WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
FOR 22, 23, 24, 25N, AND 25S. ROUTE COMBINED HYDROGRAPHS
22, 23, 24, 25N AND 25S TO 21G. SUN-BASIN 26 COMBINED AT
THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE

```
                                PROPOSED ROAD CROSSINGS.

                                REVISED BY GREINER 12-9-93 BY RON FERGUSON
                                REVISED BY C. J. LOVELY, COS, 3-9-94
                                Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
                                   *Eliminate DSS Records
                                   *Divide #26 into 26N & 26S; 26N is portion north of Jomax
                                   *Add 26N @ CP21H and route with 21H to apex
                                   *Add 26S @ apex
                                   *Modify reach length in 26S & 26N to reflect division

                                ******************************************************************
                                * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
                                * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.      *
                                ******************************************************************

                             September 1998 - HDR Engineering Modified by adding 2 basins to the
                             September 1998 - center of Section 36 (Alternative No. 6A, separated basins)
                             September 1998 - Modified Alt. 6 by raising the weir by 2 feet, expanding
                             September 1998 - basin area.
                             September 1998 - Filename <RAWALT6A.DAT>


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

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

     IT          HYDROGRAPH TIME DATA
                        NMIN           5  MINUTES IN COMPUTATION INTERVAL
                       IDATE      3MAR94  STARTING DATE
                       ITIME        0000  STARTING TIME
                          NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      4MAR94  ENDING DATE
                      NDTIME        1735  ENDING TIME
                       ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL    0.08 HOURS
                       TOTAL TIME BASE   41.58 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
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
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*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

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            *            *
279 KK      *     DAM1   *
            *            *
            **************

281 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          3  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

282 RS          STORAGE ROUTING
                      NSTPS          1  NUMBER OF SUBREACHES
                       ITYP       FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC       0.00  INITIAL CONDITION
                          X       0.00 WORKING R AND D COEFFICIENT

283 SV            STORAGE        0.0      33.0     215.0     413.0     628.0     860.0    1111.0    1381.0

284 SE          ELEVATION     2176.00   2177.00   2182.00   2187.00   2192.00   2197.00   2202.00   2207.00

286 SL          LOW-LEVEL OUTLET
                      ELEVL     2176.00  ELEVATION AT CENTER OF OUTLET
                      CAREA       14.10  CROSS-SECTIONAL AREA
                       COQL        0.60  COEFFICIENT
                       EXPL        0.50  EXPONENT OF HEAD

285 SS          SPILLWAY
                       CREL     2197.00  SPILLWAY CREST ELEVATION
                      SPWID      700.00  SPILLWAY WIDTH
                       COQW        3.20  WEIR COEFFICIENT
                       EXPW        1.50  EXPONENT OF HEAD
                                                        ***
                                          COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW       0.00     98.56    107.76    118.85    132.49    149.67    171.97    202.07    244.95    310.92
        ELEVATION    2176.00   2178.11   2178.52   2179.07   2179.81   2180.87   2182.42   2184.87   2189.03   2197.00

          OUTFLOW     383.85    885.32   2239.43   4870.25   9201.84  15658.24  24663.51  36641.66  52016.75  71212.80
        ELEVATION    2197.10   2197.40   2197.90   2198.60   2199.50   2200.60   2201.90   2203.40   2205.10   2207.00

                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00     33.00     73.41     88.42    108.29    135.40    173.73    215.00    231.79    328.65
          OUTFLOW       0.00     67.85     98.56    107.76    118.85    132.49    149.67    166.20    171.97    202.07
        ELEVATION    2176.00   2177.00   2178.11   2178.52   2179.07   2179.81   2180.87   2182.00   2182.42   2184.87

          STORAGE     413.00    500.44    628.00    860.00    865.09    880.20    905.32    940.48    985.67   1040.88
          OUTFLOW     225.03    244.95    271.40    310.92    383.91    885.56   2239.12   4869.93   9201.48  15657.77
        ELEVATION    2187.00   2189.03   2192.00   2197.00   2197.10   2197.40   2197.90   2198.60   2199.50   2200.60

          STORAGE    1106.12   1111.00   1186.73   1278.47   1381.00
          OUTFLOW   24662.79  25389.93  36642.63  52017.35  71212.79
        ELEVATION    2201.90   2202.00   2203.40   2205.10   2207.00

    ***           ***           ***           ***           ***
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                    HYDROGRAPH AT STATION     DAM1

 PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     41.58-HR
+   (CFS)      (HR)
                          (CFS)
+    3037.     4.83        987.        451.        329.        329.
                       (INCHES)      0.708       1.293       1.637       1.637
                        (AC-FT)       489.        894.       1131.       1131.

 PEAK STORAGE  TIME                      MAXIMUM AVERAGE STORAGE
                                    6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)     (HR)
     916.      4.83                875.        699.        516.        516.

 PEAK STAGE    TIME                        MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR     41.58-HR
+   (FEET)     (HR)
   2198.12     4.83             2197.29     2193.47     2189.13     2189.13

                     CUMULATIVE AREA =   12.96 SQ MI


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


            **************
            *            *
 287 KK     *     DAM2   *
            *            *
            **************

 289 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           3  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

 290 RS          STORAGE ROUTING
                       NSTPS           1  NUMBER OF SUBREACHES
                        ITYP        FLOW  TYPE OF INITIAL CONDITION
                      RSVRIC        0.00  INITIAL CONDITION
                           X        0.00 WORKING R AND D COEFFICIENT

 291 SV            STORAGE         0.0      90.0     185.0     287.0     395.0     509.0     630.0

 292 SE          ELEVATION     2147.00   2152.00   2157.00   2162.00   2167.00   2172.00   2177.00

 294 SL          LOW-LEVEL OUTLET
                       ELEVL     2147.00  ELEVATION AT CENTER OF OUTLET
                       CAREA       14.10  CROSS-SECTIONAL AREA
                        COQL        0.60  COEFFICIENT
                        EXPL        0.50  EXPONENT OF HEAD

 293 SS          SPILLWAY
                        CREL     2167.00  SPILLWAY CREST ELEVATION
                       SPWID      200.00  SPILLWAY WIDTH
                        COQW        3.20  WEIR COEFFICIENT
                        EXPW        1.50  EXPONENT OF HEAD
                                                                  ***
                                          COMPUTED OUTFLOW-ELEVATION DATA
```

```
      OUTFLOW      0.00     98.47    107.55    118.48    131.88    148.69    170.42    199.58    240.78    303.43
    ELEVATION   2147.00   2149.11   2149.51   2150.05   2150.78   2151.80   2153.31   2155.65   2159.59   2167.00

      OUTFLOW    325.86    473.32    866.32   1625.31   2870.76   4723.11   7302.80  10730.25  15125.91  20610.20
    ELEVATION   2167.10   2167.41   2167.91   2168.61   2169.51   2170.61   2171.91   2173.41   2175.10   2177.00


                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

      STORAGE      0.00     37.92     45.23     54.89     68.00     86.44     90.00    114.86    159.40    185.00
      OUTFLOW      0.00     98.47    107.55    118.48    131.88    148.69    151.72    170.42    199.58    214.56
    ELEVATION   2147.00   2149.11   2149.51   2150.05   2150.78   2151.80   2152.00   2153.31   2155.65   2157.00

      STORAGE    237.92    287.00    395.00    397.38    404.30    415.76    431.75    452.28    477.35    506.96
      OUTFLOW    240.79    262.78    303.43    325.84    473.27    866.43   1625.36   2870.67   4723.21   7302.58
    ELEVATION   2159.59   2162.00   2167.00   2167.10   2167.41   2167.91   2168.61   2169.51   2170.61   2171.91

      STORAGE    509.00    543.07    584.13    630.00
      OUTFLOW   7494.66  10730.16  15125.89  20610.20
    ELEVATION   2172.00   2173.41   2175.10   2177.00

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

                    HYDROGRAPH AT STATION     DAM2

 PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     41.58-HR
+   (CFS)      (HR)
                          (CFS)
+     298.     12.67                298.        293.        251.        251.
                        (INCHES)   0.214       0.840       1.249       1.249
                         (AC-FT)    148.        581.        863.        863.

 PEAK STORAGE  TIME                       MAXIMUM AVERAGE STORAGE
                                   6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)     (HR)
     380.      12.75                380.        366.        302.        302.

 PEAK STAGE    TIME                        MAXIMUM AVERAGE STAGE
                                   6-HR       24-HR       72-HR     41.58-HR
+   (FEET)     (HR)
   2166.31     12.67             2166.28     2165.68     2162.47     2162.47

                        CUMULATIVE AREA =   12.96 SQ MI


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


          **************
          *            *
 313 KK   *     CP21H  *        JOMAX RD
          *            *
          **************

 314 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          3  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

 315 HC          HYDROGRAPH COMBINATION
                      ICOMP          3  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
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MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0

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

                     HYDROGRAPH AT STATION    CP21H

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    723.       3.50                302.        297.        267.        267.
                         (INCHES)   0.206       0.810       1.260       1.260
                          (AC-FT)   150.        589.        917.        917.

                        CUMULATIVE AREA =   13.64 SQ MI

MANE2 NPLAN,NSTM       1      0


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


            **************
            *            *
  372 KK    *     CP27   *          CP AT SCOTTSDALE RD
            *            *
            **************

  373 KO          OUTPUT CONTROL VARIABLES
                        IPRNT          3  PRINT CONTROL
                        IPLOT          0  PLOT CONTROL
                        QSCAL         0.  HYDROGRAPH PLOT SCALE
                                 COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
                                 POINT 27D WITH SUB 27 .  TOTAL FLOW AT
                                 SCOTTSDALE ROAD FOR FAN 4.

  377 HC          HYDROGRAPH COMBINATION
                        ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
MANE2 NPLAN,NSTM       1      0

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

                     HYDROGRAPH AT STATION     CP27

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    1993.      3.17                486.        343.        296.        296.
                         (INCHES)   0.301       0.852       1.272       1.272
                          (AC-FT)   241.        681.        1017.       1017.

                        CUMULATIVE AREA =   15.00 SQ MI

1
                                                RUNOFF SUMMARY
                                        FLOW IN CUBIC FEET PER SECOND
                                      TIME IN HOURS,  AREA IN SQUARE MILES

                                  PEAK   TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN     MAXIMUM     TIME OF
        OPERATION       STATION   FLOW    PEAK                                           AREA      STAGE     MAX STAGE
+                                                     6-HOUR     24-HOUR     72-HOUR
```

+	HYDROGRAPH AT	16	2595.	3.25	319.	81.	47.	1.46	
+	HYDROGRAPH AT	17	2114.	3.25	259.	65.	38.	1.19	
+	HYDROGRAPH AT	18	2357.	3.25	270.	68.	39.	1.26	
+	3 COMBINED AT	19A	7066.	3.25	848.	214.	124.	3.91	
+	ROUTED TO	19B	7034.	3.33	848.	214.	124.	3.91	
+									6.96 3.33
+	HYDROGRAPH AT	15	1848.	3.42	278.	70.	41.	1.37	
+	2 COMBINED AT	19C	8679.	3.33	1125.	284.	164.	5.28	
+	ROUTED TO	19.1	8266.	3.33	1125.	284.	164.	5.28	
+									6.02 3.33
+	HYDROGRAPH AT	19	431.	3.25	42.	11.	6.	0.19	
+	HYDROGRAPH AT	20	1052.	3.25	123.	31.	18.	0.57	
+	3 COMBINED AT	CP20	9603.	3.33	1290.	326.	188.	6.03	
+	ROUTED TO	RRCP20	8867.	3.42	1289.	326.	188.	6.03	
+									4.02 3.42
+	HYDROGRAPH AT	21A	763.	3.25	80.	20.	12.	0.42	
+	2 COMBINED AT	CP21A	9325.	3.42	1368.	346.	200.	6.45	
+	ROUTED TO	RR21A	9163.	3.50	1368.	346.	200.	6.45	
+									3.42 3.50
+	HYDROGRAPH AT	21B	497.	3.25	53.	13.	8.	0.28	
+	2 COMBINED AT	CP21B	9404.	3.50	1420.	359.	207.	6.73	
+	ROUTED TO	RR21B	8768.	3.58	1419.	359.	207.	6.73	
+									3.69 3.58
+	HYDROGRAPH AT	21C	1207.	3.25	142.	36.	21.	0.75	
+	2 COMBINED AT	CP21C	9344.	3.58	1560.	395.	228.	7.48	
+	ROUTED TO	RR21C	7778.	3.75	1554.	395.	228.	7.48	

```
+                                                                                    4.07      3.75
        HYDROGRAPH AT
+                    21D     1447.   3.33     201.     51.     29.    1.06
        2 COMBINED AT
+                  CP21D     8537.   3.67    1754.    446.    257.    8.54
        ROUTED TO
+                  RR21D     8506.   3.75    1753.    446.    257.    8.54
+                                                                                    4.13      3.75
        HYDROGRAPH AT
+                    21E      392.   3.33      49.     12.      7.    0.26
        2 COMBINED AT
+                  CP21E     8645.   3.75    1801.    458.    265.    8.79
        ROUTED TO
+                  RR21E     8393.   3.83    1799.    458.    265.    8.79
+                                                                                    6.30      3.83
        HYDROGRAPH AT
+                    21F      644.   3.33      89.     22.     13.    0.47
        2 COMBINED AT
+                  CP21F     8636.   3.75    1886.    481.    278.    9.26
        ROUTED TO
+                  RR21F     8620.   3.83    1883.    481.    278.    9.26
+                                                                                    2.68      3.83
        HYDROGRAPH AT
+                    21G       25.   3.33       3.      1.      0.    0.02
        2 COMBINED AT
+                  CP21G     8629.   3.83    1887.    482.    278.    9.28
        HYDROGRAPH AT
+                     22     2753.   3.25     304.     76.     44.    1.39
        HYDROGRAPH AT
+                     23      756.   3.25      87.     22.     13.    0.39
        2 COMBINED AT
+                    24A     3509.   3.25     391.     98.     57.    1.78
        ROUTED TO
+                   24.1     2849.   3.42     391.     98.     57.    1.78
+                                                                                    5.53      3.42
        HYDROGRAPH AT
+                     24      683.   3.25      84.     21.     12.    0.49
        2 COMBINED AT
+                  24.2A     3382.   3.42     474.    120.     69.    2.27
        HYDROGRAPH AT
+                    25N     1217.   3.42     175.     44.     26.    0.78
        HYDROGRAPH AT
+                    25S     1382.   3.25     151.     38.     22.    0.63
        2 COMBINED AT
+                   25.1     2363.   3.33     326.     82.     48.    1.41
        2 COMBINED AT
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+                    24.2B    5490.   3.42     800.     202.     117.    3.68
        ROUTED TO
+                    PIMARD   5410.   3.42     800.     202.     117.    3.68
+                                                                        6.79     3.42
        ROUTED TO
+                    RR24.2   5164.   3.50     799.     202.     117.    3.68
+                                                                        6.90     3.50
        2 COMBINED AT
+                    C21.05  11894.   3.75    2683.     683.     395.   12.96
        ROUTED TO
+                    DAM1     3037.   4.83     987.     451.     329.   12.96
+                                                                     2198.12     4.83
        ROUTED TO
+                    DAM2      298.  12.67     298.     293.     251.   12.96
+                                                                     2166.31    12.67
        ROUTED TO
+                    R21G      298.  12.92     298.     293.     250.   12.96
+                                                                        0.36    13.00
        HYDROGRAPH AT
+                    21H        62.   3.33       8.       2.       1.    0.04
        HYDROGRAPH AT
+                    26N       674.   3.50     109.      28.      16.    0.64
        3 COMBINED AT
+                    CP21H     723.   3.50     302.     297.     267.   13.64
        ROUTED TO
+                    RR21H     603.   3.58     299.     296.     265.   13.64
+                                                                        0.57     3.58
        HYDROGRAPH AT
+                    26S       230.   3.25      29.       7.       4.    0.17
        2 COMBINED AT
+                    *APEX*    720.   3.58     319.     301.     269.   13.81
        ROUTED TO
+                    CP27A     702.   3.67     319.     301.     269.   13.81
+                                                                        1.73     3.67
        ROUTED TO
+                    CP27B     670.   3.75     316.     301.     268.   13.81
+                                                                        1.68     3.75
        ROUTED TO
+                    CP27C     636.   3.83     314.     300.     267.   13.81
+                                                                        1.64     3.83
        ROUTED TO
+                    CP27D     629.   3.83     313.     300.     266.   13.81
+                                                                        1.63     3.83
        HYDROGRAPH AT
+                    27       1984.   3.17     205.      52.      30.    1.19
        2 COMBINED AT
+                    CP27     1993.   3.17     486.     343.     296.   15.00
1
                    SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
```

(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	INTERPOLATED TO COMPUTATION INTERVAL DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)
16	MANE	3.31	2714.57	197.99	2.05	5.00	2595.35	195.00	2.06
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1602E+03 OUTFLOW=0.1596E+03 BASIN STORAGE=0.1487E-01 PERCENT ERROR= 0.4									
17	MANE	3.72	2179.71	195.53	2.05	5.00	2113.93	195.00	2.05
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1303E+03 OUTFLOW=0.1296E+03 BASIN STORAGE=0.1813E-01 PERCENT ERROR= 0.6									
18	MANE	3.06	2403.41	196.84	2.00	5.00	2357.00	195.00	2.00
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1353E+03 OUTFLOW=0.1346E+03 BASIN STORAGE=0.1762E-01 PERCENT ERROR= 0.5									
15	MANE	3.60	1852.02	207.71	1.91	5.00	1847.60	205.00	1.91
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1401E+03 OUTFLOW=0.1393E+03 BASIN STORAGE=0.1918E-01 PERCENT ERROR= 0.5									
19	MANE	1.73	440.63	193.75	2.09	5.00	430.55	195.00	2.09
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2089E+02 OUTFLOW=0.2083E+02 BASIN STORAGE=0.1376E-02 PERCENT ERROR= 0.3									
20	MANE	3.79	1104.65	196.23	2.02	5.00	1052.10	195.00	2.03
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6186E+02 OUTFLOW=0.6151E+02 BASIN STORAGE=0.5950E-02 PERCENT ERROR= 0.6									
21A	MANE	2.39	781.28	193.64	1.79	5.00	762.73	195.00	1.79
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4022E+02 OUTFLOW=0.4006E+02 BASIN STORAGE=0.4421E-02 PERCENT ERROR= 0.4									
21B	MANE	2.59	504.98	194.27	1.79	5.00	497.48	195.00	1.79
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2643E+02 OUTFLOW=0.2632E+02 BASIN STORAGE=0.2952E-02 PERCENT ERROR= 0.4									
21C	MANE	3.26	1262.50	196.65	1.79	5.00	1206.94	195.00	1.78
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7164E+02 OUTFLOW=0.7124E+02 BASIN STORAGE=0.9548E-02 PERCENT ERROR= 0.5									
21D	MANE	3.13	1492.11	200.84	1.79	5.00	1447.37	200.00	1.79
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1014E+03 OUTFLOW=0.1009E+03 BASIN STORAGE=0.1927E-01 PERCENT ERROR= 0.5									

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          21E  MANE        3.07    409.14    198.46      1.79      5.00    391.91    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2461E+02 OUTFLOW=0.2448E+02 BASIN STORAGE=0.4121E-02 PERCENT ERROR=   0.5

          21F  MANE        4.37    667.83    201.44      1.78      5.00    644.11    200.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4492E+02 OUTFLOW=0.4457E+02 BASIN STORAGE=0.8835E-02 PERCENT ERROR=   0.8

          21G  MANE        4.21     25.33    199.36      1.78      5.00     25.13    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1647E+01 OUTFLOW=0.1637E+01 BASIN STORAGE=0.2774E-03 PERCENT ERROR=   0.6

           22  MANE        3.74   2772.23    194.54      2.05      5.00   2752.96    195.00        2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1522E+03 OUTFLOW=0.1514E+03 BASIN STORAGE=0.1237E-01 PERCENT ERROR=   0.5

           23  MANE        4.00    758.21    194.26      2.07      5.00    755.94    195.00        2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4372E+02 OUTFLOW=0.4348E+02 BASIN STORAGE=0.3485E-02 PERCENT ERROR=   0.5

           24  MANE        2.81    712.57    195.93      1.60      5.00    683.20    195.00        1.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4211E+02 OUTFLOW=0.4189E+02 BASIN STORAGE=0.6065E-02 PERCENT ERROR=   0.5

          25N  MANE        4.31   1247.82    204.02      2.11      5.00   1216.63    205.00        2.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8859E+02 OUTFLOW=0.8801E+02 BASIN STORAGE=0.1552E-01 PERCENT ERROR=   0.6

          25S  MANE        2.95   1387.24    195.20      2.26      5.00   1382.42    195.00        2.26

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7570E+02 OUTFLOW=0.7535E+02 BASIN STORAGE=0.9688E-02 PERCENT ERROR=   0.5

          21H  MANE        4.20     62.60    199.65      1.78      5.00     62.34    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4128E+01 OUTFLOW=0.4098E+01 BASIN STORAGE=0.7793E-03 PERCENT ERROR=   0.7

          26N  MANE        4.38    677.78    209.77      1.61      5.00    673.89    210.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5502E+02 OUTFLOW=0.5473E+02 BASIN STORAGE=0.9032E-02 PERCENT ERROR=   0.5

          26S  MANE        3.18    239.32    195.89      1.61      5.00    229.95    195.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1443E+02 OUTFLOW=0.1437E+02 BASIN STORAGE=0.1797E-02 PERCENT ERROR=   0.4
```

```
                27  MANE        0.62   2007.62    190.77      1.61      5.00   1984.32    190.00        1.62

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1028E+03 OUTFLOW=0.1026E+03 BASIN STORAGE=0.1039E-01 PERCENT ERROR=   0.2


*** NORMAL END OF HEC-1 ***
```

Appendix E

Existing Conditions Model

```
1****************************************                    ****************************************
*                                      *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *   U.S. ARMY CORPS OF ENGINEERS       *
*             JUN 09 1992              *                    *   HYDROLOGIC ENGINEERING CENTER      *
*           VERSION 4.0.3E             *                    *         609 SECOND STREET            *
*                                      *                    *      DAVIS, CALIFORNIA 95616         *
*  RUN DATE  01/15/99  TIME  15:58:25  *                    *          (916) 551-1748              *
*                                      *                    *                                      *
****************************************                    ****************************************


                                    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. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                          HEC-1 INPUT                                          PAGE  1

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

        1           ID        FILE <RWDAM21F.DAT>
        2           ID        THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
        3           ID        THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
        4           ID
        5           ID        THE MODIFICIATION INCLUDE THE FOLLOWING:
        6           ID        1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
        7           ID           TO CONCENTRATION POINT AT THE APEX OF 21F
        8           ID        2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE
        9           ID
       10           ID        NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
       11           ID        1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
       12           ID        MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
       13           ID        25S.
       14           ID
       15           ID        100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
       16           ID        RAINFALL FROM NOAA ATLAS
       17           ID
       18           ID        FILE RAW4A.DAT
       19           ID        WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
       20           ID        FOR 22, 23, 24, 25N, AND 25S.  ROUTE COMBINED HYDROGRAPHS
       21           ID        22, 23, 24, 25N AND 25S TO 21G.  SUN-BASIN 26 COMBINED AT
       22           ID        THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
       23           ID        ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
       24           ID        INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
       25           ID        PROPOSED ROAD CROSSINGS.
       26           ID
       27           ID        REVISED BY GREINER 12-9-93 BY RON FERGUSON
       28           ID        REVISED BY C. J. LOVELY, COS, 3-9-94
       29           ID        Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
       30           ID           *Eliminate DSS Records
```

```
31          ID          *Divide #26 into 26N & 26S; 26N is portion north of Jomax
32          ID          *Add 26N @ CP21H and route with 21H to apex
33          ID          *Add 26S @ apex
34          ID          *Modify reach length in 26S & 26N to reflect division
35          ID
36          ID        ******************************************************************
37          ID        * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
38          ID        * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.       *
39          ID        ******************************************************************
40          ID                                  Used as the base condition for the
41          ID    September 1998 - Rawhide Detention Basin Design Project FCD 97-23
42          ID    September 1998 - Filename <RAWBASE.DAT>
43          ID
44          ID
45          ID   ***********************************************************************
            *DIAGRAM
46          IT       5 03MAR94       0     500
47          IO       3       0       0       0
            *
1                                   HEC-1 INPUT                                    PAGE  2

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

48          KK      16     SUB
49          KM        RUNOFF FROM SUB-BASIN 16
50          BA  1.4570
51          PH       0    13.7    0.77    1.51    2.65    3.00    3.23    3.66
52          LS       0      83     9.8       0       0       0       0       0
53          UK     217   .0581     .20     100
54          RK   14800   .0216    .045       0    TRAP      25       3
            *

55          KK      17     SUB
56          KM        RUNOFF FROM SUB-BASIN 17
57          BA  1.1851       0       0
58          LS       0      83     9.8
59          UK     285   .0421     .20     100       0       0       0
60          RK   12200   .0254    .045       0    TRAP      25       3
            *

61          KK      18     SUB
62          KM        RUNOFF FROM SUB-BASIN 18
63          BA  1.2641
64          LS       0      83     6.5       0
65          UK     285   .0421     .20     100       0       0       0
66          RK   10840   .0259    .045       0    TRAP      25       3
            *

67          KK     19A      CP
68          KM        COMBINE HYDROGRAPHS SUB16, SUB17 AND SUB18
69          HC       3
            *

70          KK     19B      CP
71          KM        ROUTE CP19A TO CP19B
72          RS       1    FLOW      -1       0       0
73          RC    .055    .040    .055    1100   .0155       0       0       0
74          RX       0       1     126     132     167     173     298     299
75          RY      10       8       3       0       0       3       8      10
            *

76          KK      15     SUB
77          KM        RUNOFF FROM SUBBASIN 15
78          BA  1.3702       0       0
79          LS       0      82     5.4       0
80          UK     217   .0581     .20     100       0       0       0
```

```
 81          RK   21200   .0236    .045       0    TRAP      25       3
             *

 82          KK     19C      CP
 83          KM        COMBINE HYDROGRAPHS SUB15 & CP19B
 84          HC       2
             *
1                                          HEC-1 INPUT                                                PAGE  3

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

 85          KK    19.1      CP
 86          KM        ROUTE CP 19C TO 19.1
 87          RS       1    FLOW      -1       0       0
 88          RC    .055    .040    .055    1800   .0200       0       0
 89          RX       0       1     151     166     216     231     381     382
 90          RY      10       9       3       0       0       3       9      10
             *

 91          KK      19     SUB
 92          KM        RUNOFF FROM SUB-BASIN 19
 93          BA  0.1872
 94          LS       0      84     7.2       0
 95          UK     275   .0800     .20     100       0       0       0
 96          RK    3730   .0352    .045    .160    TRAP      15       3
 97          RK    1800   .0200    .045       0    TRAP      50      30
             *

 98          KK      20     SUB
 99          KM        RUNOFF FROM SUB-BASIN 20
100          BA  0.5698       0       0
101          LS       0      84     3.6       0
102          UK     300   .0750     .20     100       0       0       0
103          RK    9640   .0197    .045       0    TRAP      15       3
             *

104          KK    CP20      CP
105          KM        COMBINE SUB 19, SUB 20 AND CP 19.1
106          HC       3
             *
107          KM    *******BEGIN SUBAREA 21 BREAKDOWN-3/94 REVISIONS*****

108          KK  RRCP20      CP
109          KM        ROUTE CP20 TO CP 21A, WHICH IS 4600'
110          RS       1    FLOW      -1       0       0
111          RC    .055    .040    .055    4600   .0217       0       0       0
112          RX       0      30      60      85     195     220     250     280
113          RY      10       4       1       0       0       1       4      10
             *

114          KK     21A     SUB
115          KM        RUNOFF FROM SUB-BASIN 21A
116          BA     .42       0       0
117          LS       0      80     6.4       0       0       0
118          UK     297   .0558     .20     100       0       0       0
119          RK    6400   .0344    .045       0    TRAP      10       3
             *

120          KK   CP21A
121          HC       2
             *
1                                          HEC-1 INPUT                                                PAGE  4

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

```
 122          KK   RR21A      CP
 123          KM        ROUTE CP21A TO 21B    WHICH IS 960'
 124          RS       1    FLOW      -1       0       0
 125          RC    .055    .040    .055     960   .0156       0       0       0
 126          RX       0      10      60     205     295     440     490     500
 127          RY       6       4       2       0       0       2       4       6
              *

 128          KK     21B     SUB
 129          KM        RUNOFF FROM SUB-BASIN 21B
 130          BA   0.276       0       0
 131          LS       0      80     6.4       0       0       0
 132          UK     297   .0558     .20     100       0       0       0
 133          RK    6300   .0381    .045       0    TRAP      10       3
              *

 134          KK   CP21B
 135          HC       2
              *

 136          KK   RR21B      CP
 137          KM        ROUTE CP21B TO 21C    WHICH IS 4400'
 138          RS       1    FLOW      -1       0       0
 139          RC    .055    .040    .055    4400   .0205       0       0       0
 140          RX       0      10      60     205     295     440     490     500
 141          RY       6       4       2       0       0       2       4       6
              *

 142          KK     21C     SUB
 143          KM        RUNOFF FROM SUB-BASIN 21C
 144          BA    .748       0       0
 145          LS       0      80     6.4       0       0       0
 146          UK     297   .0558     .20     100       0       0       0
 147          RK    9900   .0328    .045       0    TRAP      20       3
              *

 148          KK   CP21C
 149          HC       2
              *

 150          KK   RR21C      CP
 151          KM        ROUTE CP21C TO 21D    WHICH IS 5700'
 152          RS       1    FLOW      -1       0       0
 153          RC    .055    .040    .055    5700   .0181       0       0       0
 154          RX       0      20     175     210     300     335     490     510
 155          RY     5.5     3.5     2.5       0       0     2.5     3.5     5.5
              *

 156          KK     21D     SUB
 157          KM        RUNOFF FROM SUB-BASIN 21D
 158          BA   1.059       0       0
 159          LS       0      80     6.4       0       0       0
 160          UK     297   .0558     .20     100       0       0       0
 161          RK   14500   .0252    .045       0    TRAP      30       3
              *
```



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

 162          KK   CP21D
 163          HC       2
              *

 164          KK   RR21D      CP
 165          KM        ROUTE CP21D TO 21E    WHICH IS 1100'
 166          RS       1    FLOW      -1       0       0
```

```
167          RC    .055    .040    .055    1100   .0200      0      0      0
168          RX       0      20     175     210     300    335    490    510
169          RY     5.5     3.5     2.5       0       0    2.5    3.5    5.5
             *

170          KK     21E     SUB
171          KM        RUNOFF FROM SUB-BASIN 21E
172          BA   0.257       0       0
173          LS       0      80     6.4       0       0      0
174          UK     297   .0333     .20     100       0      0      0
175          RK    6600   .0288    .045       0    TRAP     15      3
             *

176          KK   CP21E
177          HC       2
             *

178          KK   RR21E      CP
179          KM        ROUTE CP21E TO 21F    WHICH IS 2800'
180          RS       1    FLOW      -1       0       0
181          RC    .055    .040    .055    2800   .0143      0      0      0
182          RX       0      70     170     180     230    240    340    410
183          RY    10.5     4.5     3.5       0       0    3.5    4.5   10.5
             *

184          KK     21F     SUB
185          KM        RUNOFF FROM SUB-BASIN 21F
186          BA   0.469       0       0
187          LS       0      80     6.4       0       0      0
188          UK     297   .0333     .20     100       0      0      0
189          RK   10400   .0279    .045       0    TRAP     20      3
             *

190          KK   CP21F
191          HC       2
             *

192          KK   RR21F      CP
193          KM   ROUTE CP21F TO 21G (1900' DOWNSTREAM)
194          RS       1    FLOW      -1       0       0
195          RC    .055    .040    .055    1900   .0158      0      0      0
196          RX       0      20      70     345     455    730    780    800
197          RY      10       8       2       0       0      2      8     10
             *
```



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

198          KK     21G     SUB
199          KM   RUNOFF FROM SUB-BASIN 21G
200          BA   .0172       0       0
201          LS       0      80     6.4       0       0      0
202          UK     297   .0333     .20     100       0      0      0
203          RK    4000   .0300    .045       0    TRAP     10      3
             *

204          KK   CP21G
205          HC       2
             *

206          KK      22     SUB
207          KM       RUNOFF FROM SUB-BASIN 22
208          BA  1.3860
209          LS       0      84     5.1       0
210          UK     225   .0590     .20     100       0      0      0      0
211          RK   13000   .0238    .045       0    TRAP     25      3
```

```
                 *

212              KK      23      SUB
213              KM         RUNOFF FROM SUB-BASIN 23
214              BA  0.3945       0       0
215              LS       0      84     6.3       0
216              UK     225   .0590     .20     100       0       0       0
217              RK   10200   .0304    .045       0    TRAP      20       3
                 *

218              KK     24A      CP
219              KM         COMBINE HYDROGRAPHS FOR SUB 22 AND SUB 23
220              HC       2
                 *

221              KK    24.1      CP
222              KM         ROUTE CP 24A TO CP 24.1
223              RS       3    FLOW      -1       0       0
224              RC    .055    .040    .055    6800   .0257       0       0       0
225              RX       0       1     101     107     122     128     228     229
226              RY      10       8       3       0       0       3       8      10
                 *

227              KK      24     SUB
228              KM         RUNOFF FROM SUB-BASIN 24
229              KM         DRAINAGE AREA CHANGED TO MATCH VALUE USED BY MICHAEL BAKER
230              KM         Jr., INC.
231              BA  0.4907       0       0
232              LS       0      77     6.8       0
233              UK     295   .0438     .20     100       0       0       0
234              RK    6800   .0257    .045       0    TRAP      15       3
                 *
1                                          HEC-1 INPUT                                          PAGE  7

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

235              KK   24.2A      CP
236              KM         COMBINE SUB 24 & CP 24.1 - APEX
237              HC       2
                 *

238              KK     25N       SUB
239              KM         RUNOFF FROM SUB-BASIN 25N - APEX
240              BA  0.7834       0       0       0       0       0       0       0
241              LS       0      84     9.0       0
242              UK     295   .0438     .20     100       0       0       0
243              RK   16700   .0302    .045       0    TRAP      25       3
                 *

244              KK     25S      SUB
245              KM         RUNOFF FROM SUB-BASIN 25S - APEX
246              BA  0.6256       0       0       0       0       0       0       0
247              LS       0      86     9.0       0
248              UK     295   .0438     .20     100       0       0       0
249              RK    8900   .0278    .045       0    TRAP      25       3
                 *

250              KK    25.1      CP
251              KM         COMBINE HYDROGRAPHS FOR SUB-BASINS 25N AND 25S
252              HC       2
                 *

253              KK   24.2B      CP
254              KM         COMBINE TOTAL HYDROGRAPH 24.2A WITH 25.1
255              HC       2
                 *
```

```
256          KK  PIMARD      CP
257          KM   ROUTE THE TOTAL HYDROGRAPH AT THE CONCENTRATION POINT
258          KM   24.2B TO THE CULVERT AT THE PIMA ROAD. THERE IS NO
259          KM   CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
260          RS       1    FLOW      -1       0       0
261          RC    .055    .040    .055    2000   .0287       0       0       0
262          RX       0       1     101     107     122     128     228     229
263          RY      10       8       3       0       0       3       8      10
             *

264          KK  RR24.2      CP
265          KM   ROUTE THE TOTAL HYDROGRAPH AT CONCENTRATION POINT
266          KM   24.2B FROM THE CULVERT UNDER PIMA ROAD TO CONCENTRATION
267          KM   POINT 21.05.
268          RS       1    FLOW      -1       0       0
269          RC    .055    .040    .055    3050   .0238       0       0       0
270          RX       0       1     101     107     122     128     228     229
271          RY      10       8       3       0       0       3       8      10
             *
             *
1                                          HEC-1 INPUT                                          PAGE  8

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

272          KK  C21.05 CONFLUENCE OF DGB CHANNELS NEAR MID-SECTION 36
273          KM         COMBINE HYDROGRAPH CP21G WITH HYDROGRAPH RR24.2
274          KM         (FROM THE PIMA ROAD CULVERT)
275          HC       2
             *

276          KK    R21G     CP
277          KM        ROUTE CP21G(21.05)TO 21H WHICH IS 3100'
278          RS       1    FLOW      -1       0       0
279          RC    .055    .040    .055    3100   .0194       0       0       0
280          RX       0      90     120     355     585     820     850     940
281          RY       9       4     1.5       0       0     1.5       4       9
             *

282          KK     21H     SUB
283          KM        RUNOFF FROM SUB-BASIN 21H
284          BA   .0431       0       0
285          LS       0      80     6.4       0       0       0
286          UK     297   .0333     .20     100       0       0       0
287          RK    4600   .0278    .045       0    TRAP      20       3
             *

288          KK     26N
289          KM       Runoff from sub-basin 26N
290          BA   .6376       0       0
291          LS       0      75    12.7       0
292          UK     200   .0250     .20     100       0
293          RK   12000   .0263    .045       0    TRAP      35      10
             *

294          KK   CP21H   JOMAX RD
295          KO       3
296          HC       3
             *

297          KK   RR21H      CP
298          KM        ROUTE HYDROGRAPH AT CONCENTRATION POINT 21H   DOWNSTREAM FROM
299          KM        JOMAX ROAD           THERE IS NO ADDITIONAL CONTRIBUTING
300          KM        DRAINAGE AREA AT THIS CONCENTRATION POINT.  USED CHANNEL
301          KM        GEOMETRY                          FROM REACH SIX
302          KM             DEVELOPED BY C. LOVELY
```

```
303          RS       1    FLOW      -1       0       0
304          RC    .055    .040    .055    2390   .0188       0       0       0
305          RX       0      90     120     355     585     820     850     940
306          RY       9       4     1.5       0       0     1.5       4       9
             *

307          KK     26S     SUB
308          KM        RUNOFF FROM SUB-BASIN 26S
309          BA  0.1672       0       0
310          LS       0      75    12.7       0
311          UK     200   .0250     .20     100       0       0       0
312          RK    4000   .0263    .045       0    TRAP      35      10
             *
1                                          HEC-1 INPUT                                                PAGE  9

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

313          KK  *APEX*      CP
314          KM        COMBINE FLOW FROM SUB-BASIN 26 ,
315          KM            AND ROUTED HYDROGRAPH FROM JOMAX ROAD.
316          HC       2
             *
317          KM        *********END SUBAREA 21 REVISIONS************

318          KK   CP27A      CP AT HAPPY VALLEY RD
319          KM        ROUTE FLOW FROM CONCENTRATION POINT APEX  TO 27A (HAPPY VALLEY
320          KM        ROAD).  THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION PT.
321          KM
322          RS       1    FLOW      -1       0       0
323          RC    .055    .040    .055    1600   .0196       0       0       0
324          RX       0       1     201     211     261     271     471     472
325          RY      10       4       2       0       0       2       4      10
             *

326          KK   CP27B      CP AT MILLER RD
327          KM        ROUTE FLOW FROM CONCENTRATION POINT 27B TO 27C (MILLER ROAD).
328          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
329          RS       1    FLOW      -1       0       0
330          RC    .055    .040    .055    3300   .0196       0       0       0
331          RX       0       1     201     211     261     271     471     472
332          RY      10       4       2       0       0       2       4      10
             *

333          KK   CP27C      CP AT PINNACLE PEAK RD
334          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (PINNACLE PK ROAD).
335          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
336          RS       1    FLOW      -1       0       0
337          RC    .055    .040    .055    3300   .0196       0       0       0
338          RX       0       1     201     211     261     271     471     472
339          RY      10       4       2       0       0       2       4      10
             *

340          KK   CP27D     CP AT SCOTTSDALE RD
341          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (SCOTTSDALE ROAD)
342          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
343          RS       1    FLOW      -1       0       0
344          RC    .055    .040    .055    1000   .0196       0       0       0
345          RX       0       1     201     211     261     271     471     472
346          RY      10       4       2       0       0       2       4      10
             *

347          KK      27     SUB
348          KM        RUNOFF FROM SUB-BASIN 27
349          BA  1.1913       0       0
350          LS       0      75    12.7       0
351          UK     200   .0250     .20     100       0       0       0
```

```
          352          RK    1500   .0263    .045       0    TRAP      35      10
                       *
1                                                HEC-1 INPUT                                                PAGE 10
         LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          353          KK    CP27      CP AT SCOTTSDALE RD
          354          KO       3
          355          KM        COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
          356          KM        POINT 27D WITH SUB 27 .  TOTAL FLOW AT
          357          KM        SCOTTSDALE ROAD FOR FAN 4.          /
          358          HC       2
                       *
          359          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   48          16
               .
               .
   55          .          17
               .           .
               .           .
   61          .           .          18
               .           .           .
               .           .           .
   67        19A.......................
               V
               V
   70        19B
               .
               .
   76          .          15
               .           .
               .           .
   82        19C............
               V
               V
   85       19.1
               .
               .
   91          .          19
               .           .
               .           .
   98          .           .          20
               .           .           .
               .           .           .
  104       CP20.......................
               V
               V
  108      RRCP20
               .
               .
  114          .         21A
               .           .
               .           .
  120      CP21A............
               V
               V
  122      RR21A
               .
               .
```

```
128          .        21B
             .          .
134     CP21B...........
             V
             V
136     RR21B
             .
             .
142          .        21C
             .          .
148     CP21C...........
             V
             V
150     RR21C
             .
             .
156          .        21D
             .          .
162     CP21D...........
             V
             V
164     RR21D
             .
             .
170          .        21E
             .          .
176     CP21E...........
             V
             V
178     RR21E
             .
             .
184          .        21F
             .          .
190     CP21F...........
             V
             V
192     RR21F
             .
             .
198          .        21G
             .          .
204     CP21G...........
             .
             .
206          .         22
             .          .
             .          .
212          .          .        23
             .          .        .
             .          .        .
218          .        24A........
             .          V
             .          V
221          .       24.1
             .          .
             .          .
227          .          .        24
             .          .        .
             .          .        .
235          .      24.2A........
```

```
                .          .
                .          .
  238           .          .        25N
                .          .          .
  244           .          .          .        25S
                .          .          .          .
                .          .          .          .
  250           .          .       25.1............
                .          .          .
                .          .          .
  253           .      24.2B............
                .          V
                .          V
  256           .     PIMARD
                .          V
                .          V
  264           .     RR24.2
                .          .
                .          .
  272      C21.05............
                V
                V
  276       R21G
                .
                .
  282           .        21H
                .          .
                .          .
  288           .          .        26N
                .          .          .
                .          .          .
  294       CP21H......................
                V
                V
  297       RR21H
                .
                .
  307           .        26S
                .          .
                .          .
  313      *APEX*............
                V
                V
  318       CP27A
                V
                V
  326       CP27B
                V
                V
  333       CP27C
                V
                V
  340       CP27D
                .
                .
  347           .         27
                .          .
                .          .
  353        CP27............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            JUN 09 1992               *
*          VERSION 4.0.3E              *
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
```

```
*                                        *                                        *      DAVIS, CALIFORNIA 95616      *
*  RUN DATE  01/15/99  TIME  15:58:25    *                                        *          (916) 551-1748           *
*                                        *                                        *                                   *
******************************************                                        *************************************


                                FILE <RWDAM21F.DAT>
                                THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
                                THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.

                                THE MODIFICIATION INCLUDE THE FOLLOWING:
                                1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
                                   TO CONCENTRATION POINT AT THE APEX OF 21F
                                2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE

                                NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
                                1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
                                MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
                                25S.

                                100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
                                RAINFALL FROM NOAA ATLAS

                                FILE RAW4A.DAT
                                WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
                                FOR 22, 23, 24, 25N, AND 25S.  ROUTE COMBINED HYDROGRAPHS
                                22, 23, 24, 25N AND 25S TO 21G.  SUN-BASIN 26 COMBINED AT
                                THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
                                ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
                                INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
                                PROPOSED ROAD CROSSINGS.

                                REVISED BY GREINER 12-9-93 BY RON FERGUSON
                                REVISED BY C. J. LOVELY, COS, 3-9-94
                                Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
                                   *Eliminate DSS Records
                                   *Divide #26 into 26N & 26S; 26N is portion north of Jomax
                                   *Add 26N @ CP21H and route with 21H to apex
                                   *Add 26S @ apex
                                   *Modify reach length in 26S & 26N to reflect division

                                ********************************************************************
                                * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
                                * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.       *
                                ********************************************************************
                                                          Used as the base condition for the
                            September 1998 - Rawhide Detention Basin Design Project FCD 97-23
                            September 1998 - Filename <RAWBASE.DAT>


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

 47 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           3  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      3MAR94  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      4MAR94  ENDING DATE
                     NDTIME        1735  ENDING TIME
```

```
                    ICENT          19  CENTURY MARK

              COMPUTATION INTERVAL    0.08 HOURS
                   TOTAL TIME BASE   41.58 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


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


          **************
          *            *
  48 KK   *        16  *          SUB
          *            *
          **************
                              RUNOFF FROM SUB-BASIN 16

             SUBBASIN RUNOFF DATA

  50 BA        SUBBASIN CHARACTERISTICS
                     TAREA        1.46  SUBBASIN AREA

               PRECIPITATION DATA

  51 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
                0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                STORM AREA =   13.70

  52 LS        SCS LOSS RATE
                     STRTL        0.41  INITIAL ABSTRACTION
                    CRVNBR       83.00  CURVE NUMBER
                     RTIMP        9.80  PERCENT IMPERVIOUS AREA

               KINEMATIC WAVE
  53 UK          OVERLAND-FLOW ELEMENT NO. 1
                         L        217.  OVERLAND FLOW LENGTH
                         S      0.0581  SLOPE
                         N       0.200  ROUGHNESS COEFFICIENT
                        PA       100.0  PERCENT OF SUBBASIN
                     DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

               KINEMATIC WAVE
  54 RK          MAIN CHANNEL
                         L      14800.  CHANNEL LENGTH
                         S      0.0216  SLOPE
                         N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                        CA        1.46  CONTRIBUTING AREA
                     SHAPE        TRAP  CHANNEL SHAPE
                        WD       25.00  BOTTOM WIDTH OR DIAMETER
                         Z        3.00  SIDE SLOPE
                    NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                    RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH
                                                                  ***
                                  COMPUTED KINEMATIC PARAMETERS
```

```
                                   VARIABLE TIME STEP
                                (DT SHOWN IS A MINIMUM)

                ELEMENT    ALPHA       M        DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                            PEAK                  CELERITY
                                                (MIN)     (FT)     (CFS)    (MIN)      (IN)      (FPS)

                PLANE1      1.80      1.67      1.37     43.40   4010.06   185.89      2.05       0.53
                MAIN        0.82      1.50      3.31   3700.00   2698.28   197.99      2.05      18.70

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.1599E+03 OUTFLOW=0.1592E+03 BASIN STORAGE=0.1500E-01 PERCENT ERROR=   0.4

                                   INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                MAIN        0.82      1.50      5.00             2576.99   195.00      2.05
      ***          ***          ***          ***          ***

                     HYDROGRAPH AT STATION      16

   TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.49, TOTAL EXCESS =    2.06

  PEAK FLOW     TIME                      MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                              (CFS)
+    2577.      3.25          319.         80.         46.          46.
                         (INCHES)      2.033       2.052       2.052       2.052
                          (AC-FT)       158.        159.        159.        159.

                     CUMULATIVE AREA =    1.46 SQ MI


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


          **************
          *            *
  55 KK   *        17  *          SUB
          *            *
          **************
                                RUNOFF FROM SUB-BASIN 17

             SUBBASIN RUNOFF DATA

  57 BA        SUBBASIN CHARACTERISTICS
                     TAREA        1.19  SUBBASIN AREA

               PRECIPITATION DATA

  51 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
                0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                STORM AREA =    13.70

  58 LS        SCS LOSS RATE
                     STRTL        0.41  INITIAL ABSTRACTION
                    CRVNBR       83.00  CURVE NUMBER
                     RTIMP        9.80  PERCENT IMPERVIOUS AREA
```

```
                 KINEMATIC WAVE
 59 UK             OVERLAND-FLOW ELEMENT NO. 1
                          L        285.  OVERLAND FLOW LENGTH
                          S      0.0421  SLOPE
                          N       0.200  ROUGHNESS COEFFICIENT
                         PA       100.0  PERCENT OF SUBBASIN
                      DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                 KINEMATIC WAVE
 60 RK             MAIN CHANNEL
                          L      12200.  CHANNEL LENGTH
                          S      0.0254  SLOPE
                          N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                         CA        1.19  CONTRIBUTING AREA
                      SHAPE        TRAP  CHANNEL SHAPE
                         WD       25.00  BOTTOM WIDTH OR DIAMETER
                          Z        3.00  SIDE SLOPE
                     NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                     RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH
                                                  ***
                                COMPUTED KINEMATIC PARAMETERS
                                     VARIABLE TIME STEP
                                  (DT SHOWN IS A MINIMUM)

                  ELEMENT    ALPHA       M        DT        DX      PEAK    TIME TO     VOLUME    MAXIMUM
                                                                             PEAK                  CELERITY
                                                (MIN)      (FT)     (CFS)    (MIN)       (IN)      (FPS)

                  PLANE1      1.53      1.67      1.99     57.00   2786.55    189.39      2.05       0.51
                  MAIN        0.89      1.50      3.73   4066.67   2164.39    195.52      2.05      18.96

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.1300E+03 OUTFLOW=0.1293E+03 BASIN STORAGE=0.1764E-01 PERCENT ERROR=   0.6

                                INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                  MAIN        0.89      1.50      5.00             2099.53    195.00      2.05
      ***          ***         ***       ***       ***
                       HYDROGRAPH AT STATION       17
    TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.49, TOTAL EXCESS =    2.06
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                              (CFS)
+    2100.      3.25           258.        65.         38.         38.
                         (INCHES)      2.028       2.049       2.050       2.050
                          (AC-FT)       128.        130.        130.        130.
                       CUMULATIVE AREA =    1.19 SQ MI


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

            **************
            *            *
 61 KK      *        18  *          SUB
            *            *
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**************
                    RUNOFF FROM SUB-BASIN 18

          SUBBASIN RUNOFF DATA

63 BA       SUBBASIN CHARACTERISTICS
                TAREA        1.26  SUBBASIN AREA

            PRECIPITATION DATA

51 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
             0.77    1.51    2.65   3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                          STORM AREA =   13.70

64 LS       SCS LOSS RATE
                STRTL        0.41  INITIAL ABSTRACTION
               CRVNBR       83.00  CURVE NUMBER
                RTIMP        6.50  PERCENT IMPERVIOUS AREA

            KINEMATIC WAVE
65 UK         OVERLAND-FLOW ELEMENT NO. 1
                    L        285.  OVERLAND FLOW LENGTH
                    S      0.0421  SLOPE
                    N       0.200  ROUGHNESS COEFFICIENT
                   PA       100.0  PERCENT OF SUBBASIN
               DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

            KINEMATIC WAVE
66 RK         MAIN CHANNEL
                    L      10840.  CHANNEL LENGTH
                    S      0.0259  SLOPE
                    N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                   CA        1.26  CONTRIBUTING AREA
                SHAPE        TRAP  CHANNEL SHAPE
                   WD       25.00  BOTTOM WIDTH OR DIAMETER
                    Z        3.00  SIDE SLOPE
               NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
               RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH
                                                  ***
                              COMPUTED KINEMATIC PARAMETERS
                                   VARIABLE TIME STEP
                                (DT SHOWN IS A MINIMUM)

              ELEMENT    ALPHA       M        DT        DX      PEAK    TIME TO     VOLUME    MAXIMUM
                                                                          PEAK                  CELERITY
                                                (MIN)     (FT)    (CFS)    (MIN)      (IN)      (FPS)

              PLANE1      1.53     1.67      1.95     57.00   2892.64   188.78      2.00      0.50
              MAIN        0.90     1.50      3.07   3613.33   2389.56   196.85      1.99     19.65

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.1350E+03 OUTFLOW=0.1343E+03 BASIN STORAGE=0.1763E-01 PERCENT ERROR=   0.5

                                   INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

              MAIN        0.90     1.50      5.00            2341.41   195.00      2.00
    ***         ***         ***          ***          ***
                     HYDROGRAPH AT STATION       18
```

```
     TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.54, TOTAL EXCESS =    2.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    2341.      3.25                269.        68.         39.         39.
                        (INCHES)    1.978       1.995       1.996       1.996
                         (AC-FT)    133.        135.        135.        135.

                         CUMULATIVE AREA =    1.26 SQ MI


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


            **************
            *            *
   67 KK    *      19A   *          CP
            *            *
            **************
                                COMBINE HYDROGRAPHS SUB16, SUB17 AND SUB18

   69 HC          HYDROGRAPH COMBINATION
                        ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
       ***             ***            ***            ***            ***

                          HYDROGRAPH AT STATION      19A

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    7018.      3.25                846.       214.        123.        123.
                        (INCHES)    2.014       2.033       2.033       2.033
                         (AC-FT)    419.        423.        424.        424.

                         CUMULATIVE AREA =    3.91 SQ MI


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


            **************
            *            *
   70 KK    *      19B   *          CP
            *            *
            **************
                                ROUTE CP19A TO CP19B

               HYDROGRAPH ROUTING DATA

   72 RS          STORAGE ROUTING
                        NSTPS           1  NUMBER OF SUBREACHES
                         ITYP        FLOW  TYPE OF INITIAL CONDITION
                        RSVRIC      -1.00  INITIAL CONDITION
                             X       0.00 WORKING R AND D COEFFICIENT
```

```
 73 RC          NORMAL DEPTH CHANNEL
                      ANL       0.055  LEFT OVERBANK N-VALUE
                     ANCH       0.040  MAIN CHANNEL N-VALUE
                      ANR       0.055  RIGHT OVERBANK N-VALUE
                    RLNTH       1100.  REACH LENGTH
                      SEL      0.0155  ENERGY SLOPE
                    ELMAX         0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                   CROSS-SECTION DATA
                          --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 75 RY        ELEVATION     10.00      8.00      3.00      0.00      0.00      3.00      8.00     10.00
 74 RX        DISTANCE       0.00      1.00    126.00    132.00    167.00    173.00    298.00    299.00
                                                                  ***

                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00      0.48      0.99      1.52      2.08      2.68      3.31      4.21      5.47      7.07
          OUTFLOW       0.00     56.02    179.16    355.05    578.70    847.61   1171.35   1583.36   2089.74   2712.17
        ELEVATION       0.00      0.53      1.05      1.58      2.11      2.63      3.16      3.68      4.21      4.74

          STORAGE       9.03     11.33     13.98     16.99     20.34     24.04     27.98     31.94     35.90     39.87
          OUTFLOW    3469.17   4377.53   5452.81   6709.70   8162.20   9823.73  11911.32  14259.55  16805.32  19539.52
        ELEVATION       5.26      5.79      6.32      6.84      7.37      7.89      8.42      8.95      9.47     10.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      179. TO    19540.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                        HYDROGRAPH AT STATION      19B

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                              (CFS)
+    6994.      3.33                 846.        214.        123.        123.
                          (INCHES)  2.013       2.033       2.033       2.033
                           (AC-FT)   419.        423.        424.        424.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
      18.       3.33                   3.          1.          0.          0.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
     6.95       3.33                1.88        0.49        0.28        0.28

                        CUMULATIVE AREA =    3.91 SQ MI


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


            **************
            *            *
 76 KK      *       15   *          SUB
            *            *
            **************
                                RUNOFF FROM SUBBASIN 15
```

```
                SUBBASIN RUNOFF DATA

 78 BA            SUBBASIN CHARACTERISTICS
                        TAREA        1.37  SUBBASIN AREA

                  PRECIPITATION DATA

 51 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
                   0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                STORM AREA =   13.70

 79 LS            SCS LOSS RATE
                        STRTL        0.44  INITIAL ABSTRACTION
                       CRVNBR       82.00  CURVE NUMBER
                        RTIMP        5.40  PERCENT IMPERVIOUS AREA

                  KINEMATIC WAVE
 80 UK              OVERLAND-FLOW ELEMENT NO. 1
                              L       217.  OVERLAND FLOW LENGTH
                              S      0.0581  SLOPE
                              N       0.200  ROUGHNESS COEFFICIENT
                             PA       100.0  PERCENT OF SUBBASIN
                          DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                  KINEMATIC WAVE
 81 RK              MAIN CHANNEL
                              L     21200.  CHANNEL LENGTH
                              S      0.0236  SLOPE
                              N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                             CA        1.37  CONTRIBUTING AREA
                          SHAPE        TRAP  CHANNEL SHAPE
                             WD       25.00  BOTTOM WIDTH OR DIAMETER
                              Z        3.00  SIDE SLOPE
                         NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                         RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH

                                                     ***
                                   COMPUTED KINEMATIC PARAMETERS
                                        VARIABLE TIME STEP
                                     (DT SHOWN IS A MINIMUM)

                    ELEMENT    ALPHA       M        DT       DX      PEAK    TIME TO     VOLUME    MAXIMUM
                                                                             PEAK                  CELERITY
                                                   (MIN)     (FT)    (CFS)    (MIN)      (IN)      (FPS)

                   PLANE1       1.80      1.67      1.45    43.40   3471.46   186.49      1.91       0.52
                   MAIN         0.86      1.50      3.61  3533.33   1841.94   207.76      1.90      16.73

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.1398E+03 OUTFLOW=0.1390E+03 BASIN STORAGE=0.1918E-01 PERCENT ERROR=   0.5

                                   INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                   MAIN         0.86      1.50      5.00            1836.90   205.00      1.90

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

                        HYDROGRAPH AT STATION       15

   TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.63, TOTAL EXCESS =    1.91

 PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
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                                        6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    1837.      3.42                   277.         70.         40.         40.
                        (INCHES)     1.881       1.902       1.902       1.902
                         (AC-FT)      137.        139.        139.        139.

                        CUMULATIVE AREA =    1.37 SQ MI


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


            **************
            *            *
   82 KK    *      19C   *          CP
            *            *
            **************
                                COMBINE HYDROGRAPHS SUB15 & CP19B

   84 HC          HYDROGRAPH COMBINATION
                       ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM       1      0
      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      19C

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    8628.      3.33                  1123.        284.        164.        164.
                        (INCHES)     1.979       1.999       1.999       1.999
                         (AC-FT)      557.        562.        563.        563.

                        CUMULATIVE AREA =    5.28 SQ MI


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


            **************
            *            *
   85 KK    *      19.1  *          CP
            *            *
            **************
                                ROUTE CP 19C TO 19.1

              HYDROGRAPH ROUTING DATA

   87 RS          STORAGE ROUTING
                       NSTPS           1  NUMBER OF SUBREACHES
                        ITYP        FLOW  TYPE OF INITIAL CONDITION
                      RSVRIC       -1.00  INITIAL CONDITION
                           X        0.00 WORKING R AND D COEFFICIENT

   88 RC          NORMAL DEPTH CHANNEL
                         ANL       0.055  LEFT OVERBANK N-VALUE
                        ANCH       0.040  MAIN CHANNEL N-VALUE
                         ANR       0.055  RIGHT OVERBANK N-VALUE
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                    RLNTH       1800.  REACH LENGTH
                      SEL      0.0200  ENERGY SLOPE
                    ELMAX         0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                   CROSS-SECTION DATA
                         --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  90 RY      ELEVATION    10.00      9.00      3.00      0.00      0.00      3.00      9.00     10.00
  89 RX      DISTANCE      0.00      1.00    151.00    166.00    216.00    231.00    381.00    382.00

                                                          ***

                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00      1.14      2.40      3.78      5.27      6.87      8.61     10.80     13.57     16.92
          OUTFLOW       0.00     91.97    297.76    597.74    986.99   1464.43   2055.99   2818.18   3725.74   4801.25
        ELEVATION       0.00      0.53      1.05      1.58      2.11      2.63      3.16      3.68      4.21      4.74

          STORAGE      20.83     25.32     30.38     36.01     42.21     48.99     56.34     64.26     72.53     80.83
          OUTFLOW    6064.07   7531.82   9221.01  11147.26  13325.57  15770.35  18495.58  21514.81  25191.32  29197.22
        ELEVATION       5.26      5.79      6.32      6.84      7.37      7.89      8.42      8.95      9.47     10.00

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      987. TO    29197.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                        HYDROGRAPH AT STATION     19.1

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                            (CFS)
+    8212.      3.33       1123.       284.        164.        164.
                        (INCHES)     1.978       1.999       1.999       1.999
                         (AC-FT)      557.        562.        563.        563.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR        24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
       27.      3.33          5.          1.          1.          1.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR        24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
      6.00      3.33       1.67        0.43        0.25        0.25

                        CUMULATIVE AREA =    5.28 SQ MI


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


            **************
            *            *
  91 KK     *        19  *          SUB
            *            *
            **************
                                RUNOFF FROM SUB-BASIN 19

                SUBBASIN RUNOFF DATA

  93 BA           SUBBASIN CHARACTERISTICS
                        TAREA        0.19  SUBBASIN AREA
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                PRECIPITATION DATA

 51 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
                  0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                STORM AREA =   13.70

 94 LS          SCS LOSS RATE
                      STRTL        0.38  INITIAL ABSTRACTION
                     CRVNBR       84.00  CURVE NUMBER
                      RTIMP        7.20  PERCENT IMPERVIOUS AREA

                KINEMATIC WAVE
 95 UK            OVERLAND-FLOW ELEMENT NO. 1
                          L         275.  OVERLAND FLOW LENGTH
                          S      0.0800  SLOPE
                          N       0.200  ROUGHNESS COEFFICIENT
                         PA       100.0  PERCENT OF SUBBASIN
                       DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                KINEMATIC WAVE
 96 RK            COLLECTOR CHANNEL
                          L        3730.  CHANNEL LENGTH
                          S      0.0352  SLOPE
                          N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                         CA        0.16  CONTRIBUTING AREA
                      SHAPE        TRAP  CHANNEL SHAPE
                         WD       15.00  BOTTOM WIDTH OR DIAMETER
                          Z        3.00  SIDE SLOPE
                     NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
 97 RK            MAIN CHANNEL
                          L        1800.  CHANNEL LENGTH
                          S      0.0200  SLOPE
                          N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                         CA        0.19  CONTRIBUTING AREA
                      SHAPE        TRAP  CHANNEL SHAPE
                         WD       50.00  BOTTOM WIDTH OR DIAMETER
                          Z       30.00  SIDE SLOPE
                     NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                     RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH
                                                   ***
                                  COMPUTED KINEMATIC PARAMETERS
                                       VARIABLE TIME STEP
                                     (DT SHOWN IS A MINIMUM)

                   ELEMENT    ALPHA       M        DT       DX      PEAK    TIME TO     VOLUME    MAXIMUM
                                                                            PEAK                  CELERITY
                                                (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                  PLANE1       2.11     1.67      1.50    55.00    514.71   185.94       2.08       0.65
                  COLLECTOR1   1.42     1.45      1.77  1243.33    475.23   190.63       2.08      12.91
                  MAIN         0.69     1.38      1.73   600.00    438.42   193.74       2.08       6.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.2084E+02 OUTFLOW=0.2078E+02 BASIN STORAGE=0.1363E-02 PERCENT ERROR=   0.3

                                  INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                  MAIN         0.69     1.38      5.00             428.52   195.00       2.08
     ***            ***            ***            ***            ***
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                    HYDROGRAPH AT STATION       19

    TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.46, TOTAL EXCESS =    2.09

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                                   (CFS)
+     429.      3.25                  42.         10.          6.          6.
                                (INCHES)      2.071       2.084       2.084       2.084
                                 (AC-FT)        21.         21.         21.         21.

                                CUMULATIVE AREA =    0.19 SQ MI


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


            **************
            *            *
  98 KK     *        20  *          SUB
            *            *
            **************
                                RUNOFF FROM SUB-BASIN 20

               SUBBASIN RUNOFF DATA

  100 BA          SUBBASIN CHARACTERISTICS
                        TAREA        0.57  SUBBASIN AREA

                  PRECIPITATION DATA

   51 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
                   0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                   STORM AREA =   13.70

  101 LS          SCS LOSS RATE
                        STRTL        0.38  INITIAL ABSTRACTION
                       CRVNBR       84.00  CURVE NUMBER
                        RTIMP        3.60  PERCENT IMPERVIOUS AREA

                  KINEMATIC WAVE
  102 UK            OVERLAND-FLOW ELEMENT NO. 1
                            L        300.  OVERLAND FLOW LENGTH
                            S      0.0750  SLOPE
                            N       0.200  ROUGHNESS COEFFICIENT
                           PA       100.0  PERCENT OF SUBBASIN
                        DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                  KINEMATIC WAVE
  103 RK            MAIN CHANNEL
                            L       9640.  CHANNEL LENGTH
                            S      0.0197  SLOPE
                            N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                           CA        0.57  CONTRIBUTING AREA
                        SHAPE        TRAP  CHANNEL SHAPE
                           WD       15.00  BOTTOM WIDTH OR DIAMETER
                            Z        3.00  SIDE SLOPE
                       NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                       RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH
```

```
                                                                    ***
                                   COMPUTED KINEMATIC PARAMETERS
                                        VARIABLE TIME STEP
                                     (DT SHOWN IS A MINIMUM)

                 ELEMENT    ALPHA      M        DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                            PEAK                  CELERITY
                                                (MIN)      (FT)     (CFS)    (MIN)      (IN)      (FPS)

                 PLANE1       2.04     1.67      1.64     60.00   1455.11   186.54      2.03       0.64
                 MAIN         1.06     1.45      3.80   3213.33   1097.76   196.23      2.02      14.09

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.6172E+02 OUTFLOW=0.6137E+02 BASIN STORAGE=0.5960E-02 PERCENT ERROR=   0.6

                                        INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                 MAIN         1.06     1.45      5.00             1045.16   195.00      2.02
      ***          ***          ***          ***          ***

                      HYDROGRAPH AT STATION       20

    TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.51, TOTAL EXCESS =    2.03

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    1045.      3.25                123.        31.         18.         18.
                        (INCHES)    2.008       2.022       2.022       2.022
                         (AC-FT)     61.         61.         61.         61.

                      CUMULATIVE AREA =    0.57 SQ MI


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


            **************
            *            *
  104 KK    *     CP20   *          CP
            *            *
            **************
                                COMBINE SUB 19, SUB 20 AND CP 19.1
                            *******BEGIN SUBAREA 21 BREAKDOWN-3/94 REVISIONS*****

  106 HC          HYDROGRAPH COMBINATION
                        ICOMP          3  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                    ***
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
      ***          ***          ***          ***          ***

                      HYDROGRAPH AT STATION     CP20

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    9543.      3.33                1287.       325.        188.        188.
```

```
                    (INCHES)     1.984       2.003       2.004       2.004
                     (AC-FT)      638.        645.        645.        645.

                    CUMULATIVE AREA =    6.03 SQ MI


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


          **************
          *            *
 108 KK   *    RRCP20  *          CP
          *            *
          **************
                         ROUTE CP20 TO CP 21A, WHICH IS 4600'

             HYDROGRAPH ROUTING DATA

 110 RS        STORAGE ROUTING
                    NSTPS          1  NUMBER OF SUBREACHES
                     ITYP       FLOW  TYPE OF INITIAL CONDITION
                   RSVRIC      -1.00  INITIAL CONDITION
                        X       0.00 WORKING R AND D COEFFICIENT

 111 RC        NORMAL DEPTH CHANNEL
                      ANL      0.055  LEFT OVERBANK N-VALUE
                     ANCH      0.040  MAIN CHANNEL N-VALUE
                      ANR      0.055  RIGHT OVERBANK N-VALUE
                    RLNTH      4600.  REACH LENGTH
                      SEL     0.0217  ENERGY SLOPE
                    ELMAX        0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                   CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 113 RY       ELEVATION    10.00      4.00      1.00      0.00      0.00      1.00      4.00     10.00
 112 RX       DISTANCE      0.00     30.00     60.00     85.00    195.00    220.00    250.00    280.00
                                                                  ***

                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00      6.85     15.15     24.39     34.22     44.63     55.63     67.22     79.36     91.85
          OUTFLOW       0.00    216.67    731.53   1585.60   2702.21   4068.56   5677.64   7525.69   9621.30  11963.14
        ELEVATION       0.00      0.53      1.05      1.58      2.11      2.63      3.16      3.68      4.21      4.74

          STORAGE     104.64    117.71    131.08    144.74    158.70    172.94    187.48    202.31    217.44    232.85
          OUTFLOW   14528.59  17313.31  20314.04  23528.32  26954.28  30590.50  34435.97  38489.92  42751.86  47221.51
        ELEVATION       5.26      5.79      6.32      6.84      7.37      7.89      8.42      8.95      9.47     10.00

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

                     HYDROGRAPH AT STATION   RRCP20

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    8812.      3.42     1286.       325.        188.        188.
                     (INCHES)     1.981       2.003       2.004       2.004
                      (AC-FT)      638.        645.        645.        645.

 PEAK STORAGE   TIME                       MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
```

```
     75.      3.42                  17.         4.         3.         3.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR      72-HR     41.58-HR
+   (FEET)      (HR)
     4.01      3.42                  1.09       0.28       0.16       0.16

                        CUMULATIVE AREA =    6.03 SQ MI


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


            **************
            *            *
 114 KK     *      21A   *          SUB
            *            *
            **************
                                RUNOFF FROM SUB-BASIN 21A

              SUBBASIN RUNOFF DATA

 116 BA         SUBBASIN CHARACTERISTICS
                      TAREA        0.42  SUBBASIN AREA

                PRECIPITATION DATA

  51 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
                 0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                STORM AREA =   13.70

 117 LS         SCS LOSS RATE
                      STRTL        0.50  INITIAL ABSTRACTION
                     CRVNBR       80.00  CURVE NUMBER
                      RTIMP        6.40  PERCENT IMPERVIOUS AREA

                KINEMATIC WAVE
 118 UK           OVERLAND-FLOW ELEMENT NO. 1
                          L        297.  OVERLAND FLOW LENGTH
                          S      0.0558  SLOPE
                          N       0.200  ROUGHNESS COEFFICIENT
                         PA       100.0  PERCENT OF SUBBASIN
                     DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                KINEMATIC WAVE
 119 RK           MAIN CHANNEL
                          L       6400.  CHANNEL LENGTH
                          S      0.0344  SLOPE
                          N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                         CA        0.42  CONTRIBUTING AREA
                      SHAPE        TRAP  CHANNEL SHAPE
                         WD       10.00  BOTTOM WIDTH OR DIAMETER
                          Z        3.00  SIDE SLOPE
                     NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                     RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH
                                                          ***
                                   COMPUTED KINEMATIC PARAMETERS
                                        VARIABLE TIME STEP
                                      (DT SHOWN IS A MINIMUM)

                  ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
```

```
                                                                                PEAK                CELERITY
                                                  (MIN)      (FT)      (CFS)    (MIN)       (IN)     (FPS)

                PLANE1        1.76      1.67       1.95     59.40     866.24   189.05       1.79      0.53
                MAIN          1.70      1.42       2.40   2133.33     776.53   193.64       1.78     15.76

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.4013E+02 OUTFLOW=0.3997E+02 BASIN STORAGE=0.4387E-02 PERCENT ERROR=  0.4

                                        INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                MAIN          1.70      1.42       5.00              758.45   195.00       1.79
      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      21A

    TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.75, TOTAL EXCESS =    1.79

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                                   (CFS)
+     758.      3.25                 80.         20.         12.         12.
                                (INCHES)      1.771       1.785       1.785       1.785
                                 (AC-FT)        40.         40.         40.         40.

                        CUMULATIVE AREA =    0.42 SQ MI


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


            **************
            *            *
  120 KK    *     CP21A  *
            *            *
            **************

  121 HC          HYDROGRAPH COMBINATION
                        ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM       1      0
      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION    CP21A

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                                   (CFS)
+    9269.      3.42                1365.        345.        199.        199.
                                (INCHES)      1.967       1.989       1.990       1.990
                                 (AC-FT)       677.        685.        685.        685.

                        CUMULATIVE AREA =    6.45 SQ MI


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
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                **************
                *            *
  122 KK        *     RR21A  *          CP
                *            *
                **************
                                  ROUTE CP21A TO 21B    WHICH IS 960'

                HYDROGRAPH ROUTING DATA

  124 RS          STORAGE ROUTING
                        NSTPS          1  NUMBER OF SUBREACHES
                         ITYP       FLOW  TYPE OF INITIAL CONDITION
                        RSVRIC      -1.00  INITIAL CONDITION
                             X       0.00 WORKING R AND D COEFFICIENT

  125 RC          NORMAL DEPTH CHANNEL
                          ANL      0.055  LEFT OVERBANK N-VALUE
                         ANCH      0.040  MAIN CHANNEL N-VALUE
                          ANR      0.055  RIGHT OVERBANK N-VALUE
                        RLNTH       960.  REACH LENGTH
                          SEL     0.0156  ENERGY SLOPE
                        ELMAX        0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                      CROSS-SECTION DATA
                            --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  127 RY        ELEVATION      6.00      4.00      2.00      0.00      0.00      2.00      4.00      6.00
  126 RX        DISTANCE       0.00     10.00     60.00    205.00    295.00    440.00    490.00    500.00
                                                                  ***

                                      COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE      0.00      0.79      1.89      3.31      5.05      7.12      9.49     12.15     14.92     17.80
          OUTFLOW      0.00     68.01    241.98    530.81    949.73   1514.25   2239.48   3274.87   4558.83   6020.42
        ELEVATION      0.00      0.32      0.63      0.95      1.26      1.58      1.89      2.21      2.53      2.84

          STORAGE     20.79     23.90     27.11     30.43     33.78     37.17     40.57     43.99     47.44     50.91
          OUTFLOW   7656.61   9465.31  11445.12  13604.49  15948.99  18453.97  21114.79  23927.53  26888.80  29995.69
        ELEVATION      3.16      3.47      3.79      4.11      4.42      4.74      5.05      5.37      5.68      6.00

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN     1514. TO    29996.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                        HYDROGRAPH AT STATION    RR21A

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                             (CFS)
+    9118.      3.50         1365.       345.        199.        199.
                         (INCHES)     1.967       1.989       1.990       1.990
                          (AC-FT)      677.        685.        685.        685.

  PEAK STORAGE  TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR        24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
       23.      3.50                  5.          1.          1.          1.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR        24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
```

```
     3.41      3.50                 1.14        0.30        0.18        0.18
                        CUMULATIVE AREA =    6.45 SQ MI


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


            **************
            *            *
 128 KK     *      21B   *          SUB
            *            *
            **************
                                RUNOFF FROM SUB-BASIN 21B

               SUBBASIN RUNOFF DATA

 130 BA          SUBBASIN CHARACTERISTICS
                       TAREA        0.28  SUBBASIN AREA

                 PRECIPITATION DATA

  51 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
                  0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                STORM AREA =   13.70

 131 LS          SCS LOSS RATE
                       STRTL        0.50  INITIAL ABSTRACTION
                      CRVNBR       80.00  CURVE NUMBER
                       RTIMP        6.40  PERCENT IMPERVIOUS AREA

                 KINEMATIC WAVE
 132 UK            OVERLAND-FLOW ELEMENT NO. 1
                           L        297.  OVERLAND FLOW LENGTH
                           S      0.0558  SLOPE
                           N       0.200  ROUGHNESS COEFFICIENT
                          PA       100.0  PERCENT OF SUBBASIN
                       DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                 KINEMATIC WAVE
 133 RK            MAIN CHANNEL
                           L       6300.  CHANNEL LENGTH
                           S      0.0381  SLOPE
                           N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                          CA        0.28  CONTRIBUTING AREA
                       SHAPE        TRAP  CHANNEL SHAPE
                          WD       10.00  BOTTOM WIDTH OR DIAMETER
                           Z        3.00  SIDE SLOPE
                      NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                      RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH
                                                                  ***
                                   COMPUTED KINEMATIC PARAMETERS
                                        VARIABLE TIME STEP
                                      (DT SHOWN IS A MINIMUM)

                    ELEMENT    ALPHA       M        DT        DX      PEAK    TIME TO     VOLUME    MAXIMUM
                                                                              PEAK                  CELERITY
                                                   (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                   PLANE1       1.76      1.67      1.95     59.40    569.24    189.05      1.79       0.53
                   MAIN         1.79      1.42      2.60   2100.00    501.85    194.28      1.78      14.35
```

```
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.2637E+02 OUTFLOW=0.2626E+02 BASIN STORAGE=0.2931E-02 PERCENT ERROR=   0.4

                                        INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                  MAIN          1.79      1.42       5.00             494.55    195.00      1.79
      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      21B

    TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.75, TOTAL EXCESS =    1.79

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+     495.      3.25                 53.         13.          8.          8.
                        (INCHES)    1.772       1.785       1.786       1.786
                         (AC-FT)     26.         26.         26.         26.

                        CUMULATIVE AREA =    0.28 SQ MI


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


            **************
            *            *
  134 KK    *     CP21B  *
            *            *
            **************

  135 HC          HYDROGRAPH COMBINATION
                       ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM       1      0
      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION    CP21B

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    9357.      3.50                1417.        358.        207.        207.
                        (INCHES)    1.958       1.981       1.981       1.981
                         (AC-FT)     703.        711.        711.        711.

                        CUMULATIVE AREA =    6.73 SQ MI


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


            **************
            *            *
  136 KK    *     RR21B  *          CP
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*            *
**************
                    ROUTE CP21B TO 21C    WHICH IS 4400'

          HYDROGRAPH ROUTING DATA

138 RS        STORAGE ROUTING
                   NSTPS          1  NUMBER OF SUBREACHES
                    ITYP       FLOW  TYPE OF INITIAL CONDITION
                  RSVRIC      -1.00  INITIAL CONDITION
                       X       0.00 WORKING R AND D COEFFICIENT

139 RC        NORMAL DEPTH CHANNEL
                     ANL      0.055  LEFT OVERBANK N-VALUE
                    ANCH      0.040  MAIN CHANNEL N-VALUE
                     ANR      0.055  RIGHT OVERBANK N-VALUE
                   RLNTH      4400.  REACH LENGTH
                     SEL     0.0205  ENERGY SLOPE
                   ELMAX        0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                CROSS-SECTION DATA
                  --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
141 RY     ELEVATION    6.00     4.00    20.00     0.00     0.00     2.00     4.00     6.00
140 RX     DISTANCE     0.00    10.00    60.00   205.00   295.00   440.00   490.00   500.00
                                                   ***

                                COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

        STORAGE      0.00     14.03     36.96     65.66     97.94    132.92    170.13    208.78    248.59    289.56
        OUTFLOW      0.00    637.58   2511.78   6188.60  11262.24  17724.47  25513.07  34628.88  44969.78  56505.15
      ELEVATION      0.00      1.05      2.11      3.16      4.21      5.26      6.32      7.37      8.42      9.47

        STORAGE    331.69    374.98    419.44    465.05    511.83    559.77    608.87    659.13    710.55    763.13
        OUTFLOW  69214.94  83086.18  98110.84 114284.61 131606.02 150075.81 169696.53 190472.13 212407.91 235509.84
      ELEVATION     10.53     11.58     12.63     13.68     14.74     15.79     16.84     17.89     18.95     20.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN    56505. TO   235510.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                    HYDROGRAPH AT STATION    RR21B

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)      (HR)
                          (CFS)
+    8726.     3.58                1416.        358.        207.        207.
                       (INCHES)    1.956       1.981       1.981       1.981
                        (AC-FT)     702.        711.        711.        711.

 PEAK STORAGE  TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)     (HR)
      82.      3.58                  19.          5.          3.          3.

 PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+   (FEET)     (HR)
     3.68      3.58                1.14        0.29        0.17        0.17

                       CUMULATIVE AREA =    6.73 SQ MI
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*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
142 KK    *     21C    *          SUB
          *            *
          **************
                              RUNOFF FROM SUB-BASIN 21C

             SUBBASIN RUNOFF DATA

144 BA          SUBBASIN CHARACTERISTICS
                      TAREA        0.75  SUBBASIN AREA

                PRECIPITATION DATA

 51 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
                 0.77    1.51    2.65   3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                STORM AREA =   13.70

145 LS          SCS LOSS RATE
                      STRTL        0.50  INITIAL ABSTRACTION
                     CRVNBR       80.00  CURVE NUMBER
                      RTIMP        6.40  PERCENT IMPERVIOUS AREA

                KINEMATIC WAVE
146 UK            OVERLAND-FLOW ELEMENT NO. 1
                          L        297.  OVERLAND FLOW LENGTH
                          S      0.0558  SLOPE
                          N       0.200  ROUGHNESS COEFFICIENT
                         PA       100.0  PERCENT OF SUBBASIN
                      DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                KINEMATIC WAVE
147 RK            MAIN CHANNEL
                          L       9900.  CHANNEL LENGTH
                          S      0.0328  SLOPE
                          N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                         CA        0.75  CONTRIBUTING AREA
                      SHAPE        TRAP  CHANNEL SHAPE
                         WD       20.00  BOTTOM WIDTH OR DIAMETER
                          Z        3.00  SIDE SLOPE
                     NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                     RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH

                                                          ***
                                   COMPUTED KINEMATIC PARAMETERS
                                        VARIABLE TIME STEP
                                     (DT SHOWN IS A MINIMUM)

                  ELEMENT    ALPHA       M        DT        DX      PEAK    TIME TO     VOLUME    MAXIMUM
                                                                             PEAK                  CELERITY
                                                (MIN)      (FT)     (CFS)    (MIN)       (IN)      (FPS)

                  PLANE1      1.76     1.67      1.95     59.40   1542.74    189.05      1.79      0.53
                  MAIN        1.16     1.48      3.27   3300.00   1254.71    196.67      1.78     17.43

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.7147E+02 OUTFLOW=0.7107E+02 BASIN STORAGE=0.9525E-02 PERCENT ERROR=   0.5
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                                    INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                 MAIN          1.16      1.48      5.00            1198.51    195.00      1.78
      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      21C

    TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.75, TOTAL EXCESS =    1.79
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    1199.      3.25                142.        36.         21.         21.
                         (INCHES)   1.765       1.780       1.780       1.780
                          (AC-FT)    70.         71.         71.         71.

                        CUMULATIVE AREA =    0.75 SQ MI


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


            **************
            *            *
  148 KK    *     CP21C  *
            *            *
            **************

  149 HC          HYDROGRAPH COMBINATION
                        ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM       1      0
      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION    CP21C
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    9301.      3.58                1557.       394.        228.        228.
                         (INCHES)   1.936       1.961       1.961       1.961
                          (AC-FT)    772.        782.        782.        782.

                        CUMULATIVE AREA =    7.48 SQ MI


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


            **************
            *            *
  150 KK    *     RR21C  *          CP
            *            *
            **************
                                ROUTE CP21C TO 21D    WHICH IS 5700'
               HYDROGRAPH ROUTING DATA
```

```
152 RS          STORAGE ROUTING
                     NSTPS          1  NUMBER OF SUBREACHES
                      ITYP       FLOW  TYPE OF INITIAL CONDITION
                    RSVRIC      -1.00  INITIAL CONDITION
                         X       0.00 WORKING R AND D COEFFICIENT

153 RC          NORMAL DEPTH CHANNEL
                       ANL      0.055  LEFT OVERBANK N-VALUE
                      ANCH      0.040  MAIN CHANNEL N-VALUE
                       ANR      0.055  RIGHT OVERBANK N-VALUE
                     RLNTH      5700.  REACH LENGTH
                       SEL     0.0181  ENERGY SLOPE
                     ELMAX        0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                   CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
155 RY        ELEVATION      5.50      3.50      2.50      0.00      0.00      2.50      3.50      5.50
154 RX        DISTANCE       0.00     20.00    175.00    210.00    300.00    335.00    490.00    510.00
                                                          ***

                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00      3.56      7.43     11.61     16.09     20.88     25.98     31.39     37.10     43.32
          OUTFLOW       0.00     58.04    187.48    375.33    617.91    914.02   1263.50   1666.84   2124.82   2669.63
        ELEVATION       0.00      0.29      0.58      0.87      1.16      1.45      1.74      2.03      2.32      2.61

          STORAGE      52.32     64.71     80.51     98.39    116.50    134.83    153.38    172.15    191.14    210.35
          OUTFLOW    3352.99   4163.08   5129.75   6330.52   7703.30   9230.41  10903.79  12717.49  14666.87  16748.21
        ELEVATION       2.89      3.18      3.47      3.76      4.05      4.34      4.63      4.92      5.21      5.50

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

                       HYDROGRAPH AT STATION    RR21C

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR     41.58-HR
+   (CFS)      (HR)
                          (CFS)
+    7742.     3.75                1550.        394.        228.        228.
                        (INCHES)   1.928       1.961       1.961       1.961
                         (AC-FT)    769.        782.        782.        782.

 PEAK STORAGE  TIME                          MAXIMUM AVERAGE STORAGE
                                    6-HR        24-HR       72-HR     41.58-HR
+  (AC-FT)     (HR)
     117.      3.75                  28.          7.          4.          4.

 PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                    6-HR        24-HR       72-HR     41.58-HR
+   (FEET)     (HR)
     4.06      3.75                 1.55        0.42        0.24        0.24

                       CUMULATIVE AREA =    7.48 SQ MI


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


           **************
           *            *
156 KK     *      21D   *        SUB
           *            *
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                    RUNOFF FROM SUB-BASIN 21D

          SUBBASIN RUNOFF DATA

158 BA        SUBBASIN CHARACTERISTICS
                    TAREA        1.06  SUBBASIN AREA

              PRECIPITATION DATA

 51 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
               0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                          STORM AREA =   13.70

159 LS        SCS LOSS RATE
                    STRTL        0.50  INITIAL ABSTRACTION
                   CRVNBR       80.00  CURVE NUMBER
                    RTIMP        6.40  PERCENT IMPERVIOUS AREA

              KINEMATIC WAVE
160 UK          OVERLAND-FLOW ELEMENT NO. 1
                        L        297.  OVERLAND FLOW LENGTH
                        S      0.0558  SLOPE
                        N       0.200  ROUGHNESS COEFFICIENT
                       PA       100.0  PERCENT OF SUBBASIN
                    DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

              KINEMATIC WAVE
161 RK          MAIN CHANNEL
                        L      14500.  CHANNEL LENGTH
                        S      0.0252  SLOPE
                        N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                       CA        1.06  CONTRIBUTING AREA
                    SHAPE        TRAP  CHANNEL SHAPE
                       WD       30.00  BOTTOM WIDTH OR DIAMETER
                        Z        3.00  SIDE SLOPE
                   NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                   RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH

                                                   ***
                              COMPUTED KINEMATIC PARAMETERS
                                   VARIABLE TIME STEP
                                (DT SHOWN IS A MINIMUM)

                ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                             PEAK                   CELERITY
                                                (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                PLANE1      1.76      1.67      1.95     59.40   2184.17    189.05      1.79       0.53
                MAIN        0.78      1.51      3.14   2900.00   1482.46    200.86      1.78      15.85

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.1012E+03 OUTFLOW=0.1006E+03 BASIN STORAGE=0.1920E-01 PERCENT ERROR=   0.5

                                   INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                MAIN        0.78      1.51      5.00             1436.69    200.00      1.78
    ***          ***          ***          ***          ***

                     HYDROGRAPH AT STATION      21D
```

```
    TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.75, TOTAL EXCESS =    1.79
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                                    (CFS)
+    1437.      3.33                201.         51.         29.         29.
                                (INCHES)      1.762       1.782       1.782       1.782
                                 (AC-FT)      100.        101.        101.        101.
                            CUMULATIVE AREA =    1.06 SQ MI


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


            **************
            *            *
  162 KK    *     CP21D  *
            *            *
            **************

  163 HC          HYDROGRAPH COMBINATION
                       ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM       1      0
      ***             ***             ***            ***            ***
                         HYDROGRAPH AT STATION    CP21D
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                                    (CFS)
+    8489.      3.67                1750.        445.        257.        257.
                                (INCHES)      1.905       1.939       1.939       1.939
                                 (AC-FT)      868.        883.        883.        883.
                            CUMULATIVE AREA =    8.54 SQ MI


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


            **************
            *            *
  164 KK    *     RR21D  *          CP
            *            *
            **************
                                ROUTE CP21D TO 21E    WHICH IS 1100'
               HYDROGRAPH ROUTING DATA

  166 RS          STORAGE ROUTING
                       NSTPS           1  NUMBER OF SUBREACHES
                        ITYP        FLOW  TYPE OF INITIAL CONDITION
                      RSVRIC       -1.00  INITIAL CONDITION
                           X        0.00 WORKING R AND D COEFFICIENT

  167 RC          NORMAL DEPTH CHANNEL
                         ANL       0.055  LEFT OVERBANK N-VALUE
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                    ANCH      0.040  MAIN CHANNEL N-VALUE
                     ANR      0.055  RIGHT OVERBANK N-VALUE
                   RLNTH      1100.  REACH LENGTH
                     SEL     0.0200  ENERGY SLOPE
                   ELMAX        0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                CROSS-SECTION DATA
                      --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 169 RY     ELEVATION     5.50      3.50      2.50      0.00      0.00      2.50      3.50      5.50
 168 RX     DISTANCE      0.00     20.00    175.00    210.00    300.00    335.00    490.00    510.00

                                                  ***

                                COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE      0.00      0.69      1.43      2.24      3.11      4.03      5.01      6.06      7.16      8.36
          OUTFLOW      0.00     61.01    197.08    394.53    649.54    960.79   1328.17   1752.14   2233.56   2806.26
        ELEVATION      0.00      0.29      0.58      0.87      1.16      1.45      1.74      2.03      2.32      2.61

          STORAGE     10.10     12.49     15.54     18.99     22.48     26.02     29.60     33.22     36.89     40.59
          OUTFLOW   3524.59   4376.13   5392.27   6654.50   8097.53   9702.79  11461.81  13368.33  15417.47  17605.33
        ELEVATION      2.89      3.18      3.47      3.76      4.05      4.34      4.63      4.92      5.21      5.50

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      395. TO    17605.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                     HYDROGRAPH AT STATION    RR21D

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)      (HR)
                          (CFS)
+    8466.     3.75                1749.        445.        257.        257.
                        (INCHES)   1.905       1.939       1.939       1.939
                         (AC-FT)    867.        883.        883.        883.

 PEAK STORAGE  TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)     (HR)
      23.      3.75                   6.          2.          1.          1.

 PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+   (FEET)     (HR)
     4.12      3.75                1.61        0.44        0.25        0.25

                       CUMULATIVE AREA =    8.54 SQ MI


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


            **************
            *            *
 170 KK     *      21E   *          SUB
            *            *
            **************
                                RUNOFF FROM SUB-BASIN 21E

            SUBBASIN RUNOFF DATA
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```
 172 BA          SUBBASIN CHARACTERISTICS
                       TAREA        0.26  SUBBASIN AREA

                 PRECIPITATION DATA

  51 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
                  0.77    1.51    2.65   3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                STORM AREA =   13.70

 173 LS          SCS LOSS RATE
                       STRTL        0.50  INITIAL ABSTRACTION
                      CRVNBR       80.00  CURVE NUMBER
                       RTIMP        6.40  PERCENT IMPERVIOUS AREA

                 KINEMATIC WAVE
 174 UK            OVERLAND-FLOW ELEMENT NO. 1
                           L        297.  OVERLAND FLOW LENGTH
                           S      0.0333  SLOPE
                           N       0.200  ROUGHNESS COEFFICIENT
                          PA       100.0  PERCENT OF SUBBASIN
                       DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                 KINEMATIC WAVE
 175 RK            MAIN CHANNEL
                           L       6600.  CHANNEL LENGTH
                           S      0.0288  SLOPE
                           N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                          CA        0.26  CONTRIBUTING AREA
                       SHAPE        TRAP  CHANNEL SHAPE
                          WD       15.00  BOTTOM WIDTH OR DIAMETER
                           Z        3.00  SIDE SLOPE
                      NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                      RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH

                                                   ***
                                  COMPUTED KINEMATIC PARAMETERS
                                       VARIABLE TIME STEP
                                   (DT SHOWN IS A MINIMUM)

                   ELEMENT    ALPHA      M        DT       DX      PEAK    TIME TO     VOLUME    MAXIMUM
                                                                            PEAK                  CELERITY
                                                (MIN)     (FT)    (CFS)     (MIN)      (IN)      (FPS)

                  PLANE1       1.36    1.67      2.31    59.40   478.14    190.51      1.79       0.43
                  MAIN         1.28    1.45      3.07  2200.00   406.69    198.47      1.78      11.93

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.2455E+02 OUTFLOW=0.2442E+02 BASIN STORAGE=0.4121E-02 PERCENT ERROR=   0.5

                                     INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                  MAIN         1.28    1.45      5.00            389.90    200.00      1.78

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

                        HYDROGRAPH AT STATION      21E

    TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.75, TOTAL EXCESS =    1.79

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
```

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+     390.      3.33                (CFS)
                                       49.        12.         7.         7.
                                 (INCHES)     1.766      1.784      1.784      1.784
                                  (AC-FT)       24.        24.        24.        24.

                          CUMULATIVE AREA =    0.26 SQ MI


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


              **************
              *            *
  176 KK      *     CP21E  *
              *            *
              **************

  177 HC          HYDROGRAPH COMBINATION
                        ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM       1      0
      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    CP21E

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR      72-HR     41.58-HR
+   (CFS)       (HR)
                                    (CFS)
+    8604.      3.75                1797.       457.       264.       264.
                                 (INCHES)     1.900      1.934      1.935      1.935
                                  (AC-FT)      891.       907.       907.       907.

                          CUMULATIVE AREA =    8.79 SQ MI


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


              **************
              *            *
  178 KK      *     RR21E  *          CP
              *            *
              **************
                                ROUTE CP21E TO 21F    WHICH IS 2800'

                HYDROGRAPH ROUTING DATA

  180 RS          STORAGE ROUTING
                        NSTPS           1  NUMBER OF SUBREACHES
                         ITYP        FLOW  TYPE OF INITIAL CONDITION
                        RSVRIC       -1.00  INITIAL CONDITION
                             X        0.00 WORKING R AND D COEFFICIENT

  181 RC          NORMAL DEPTH CHANNEL
                          ANL       0.055  LEFT OVERBANK N-VALUE
                         ANCH       0.040  MAIN CHANNEL N-VALUE
                          ANR       0.055  RIGHT OVERBANK N-VALUE
                        RLNTH       2800.  REACH LENGTH
                          SEL      0.0143  ENERGY SLOPE
                        ELMAX         0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION
```

```
                                   CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 183 RY      ELEVATION     10.50      4.50      3.50      0.00      0.00      3.50      4.50     10.50
 182 RX      DISTANCE       0.00     70.00    170.00    180.00    230.00    240.00    340.00    410.00
                                                          ***

                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE      0.00      1.83      3.78      5.83      8.00     10.28     12.68     16.03     23.10     32.82
          OUTFLOW      0.00     83.61    268.02    532.40    869.67   1276.42   1750.95   2348.00   3170.09   4356.31
        ELEVATION      0.00      0.55      1.11      1.66      2.21      2.76      3.32      3.87      4.42      4.97

          STORAGE     43.03     53.70     64.83     76.41     88.46    100.96    113.92    127.34    141.22    155.56
          OUTFLOW   5845.45   7604.04   9620.48  11888.69  14405.58  17169.97  20181.89  23442.26  26952.63  30714.99
        ELEVATION      5.53      6.08      6.63      7.18      7.74      8.29      8.84      9.39      9.95     10.50

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

                     HYDROGRAPH AT STATION    RR21E

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    8356.      3.83      1795.       457.        264.        264.
                       (INCHES)     1.897       1.934       1.935       1.935
                        (AC-FT)      890.        907.        907.        907.

 PEAK STORAGE   TIME                        MAXIMUM AVERAGE STORAGE
                                    6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
      58.       3.83        14.         4.          2.          2.

  PEAK STAGE    TIME                        MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
      6.29      3.83       2.61        0.71        0.41        0.41

                     CUMULATIVE AREA =    8.79 SQ MI


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


            **************
            *            *
 184 KK     *       21F  *          SUB
            *            *
            **************
                                RUNOFF FROM SUB-BASIN 21F

               SUBBASIN RUNOFF DATA

 186 BA          SUBBASIN CHARACTERISTICS
                       TAREA        0.47  SUBBASIN AREA

                 PRECIPITATION DATA

  51 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
                  0.77    1.51    2.65   3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00
```

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                                                STORM AREA =   13.70

 187 LS          SCS LOSS RATE
                      STRTL        0.50  INITIAL ABSTRACTION
                     CRVNBR       80.00  CURVE NUMBER
                      RTIMP        6.40  PERCENT IMPERVIOUS AREA

                 KINEMATIC WAVE
 188 UK            OVERLAND-FLOW ELEMENT NO. 1
                          L        297.  OVERLAND FLOW LENGTH
                          S      0.0333  SLOPE
                          N       0.200  ROUGHNESS COEFFICIENT
                         PA       100.0  PERCENT OF SUBBASIN
                     DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                 KINEMATIC WAVE
 189 RK            MAIN CHANNEL
                          L      10400.  CHANNEL LENGTH
                          S      0.0279  SLOPE
                          N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                         CA        0.47  CONTRIBUTING AREA
                      SHAPE        TRAP  CHANNEL SHAPE
                         WD       20.00  BOTTOM WIDTH OR DIAMETER
                          Z        3.00  SIDE SLOPE
                     NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                     RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH

                                                   ***
                                   COMPUTED KINEMATIC PARAMETERS
                                        VARIABLE TIME STEP
                                     (DT SHOWN IS A MINIMUM)

                  ELEMENT    ALPHA       M        DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                              PEAK                  CELERITY
                                                (MIN)      (FT)     (CFS)     (MIN)       (IN)      (FPS)

                 PLANE1       1.36      1.67      2.31     59.40    872.55    190.51      1.79      0.43
                 MAIN         1.07      1.48      4.38   3466.67    663.78    201.46      1.78     13.40

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.4481E+02 OUTFLOW=0.4446E+02 BASIN STORAGE=0.8833E-02 PERCENT ERROR=   0.8

                                        INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                 MAIN         1.07      1.48      5.00              639.63    200.00      1.78
     ***           ***          ***       ***       ***               ***

                          HYDROGRAPH AT STATION      21F

    TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.75, TOTAL EXCESS =    1.79

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+     640.      3.33                  89.         22.         13.         13.
                        (INCHES)    1.755      1.775       1.776       1.776
                         (AC-FT)     44.         44.         44.         44.

                        CUMULATIVE AREA =    0.47 SQ MI
```

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

            **************
            *            *
  190 KK    *     CP21F  *
            *            *
            **************

  191 HC          HYDROGRAPH COMBINATION
                       ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM       1      0
      ***             ***            ***            ***            ***

                        HYDROGRAPH AT STATION    CP21F

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                         (CFS)
+    8592.      3.83                1882.        480.        277.        277.
                       (INCHES)     1.889       1.926       1.926       1.926
                        (AC-FT)      933.        951.        952.        952.

                       CUMULATIVE AREA =    9.26 SQ MI


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

            **************
            *            *
  192 KK    *     RR21F  *          CP
            *            *
            **************
                         ROUTE CP21F TO 21G (1900' DOWNSTREAM)

              HYDROGRAPH ROUTING DATA

  194 RS          STORAGE ROUTING
                       NSTPS           1  NUMBER OF SUBREACHES
                        ITYP        FLOW  TYPE OF INITIAL CONDITION
                      RSVRIC       -1.00  INITIAL CONDITION
                           X        0.00 WORKING R AND D COEFFICIENT

  195 RC          NORMAL DEPTH CHANNEL
                         ANL       0.055  LEFT OVERBANK N-VALUE
                        ANCH       0.040  MAIN CHANNEL N-VALUE
                         ANR       0.055  RIGHT OVERBANK N-VALUE
                       RLNTH       1900.  REACH LENGTH
                         SEL      0.0158  ENERGY SLOPE
                       ELMAX         0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                   CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  197 RY        ELEVATION     10.00      8.00      2.00      0.00      0.00      2.00      8.00     10.00
  196 RX        DISTANCE       0.00     20.00     70.00    345.00    455.00    730.00    780.00    800.00
                                                                   ***
                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA
```

```
          STORAGE      0.00      4.19     11.70     22.53     36.62     51.91     67.41     83.10     99.00    115.10
          OUTFLOW      0.00    234.45    962.51   2335.41   4614.26   8222.74  12631.82  17784.35  23639.46  30166.23
        ELEVATION      0.00      0.53      1.05      1.58      2.11      2.63      3.16      3.68      4.21      4.74

          STORAGE    131.40    147.90    164.60    181.50    198.61    215.91    233.43    251.19    269.20    287.44
          OUTFLOW  37340.32  45142.01  53555.01  62565.66  72162.31  82334.98  93056.95 104338.91 116180.28 128576.20
        ELEVATION      5.26      5.79      6.32      6.84      7.37      7.89      8.42      8.95      9.47     10.00

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN    12632. TO   128576.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                        HYDROGRAPH AT STATION    RR21F

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    8571.      3.83                1879.        480.        277.        277.
                        (INCHES)    1.886       1.926       1.926       1.926
                         (AC-FT)     932.        951.        952.        952.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
      53.       3.83                  16.          4.          2.          2.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
      2.67      3.83                 1.15        0.31        0.18        0.18

                       CUMULATIVE AREA =    9.26 SQ MI


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


            **************
            *            *
  198 KK    *      21G   *          SUB
            *            *
            **************
                        RUNOFF FROM SUB-BASIN 21G

               SUBBASIN RUNOFF DATA

  200 BA          SUBBASIN CHARACTERISTICS
                        TAREA        0.02  SUBBASIN AREA

                  PRECIPITATION DATA

   51 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
                   0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                  STORM AREA =   13.70

  201 LS          SCS LOSS RATE
                        STRTL        0.50  INITIAL ABSTRACTION
```

```
                    CRVNBR       80.00  CURVE NUMBER
                     RTIMP        6.40  PERCENT IMPERVIOUS AREA

                 KINEMATIC WAVE
 202 UK            OVERLAND-FLOW ELEMENT NO. 1
                         L        297.  OVERLAND FLOW LENGTH
                         S      0.0333  SLOPE
                         N       0.200  ROUGHNESS COEFFICIENT
                        PA       100.0  PERCENT OF SUBBASIN
                    DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                 KINEMATIC WAVE
 203 RK            MAIN CHANNEL
                         L       4000.  CHANNEL LENGTH
                         S      0.0300  SLOPE
                         N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                        CA        0.02  CONTRIBUTING AREA
                     SHAPE        TRAP  CHANNEL SHAPE
                        WD       10.00  BOTTOM WIDTH OR DIAMETER
                         Z        3.00  SIDE SLOPE
                    NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                    RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH

                                                  ***
                                COMPUTED KINEMATIC PARAMETERS
                                     VARIABLE TIME STEP
                                  (DT SHOWN IS A MINIMUM)

                  ELEMENT    ALPHA      M        DT        DX      PEAK    TIME TO     VOLUME    MAXIMUM
                                                                            PEAK                  CELERITY
                                                (MIN)      (FT)     (CFS)    (MIN)       (IN)      (FPS)

                  PLANE1      1.36     1.67      2.31     59.40     32.00   190.51      1.79      0.43
                  MAIN        1.59     1.42      4.22   1333.33     25.16   199.35      1.78      5.43

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.1643E+01 OUTFLOW=0.1633E+01 BASIN STORAGE=0.2774E-03 PERCENT ERROR=   0.6

                                     INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                  MAIN        1.59     1.42      5.00              24.97   200.00      1.78
      ***          ***         ***       ***        ***
                          HYDROGRAPH AT STATION      21G

    TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.75, TOTAL EXCESS =    1.79
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+     25.       3.33        3.         1.          0.         0.
                        (INCHES)    1.763      1.781       1.782      1.782
                         (AC-FT)       2.         2.          2.         2.
                        CUMULATIVE AREA =    0.02 SQ MI


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

          **************
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                *             *
  204 KK        *     CP21G   *
                *             *
               ***************

  205 HC          HYDROGRAPH COMBINATION
                        ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM        1      0
       ***             ***            ***            ***            ***

                         HYDROGRAPH AT STATION    CP21G

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    8580.      3.83                1882.        480.        277.        277.
                        (INCHES)    1.886       1.926       1.926       1.926
                         (AC-FT)     933.        953.        953.        953.

                        CUMULATIVE AREA =    9.28 SQ MI


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


               ***************
               *             *
  206 KK       *        22   *          SUB
               *             *
               ***************
                                RUNOFF FROM SUB-BASIN 22

                SUBBASIN RUNOFF DATA

  208 BA          SUBBASIN CHARACTERISTICS
                        TAREA        1.39  SUBBASIN AREA

                  PRECIPITATION DATA

   51 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
                   0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                   STORM AREA =   13.70

  209 LS          SCS LOSS RATE
                        STRTL        0.38  INITIAL ABSTRACTION
                       CRVNBR       84.00  CURVE NUMBER
                        RTIMP        5.10  PERCENT IMPERVIOUS AREA

                  KINEMATIC WAVE
  210 UK            OVERLAND-FLOW ELEMENT NO. 1
                            L         225.  OVERLAND FLOW LENGTH
                            S      0.0590  SLOPE
                            N       0.200  ROUGHNESS COEFFICIENT
                           PA       100.0  PERCENT OF SUBBASIN
                        DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                  KINEMATIC WAVE
  211 RK            MAIN CHANNEL
```

```
                    L      13000.  CHANNEL LENGTH
                    S      0.0238  SLOPE
                    N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                   CA        1.39  CONTRIBUTING AREA
                SHAPE        TRAP  CHANNEL SHAPE
                   WD       25.00  BOTTOM WIDTH OR DIAMETER
                    Z        3.00  SIDE SLOPE
               NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
               RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH

                                                  ***
                              COMPUTED KINEMATIC PARAMETERS
                                   VARIABLE TIME STEP
                                (DT SHOWN IS A MINIMUM)

            ELEMENT    ALPHA      M        DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                        PEAK                  CELERITY
                                           (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

            PLANE1      1.81     1.67      1.48     45.00   3824.88   185.87      2.05       0.54
            MAIN        0.86     1.50      3.75   4333.33   2753.82   194.54      2.04      19.93

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.1519E+03 OUTFLOW=0.1510E+03 BASIN STORAGE=0.1238E-01 PERCENT ERROR=   0.5

                                   INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

            MAIN        0.86     1.50      5.00             2735.12   195.00      2.05
   ***          ***          ***          ***          ***

                     HYDROGRAPH AT STATION      22

   TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.49, TOTAL EXCESS =    2.05

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    2735.      3.25                303.        76.         44.         44.
                        (INCHES)   2.034      2.048       2.048       2.048
                         (AC-FT)    150.       151.        151.        151.

                       CUMULATIVE AREA =    1.39 SQ MI


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


            **************
            *            *
  212 KK    *        23  *          SUB
            *            *
            **************
                                RUNOFF FROM SUB-BASIN 23

               SUBBASIN RUNOFF DATA

  214 BA          SUBBASIN CHARACTERISTICS
                        TAREA        0.39  SUBBASIN AREA

                  PRECIPITATION DATA
```

```
 51 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
                      0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                   STORM AREA =   13.70

 215 LS            SCS LOSS RATE
                        STRTL        0.38  INITIAL ABSTRACTION
                       CRVNBR       84.00  CURVE NUMBER
                        RTIMP        6.30  PERCENT IMPERVIOUS AREA

                   KINEMATIC WAVE
 216 UK              OVERLAND-FLOW ELEMENT NO. 1
                              L        225.  OVERLAND FLOW LENGTH
                              S      0.0590  SLOPE
                              N       0.200  ROUGHNESS COEFFICIENT
                             PA       100.0  PERCENT OF SUBBASIN
                          DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                   KINEMATIC WAVE
 217 RK              MAIN CHANNEL
                              L      10200.  CHANNEL LENGTH
                              S      0.0304  SLOPE
                              N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                             CA        0.39  CONTRIBUTING AREA
                          SHAPE        TRAP  CHANNEL SHAPE
                             WD       20.00  BOTTOM WIDTH OR DIAMETER
                              Z        3.00  SIDE SLOPE
                         NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                         RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH

                                                          ***
                                        COMPUTED KINEMATIC PARAMETERS
                                              VARIABLE TIME STEP
                                           (DT SHOWN IS A MINIMUM)

                      ELEMENT    ALPHA       M        DT        DX       PEAK    TIME TO      VOLUME    MAXIMUM
                                                                                    PEAK                  CELERITY
                                                     (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                      PLANE1      1.81      1.67      1.52     45.00   1093.82    185.09       2.07       0.55
                      MAIN        1.12      1.48      4.01   3400.00    752.31    194.24       2.06      14.39

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.4362E+02 OUTFLOW=0.4339E+02 BASIN STORAGE=0.3522E-02 PERCENT ERROR=   0.5

                                        INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                      MAIN        1.12      1.48      5.00              750.06    195.00       2.06

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

                            HYDROGRAPH AT STATION       23

     TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.47, TOTAL EXCESS =    2.07

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
 +   (CFS)       (HR)
                                    (CFS)
 +    750.       3.25                87.         22.         13.         13.
                                 (INCHES)      2.045       2.060       2.060       2.060
                                  (AC-FT)       43.         43.         43.         43.
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                    CUMULATIVE AREA =    0.39 SQ MI


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


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            *            *
  218 KK    *      24A   *          CP
            *            *
            **************
                              COMBINE HYDROGRAPHS FOR SUB 22 AND SUB 23

  220 HC          HYDROGRAPH COMBINATION
                        ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
MANE2 NPLAN,NSTM        1      0
      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      24A

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    3485.      3.25                390.         98.         57.         57.
                        (INCHES)    2.036       2.051       2.051       2.051
                         (AC-FT)     193.        195.        195.        195.

                    CUMULATIVE AREA =    1.78 SQ MI


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


            **************
            *            *
  221 KK    *      24.1  *          CP
            *            *
            **************
                              ROUTE CP 24A TO CP 24.1

               HYDROGRAPH ROUTING DATA

  223 RS          STORAGE ROUTING
                        NSTPS           3  NUMBER OF SUBREACHES
                         ITYP        FLOW  TYPE OF INITIAL CONDITION
                        RSVRIC       -1.00  INITIAL CONDITION
                             X        0.00 WORKING R AND D COEFFICIENT

  224 RC          NORMAL DEPTH CHANNEL
                          ANL       0.055  LEFT OVERBANK N-VALUE
                         ANCH       0.040  MAIN CHANNEL N-VALUE
                          ANR       0.055  RIGHT OVERBANK N-VALUE
                        RLNTH       6800.  REACH LENGTH
                          SEL      0.0257  ENERGY SLOPE
                        ELMAX         0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                   CROSS-SECTION DATA
                          --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  226 RY        ELEVATION     10.00      8.00      3.00      0.00      0.00      3.00      8.00     10.00
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 225 RX        DISTANCE       0.00      1.00    101.00    107.00    122.00    128.00    228.00    229.00
                                                                  ***
                                                  COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

            STORAGE       0.00      1.32      2.81      4.48      6.31      8.32     10.58     14.18     19.51     26.57
            OUTFLOW       0.00     31.22    101.24    203.89    338.11    504.13    713.81   1001.79   1374.65   1855.17
          ELEVATION       0.00      0.53      1.05      1.58      2.11      2.63      3.16      3.68      4.21      4.74

            STORAGE      35.36     45.89     58.14     72.12     87.83    105.27    123.90    142.60    161.35    180.15
            OUTFLOW    2462.85   3215.29   4128.86   5218.97   6500.29   7986.88   9899.50  12068.87  14430.67  16975.64
          ELEVATION       5.26      5.79      6.32      6.84      7.37      7.89      8.42      8.95      9.47     10.00

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN    7987. TO    16976.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                        HYDROGRAPH AT STATION     24.1

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                              (CFS)
+    2831.      3.42          390.        98.         57.         57.
                         (INCHES)      2.035       2.051       2.051       2.051
                          (AC-FT)       193.        195.        195.        195.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
       14.      3.42            2.          1.          0.          0.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
     5.52       3.42           1.63        0.42        0.24        0.24

                         CUMULATIVE AREA =    1.78 SQ MI


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


            **************
            *            *
  227 KK    *        24  *          SUB
            *            *
            **************
                                RUNOFF FROM SUB-BASIN 24
                                DRAINAGE AREA CHANGED TO MATCH VALUE USED BY MICHAEL BAKER
                                Jr., INC.

               SUBBASIN RUNOFF DATA

  231 BA         SUBBASIN CHARACTERISTICS
                       TAREA        0.49  SUBBASIN AREA

                 PRECIPITATION DATA

   51 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
                 0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                STORM AREA =   13.70

 232 LS         SCS LOSS RATE
                      STRTL       0.60  INITIAL ABSTRACTION
                     CRVNBR      77.00  CURVE NUMBER
                      RTIMP       6.80  PERCENT IMPERVIOUS AREA

                KINEMATIC WAVE
 233 UK           OVERLAND-FLOW ELEMENT NO. 1
                          L       295.  OVERLAND FLOW LENGTH
                          S     0.0438  SLOPE
                          N      0.200  ROUGHNESS COEFFICIENT
                         PA      100.0  PERCENT OF SUBBASIN
                      DXMIN          5  MINIMUM NUMBER OF DX INTERVALS

                KINEMATIC WAVE
 234 RK           MAIN CHANNEL
                          L      6800.  CHANNEL LENGTH
                          S     0.0257  SLOPE
                          N      0.045  CHANNEL ROUGHNESS COEFFICIENT
                         CA       0.49  CONTRIBUTING AREA
                      SHAPE       TRAP  CHANNEL SHAPE
                         WD      15.00  BOTTOM WIDTH OR DIAMETER
                          Z       3.00  SIDE SLOPE
                     NDXMIN          2  MINIMUM NUMBER OF DX INTERVALS
                     RUPSTQ         NO  ROUTE UPSTREAM HYDROGRAPH

                                                   ***
                                  COMPUTED KINEMATIC PARAMETERS
                                       VARIABLE TIME STEP
                                   (DT SHOWN IS A MINIMUM)

                  ELEMENT    ALPHA       M        DT        DX      PEAK    TIME TO     VOLUME    MAXIMUM
                                                                            PEAK                  CELERITY
                                                (MIN)      (FT)     (CFS)    (MIN)      (IN)      (FPS)

                  PLANE1      1.56     1.67      2.30     59.00    821.32   190.75      1.60      0.45
                  MAIN        1.21     1.45      2.82   2266.67    707.64   195.94      1.60     13.70

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.4200E+02 OUTFLOW=0.4178E+02 BASIN STORAGE=0.6062E-02 PERCENT ERROR=   0.5

                                     INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                  MAIN        1.21     1.45      5.00              677.96   195.00      1.60
     ***            ***          ***          ***            ***

                       HYDROGRAPH AT STATION       24

    TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.94, TOTAL EXCESS =    1.61

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                                   (CFS)
+     678.      3.25                  83.         21.         12.         12.
                                (INCHES)       1.581       1.597       1.598       1.598
                                 (AC-FT)         41.         42.         42.         42.

                       CUMULATIVE AREA =    0.49 SQ MI
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*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

              **************
              *            *
  235 KK      *     24.2A  *          CP
              *            *
              **************
                                COMBINE SUB 24 & CP 24.1 - APEX

  237 HC            HYDROGRAPH COMBINATION
                          ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM        1      0
       ***             ***            ***            ***            ***

                          HYDROGRAPH AT STATION    24.2A

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                            (CFS)
+    3363.      3.42                473.        119.         69.         69.
                         (INCHES)   1.936       1.953       1.953       1.953
                          (AC-FT)    235.        237.        237.        237.

                         CUMULATIVE AREA =    2.27 SQ MI


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

              **************
              *            *
  238 KK      *       25N  *          SUB
              *            *
              **************
                                RUNOFF FROM SUB-BASIN 25N - APEX

                SUBBASIN RUNOFF DATA

  240 BA          SUBBASIN CHARACTERISTICS
                        TAREA        0.78  SUBBASIN AREA

                  PRECIPITATION DATA

   51 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
                   0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                   STORM AREA =   13.70

  241 LS          SCS LOSS RATE
                        STRTL        0.38  INITIAL ABSTRACTION
                       CRVNBR       84.00  CURVE NUMBER
                        RTIMP        9.00  PERCENT IMPERVIOUS AREA

                  KINEMATIC WAVE
  242 UK            OVERLAND-FLOW ELEMENT NO. 1
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                    L        295.  OVERLAND FLOW LENGTH
                    S      0.0438  SLOPE
                    N       0.200  ROUGHNESS COEFFICIENT
                   PA       100.0  PERCENT OF SUBBASIN
                DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

            KINEMATIC WAVE
 243 RK       MAIN CHANNEL
                    L      16700.  CHANNEL LENGTH
                    S      0.0302  SLOPE
                    N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                   CA        0.78  CONTRIBUTING AREA
                SHAPE        TRAP  CHANNEL SHAPE
                   WD       25.00  BOTTOM WIDTH OR DIAMETER
                    Z        3.00  SIDE SLOPE
               NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
               RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH

                                                  ***
                          COMPUTED KINEMATIC PARAMETERS
                               VARIABLE TIME STEP
                            (DT SHOWN IS A MINIMUM)

              ELEMENT    ALPHA       M        DT        DX      PEAK    TIME TO     VOLUME    MAXIMUM
                                                                          PEAK                  CELERITY
                                             (MIN)      (FT)     (CFS)    (MIN)       (IN)      (FPS)

              PLANE1      1.56     1.67      1.96     59.00   1889.23    189.74      2.11       0.53
              MAIN        0.97     1.50      4.32   4175.00   1241.05    204.05      2.10      16.16

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.8840E+02 OUTFLOW=0.8781E+02 BASIN STORAGE=0.1552E-01 PERCENT ERROR=   0.6

                                   INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

              MAIN        0.97     1.50      5.00            1210.99    205.00      2.10
      ***          ***          ***          ***          ***

                      HYDROGRAPH AT STATION      25N

    TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.43, TOTAL EXCESS =    2.12

  PEAK FLOW     TIME                      MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    1211.      3.42        175.        44.        26.        26.
                       (INCHES)      2.077      2.103      2.104      2.104
                        (AC-FT)        87.        88.        88.        88.

                      CUMULATIVE AREA =    0.78 SQ MI


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


            **************
            *            *
 244 KK     *     25S    *          SUB
            *            *
            **************
                                RUNOFF FROM SUB-BASIN 25S - APEX
```

```
                SUBBASIN RUNOFF DATA

 246 BA           SUBBASIN CHARACTERISTICS
                       TAREA        0.63  SUBBASIN AREA

                  PRECIPITATION DATA

  51 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
                   0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                   STORM AREA =   13.70

 247 LS           SCS LOSS RATE
                       STRTL        0.33  INITIAL ABSTRACTION
                      CRVNBR       86.00  CURVE NUMBER
                       RTIMP        9.00  PERCENT IMPERVIOUS AREA

                  KINEMATIC WAVE
 248 UK             OVERLAND-FLOW ELEMENT NO. 1
                            L         295.  OVERLAND FLOW LENGTH
                            S      0.0438  SLOPE
                            N       0.200  ROUGHNESS COEFFICIENT
                           PA       100.0  PERCENT OF SUBBASIN
                        DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                  KINEMATIC WAVE
 249 RK             MAIN CHANNEL
                            L       8900.  CHANNEL LENGTH
                            S      0.0278  SLOPE
                            N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                           CA        0.63  CONTRIBUTING AREA
                        SHAPE        TRAP  CHANNEL SHAPE
                           WD       25.00  BOTTOM WIDTH OR DIAMETER
                            Z        3.00  SIDE SLOPE
                       NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                       RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH

                                                        ***
                                   COMPUTED KINEMATIC PARAMETERS
                                        VARIABLE TIME STEP
                                     (DT SHOWN IS A MINIMUM)

                    ELEMENT    ALPHA       M        DT        DX      PEAK    TIME TO     VOLUME    MAXIMUM
                                                                              PEAK                  CELERITY
                                                   (MIN)      (FT)    (CFS)    (MIN)      (IN)      (FPS)

                    PLANE1      1.56      1.67      1.85     59.00  1652.34   188.19      2.26      0.55
                    MAIN        0.93      1.50      2.96   2966.67  1378.67   195.18      2.25     16.73

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.7554E+02 OUTFLOW=0.7520E+02 BASIN STORAGE=0.9709E-02 PERCENT ERROR=   0.4

                                        INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                    MAIN        0.93      1.50      5.00            1374.01   195.00      2.25

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

                          HYDROGRAPH AT STATION      25S

    TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.28, TOTAL EXCESS =    2.26
```

```
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    1374.      3.25                150.         38.         22.         22.
                         (INCHES)   2.232       2.252       2.252       2.252
                          (AC-FT)    74.         75.         75.         75.

                         CUMULATIVE AREA =    0.63 SQ MI


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


            **************
            *            *
  250 KK    *     25.1   *          CP
            *            *
            **************
                                COMBINE HYDROGRAPHS FOR SUB-BASINS 25N AND 25S

  252 HC          HYDROGRAPH COMBINATION
                        ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM       1      0
      ***             ***            ***            ***            ***

                          HYDROGRAPH AT STATION     25.1

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    2351.      3.33                325.         82.         47.         47.
                         (INCHES)   2.145       2.169       2.170       2.170
                          (AC-FT)   161.        163.        163.        163.

                         CUMULATIVE AREA =    1.41 SQ MI


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


            **************
            *            *
  253 KK    *    24.2B   *          CP
            *            *
            **************
                                COMBINE TOTAL HYDROGRAPH 24.2A WITH 25.1

  255 HC          HYDROGRAPH COMBINATION
                        ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM       1      0
      ***             ***            ***            ***            ***

                          HYDROGRAPH AT STATION    24.2B

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
```

```
                                        6-HR       24-HR      72-HR     41.58-HR
+   (CFS)       (HR)
                              (CFS)
+    5463.      3.42                    798.       201.       116.       116.
                          (INCHES)     2.016      2.035      2.036      2.036
                           (AC-FT)     396.       400.       400.       400.

                          CUMULATIVE AREA =    3.68 SQ MI


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


            **************
            *            *
 256 KK     *    PIMARD  *          CP
            *            *
            **************
                          ROUTE THE TOTAL HYDROGRAPH AT THE CONCENTRATION POINT
                          24.2B TO THE CULVERT AT THE PIMA ROAD. THERE IS NO
                          CONTRIBUTING AREA AT THIS CONCENTRATION POINT.

               HYDROGRAPH ROUTING DATA

 260 RS          STORAGE ROUTING
                      NSTPS          1  NUMBER OF SUBREACHES
                       ITYP       FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC      -1.00  INITIAL CONDITION
                          X       0.00 WORKING R AND D COEFFICIENT

 261 RC          NORMAL DEPTH CHANNEL
                        ANL      0.055  LEFT OVERBANK N-VALUE
                       ANCH      0.040  MAIN CHANNEL N-VALUE
                        ANR      0.055  RIGHT OVERBANK N-VALUE
                      RLNTH      2000.  REACH LENGTH
                        SEL     0.0287  ENERGY SLOPE
                      ELMAX        0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                   CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 263 RY       ELEVATION    10.00      8.00      3.00      0.00      0.00      3.00      8.00     10.00
 262 RX       DISTANCE      0.00      1.00    101.00    107.00    122.00    128.00    228.00    229.00
                                                          ***

                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE      0.00      0.39      0.83      1.32      1.86      2.45      3.11      4.17      5.74      7.82
          OUTFLOW      0.00     33.00    106.99    215.46    357.30    532.75    754.33   1058.65   1452.67   1960.46
        ELEVATION      0.00      0.53      1.05      1.58      2.11      2.63      3.16      3.68      4.21      4.74

          STORAGE     10.40     13.50     17.10     21.21     25.83     30.96     36.44     41.94     47.46     52.98
          OUTFLOW   2602.63   3397.77   4363.19   5515.17   6869.22   8440.18  10461.35  12753.84  15249.69  17939.09
        ELEVATION      5.26      5.79      6.32      6.84      7.37      7.89      8.42      8.95      9.47     10.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      357. TO    17939.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                       HYDROGRAPH AT STATION   PIMARD

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
```

```
                                        6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    5381.      3.42                    798.        201.        116.        116.
                        (INCHES)      2.015       2.035       2.036       2.036
                         (AC-FT)       396.        400.        400.        400.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                        6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
      21.       3.42                      3.          1.          1.          1.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                        6-HR       24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
      6.78      3.42                    2.30        0.61        0.35        0.35

                        CUMULATIVE AREA =    3.68 SQ MI


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


            **************
            *            *
  264 KK    *    RR24.2  *          CP
            *            *
            **************
                          ROUTE THE TOTAL HYDROGRAPH AT CONCENTRATION POINT
                          24.2B FROM THE CULVERT UNDER PIMA ROAD TO CONCENTRATION
                          POINT 21.05.

              HYDROGRAPH ROUTING DATA

  268 RS        STORAGE ROUTING
                     NSTPS          1  NUMBER OF SUBREACHES
                      ITYP       FLOW  TYPE OF INITIAL CONDITION
                    RSVRIC      -1.00  INITIAL CONDITION
                         X       0.00 WORKING R AND D COEFFICIENT

  269 RC        NORMAL DEPTH CHANNEL
                       ANL      0.055  LEFT OVERBANK N-VALUE
                      ANCH      0.040  MAIN CHANNEL N-VALUE
                       ANR      0.055  RIGHT OVERBANK N-VALUE
                     RLNTH      3050.  REACH LENGTH
                       SEL     0.0238  ENERGY SLOPE
                     ELMAX        0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                   CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  271 RY      ELEVATION     10.00      8.00      3.00      0.00      0.00      3.00      8.00     10.00
  270 RX      DISTANCE       0.00      1.00    101.00    107.00    122.00    128.00    228.00    229.00

                                                   ***

                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00      0.59      1.26      2.01      2.83      3.73      4.74      6.36      8.75     11.92
          OUTFLOW       0.00     30.05     97.43    196.21    325.38    485.14    686.92    964.05   1322.86   1785.28
        ELEVATION       0.00      0.53      1.05      1.58      2.11      2.63      3.16      3.68      4.21      4.74

          STORAGE      15.86     20.58     26.08     32.35     39.39     47.22     55.57     63.96     72.37     80.80
          OUTFLOW    2370.06   3094.15   3973.31   5022.35   6255.39   7685.98   9526.54  11614.18  13887.00  16336.08
        ELEVATION       5.26      5.79      6.32      6.84      7.37      7.89      8.42      8.95      9.47     10.00
```

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*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN    13887. TO    16336.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                        HYDROGRAPH AT STATION   RR24.2

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    5136.      3.50                 797.        201.        116.        116.
                        (INCHES)    2.014       2.035       2.036       2.036
                         (AC-FT)    395.        400.        400.        400.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                    6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
      33.       3.50                   6.          1.          1.          1.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
     6.89       3.50                2.42        0.64        0.37        0.37

                        CUMULATIVE AREA =    3.68 SQ MI


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


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            *            *
  272 KK    *    C21.05  *      CONFLUENCE OF DGB CHANNELS NEAR MID-SECTION 36
            *            *
            **************
                                COMBINE HYDROGRAPH CP21G WITH HYDROGRAPH RR24.2
                                (FROM THE PIMA ROAD CULVERT)

  275 HC          HYDROGRAPH COMBINATION
                        ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
MANE2 NPLAN,NSTM       1      0
      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION   C21.05

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+   11835.      3.75                2677.        682.        394.        394.
                        (INCHES)    1.921       1.957       1.957       1.957
                         (AC-FT)    1327.       1353.       1353.       1353.

                        CUMULATIVE AREA =   12.96 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
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                **************
                *            *
  276 KK        *     R21G   *          CP
                *            *
                **************
                                ROUTE CP21G(21.05)TO 21H WHICH IS 3100'

                HYDROGRAPH ROUTING DATA

  278 RS          STORAGE ROUTING
                        NSTPS          1  NUMBER OF SUBREACHES
                         ITYP       FLOW  TYPE OF INITIAL CONDITION
                       RSVRIC      -1.00  INITIAL CONDITION
                            X       0.00  WORKING R AND D COEFFICIENT

  279 RC          NORMAL DEPTH CHANNEL
                          ANL      0.055  LEFT OVERBANK N-VALUE
                         ANCH      0.040  MAIN CHANNEL N-VALUE
                          ANR      0.055  RIGHT OVERBANK N-VALUE
                        RLNTH      3100.  REACH LENGTH
                          SEL     0.0194  ENERGY SLOPE
                        ELMAX        0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                          CROSS-SECTION DATA
                              --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  281 RY        ELEVATION      9.00     4.00     1.50     0.00     0.00     1.50     4.00     9.00
  280 RX        DISTANCE       0.00    90.00   120.00   355.00   585.00   820.00   850.00   940.00
                                                                  ***

                                                COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00     10.26     25.51     45.78     69.44     93.54    118.04    142.91    168.17    193.84
          OUTFLOW       0.00    392.78   1439.00   3230.72   6298.69  10280.65  15025.67  20488.34  26635.34  33431.25
        ELEVATION       0.00      0.47      0.95      1.42      1.89      2.37      2.84      3.32      3.79      4.26

          STORAGE     220.07    246.87    274.24    302.19    330.72    359.82    389.50    419.75    450.57    481.97
          OUTFLOW   40866.80  48938.79  57637.09  66953.80  76882.58  87418.43  98557.38 110296.27 122632.68 135564.81
        ELEVATION       4.74      5.21      5.68      6.16      6.63      7.11      7.58      8.05      8.53      9.00

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN    40867. TO   135565.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                        HYDROGRAPH AT STATION     R21G

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                              (CFS)
+   11680.      3.83          2670.        682.        394.        394.
                         (INCHES)  1.915       1.957       1.957       1.957
                          (AC-FT)  1324.       1353.       1353.       1353.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR        24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
     101.       3.83                 33.          9.          5.          5.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR        24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
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     2.51      3.83                 1.04        0.28        0.16        0.16
                        CUMULATIVE AREA =   12.96 SQ MI


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


            **************
            *            *
 282 KK     *      21H   *          SUB
            *            *
            **************
                                RUNOFF FROM SUB-BASIN 21H

               SUBBASIN RUNOFF DATA

 284 BA          SUBBASIN CHARACTERISTICS
                       TAREA        0.04  SUBBASIN AREA

                 PRECIPITATION DATA

  51 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
                  0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                 STORM AREA =   13.70

 285 LS          SCS LOSS RATE
                      STRTL        0.50  INITIAL ABSTRACTION
                     CRVNBR       80.00  CURVE NUMBER
                      RTIMP        6.40  PERCENT IMPERVIOUS AREA

                 KINEMATIC WAVE
 286 UK            OVERLAND-FLOW ELEMENT NO. 1
                          L        297.  OVERLAND FLOW LENGTH
                          S      0.0333  SLOPE
                          N       0.200  ROUGHNESS COEFFICIENT
                         PA       100.0  PERCENT OF SUBBASIN
                      DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                 KINEMATIC WAVE
 287 RK            MAIN CHANNEL
                          L       4600.  CHANNEL LENGTH
                          S      0.0278  SLOPE
                          N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                         CA        0.04  CONTRIBUTING AREA
                      SHAPE        TRAP  CHANNEL SHAPE
                         WD       20.00  BOTTOM WIDTH OR DIAMETER
                          Z        3.00  SIDE SLOPE
                     NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                     RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH

                                                          ***
                                   COMPUTED KINEMATIC PARAMETERS
                                        VARIABLE TIME STEP
                                     (DT SHOWN IS A MINIMUM)

                   ELEMENT    ALPHA       M        DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                              PEAK                  CELERITY
                                                   (MIN)     (FT)     (CFS)    (MIN)       (IN)      (FPS)

                  PLANE1        1.36      1.67      2.31     59.40     80.19   190.51       1.79       0.43
                  MAIN          1.07      1.48      4.21   1533.33     62.20   199.67       1.78       6.27
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CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.4118E+01 OUTFLOW=0.4088E+01 BASIN STORAGE=0.8180E-03 PERCENT ERROR=   0.7

                                    INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                 MAIN          1.07      1.48      5.00              61.96    200.00      1.78
     ***            ***            ***            ***            ***

                      HYDROGRAPH AT STATION      21H

   TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.75, TOTAL EXCESS =    1.79

  PEAK FLOW     TIME                      MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+      62.      3.33                8.          2.          1.          1.
                        (INCHES)   1.761       1.781       1.781       1.781
                         (AC-FT)     4.          4.          4.          4.

                       CUMULATIVE AREA =    0.04 SQ MI


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


            **************
            *            *
  288 KK    *      26N   *
            *            *
            **************
                              Runoff from sub-basin 26N

                 SUBBASIN RUNOFF DATA

  290 BA           SUBBASIN CHARACTERISTICS
                        TAREA        0.64  SUBBASIN AREA

                   PRECIPITATION DATA

   51 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
                    0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                   STORM AREA =   13.70

  291 LS           SCS LOSS RATE
                        STRTL        0.67  INITIAL ABSTRACTION
                       CRVNBR       75.00  CURVE NUMBER
                        RTIMP       12.70  PERCENT IMPERVIOUS AREA

                   KINEMATIC WAVE
  292 UK             OVERLAND-FLOW ELEMENT NO. 1
                            L        200.  OVERLAND FLOW LENGTH
                            S      0.0250  SLOPE
                            N       0.200  ROUGHNESS COEFFICIENT
                           PA       100.0  PERCENT OF SUBBASIN
                        DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                   KINEMATIC WAVE
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```
 293 RK            MAIN CHANNEL
                          L      12000.  CHANNEL LENGTH
                          S      0.0263  SLOPE
                          N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                         CA        0.64  CONTRIBUTING AREA
                      SHAPE        TRAP  CHANNEL SHAPE
                         WD       35.00  BOTTOM WIDTH OR DIAMETER
                          Z       10.00  SIDE SLOPE
                     NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                     RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH

                                                  ***
                                  COMPUTED KINEMATIC PARAMETERS
                                       VARIABLE TIME STEP
                                    (DT SHOWN IS A MINIMUM)

                   ELEMENT    ALPHA       M        DT        DX      PEAK    TIME TO     VOLUME    MAXIMUM
                                                                              PEAK                  CELERITY
                                                  (MIN)      (FT)    (CFS)    (MIN)       (IN)      (FPS)

                  PLANE1        1.18      1.67      2.08     40.00   1089.60   190.54      1.61       0.33
                  MAIN          0.87      1.43      4.40   2400.00    674.69   209.64      1.60       9.37

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.5489E+02 OUTFLOW=0.5457E+02 BASIN STORAGE=0.9370E-02 PERCENT ERROR=   0.6

                                         INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                  MAIN          0.87      1.43      5.00              668.91   210.00      1.61
      ***            ***            ***            ***            ***

                       HYDROGRAPH AT STATION      26N

    TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.93, TOTAL EXCESS =    1.61

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+     669.      3.50        108.        28.         16.         16.
                       (INCHES)      1.582       1.606       1.607       1.607
                        (AC-FT)        54.         55.         55.         55.

                       CUMULATIVE AREA =    0.64 SQ MI


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


            **************
            *            *
 294 KK     *     CP21H  *        JOMAX RD
            *            *
            **************

 295 KO           OUTPUT CONTROL VARIABLES
                       IPRNT           3  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

 296 HC           HYDROGRAPH COMBINATION
                       ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE
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                                                                    ***
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0

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

                        HYDROGRAPH AT STATION    CP21H

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                            (CFS)
+   12041.      3.83                2784.        711.        411.        411.
                          (INCHES)  1.898       1.940       1.940       1.940
                           (AC-FT)  1381.       1411.       1412.       1412.

                          CUMULATIVE AREA =   13.64 SQ MI


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


            **************
            *            *
  297 KK    *     RR21H  *          CP
            *            *
            **************
                                ROUTE HYDROGRAPH AT CONCENTRATION POINT 21H   DOWNSTREAM FROM
                                JOMAX ROAD          THERE IS NO ADDITIONAL CONTRIBUTING
                                DRAINAGE AREA AT THIS CONCENTRATION POINT.  USED CHANNEL
                                GEOMETRY                          FROM REACH SIX
                                     DEVELOPED BY C. LOVELY

                HYDROGRAPH ROUTING DATA

  303 RS          STORAGE ROUTING
                        NSTPS          1  NUMBER OF SUBREACHES
                         ITYP       FLOW  TYPE OF INITIAL CONDITION
                        RSVRIC      -1.00  INITIAL CONDITION
                             X       0.00 WORKING R AND D COEFFICIENT

  304 RC          NORMAL DEPTH CHANNEL
                          ANL      0.055  LEFT OVERBANK N-VALUE
                         ANCH      0.040  MAIN CHANNEL N-VALUE
                          ANR      0.055  RIGHT OVERBANK N-VALUE
                        RLNTH      2390.  REACH LENGTH
                          SEL     0.0188  ENERGY SLOPE
                        ELMAX        0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                          CROSS-SECTION DATA
                            --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  306 RY        ELEVATION      9.00      4.00      1.50      0.00      0.00      1.50      4.00      9.00
  305 RX        DISTANCE       0.00     90.00    120.00    355.00    585.00    820.00    850.00    940.00
                                                                    ***

                                          COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

            STORAGE       0.00      7.91     19.67     35.29     53.53     72.12     91.00    110.18    129.65    149.44
            OUTFLOW       0.00    386.66   1416.57   3180.37   6200.53  10120.42  14791.49  20169.02  26220.22  32910.21
          ELEVATION       0.00      0.47      0.95      1.42      1.89      2.37      2.84      3.32      3.79      4.26

            STORAGE     169.66    190.33    211.43    232.98    254.97    277.41    300.29    323.61    347.38    371.59
            OUTFLOW   40229.88  48176.06  56738.80  65910.30  75684.34  86055.98  97021.32 108577.26 120721.40 133451.97
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          ELEVATION       4.74      5.21      5.68      6.16      6.63      7.11      7.58      8.05      8.53      9.00

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN    20169. TO   133452.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                        HYDROGRAPH AT STATION    RR21H

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                              (CFS)
+   11876.      3.83                2779.        711.        411.        411.
                          (INCHES)  1.894       1.940       1.940       1.940
                           (AC-FT)  1378.       1411.       1412.       1412.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                    6-HR        24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
      79.       3.83                 27.          7.          4.          4.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                    6-HR        24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
     2.55       3.83                1.08        0.29        0.17        0.17

                        CUMULATIVE AREA =   13.64 SQ MI


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


            **************
            *            *
  307 KK    *      26S   *          SUB
            *            *
            **************
                                RUNOFF FROM SUB-BASIN 26S

               SUBBASIN RUNOFF DATA

  309 BA         SUBBASIN CHARACTERISTICS
                       TAREA        0.17  SUBBASIN AREA

                 PRECIPITATION DATA

   51 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
                  0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                STORM AREA =   13.70

  310 LS         SCS LOSS RATE
                       STRTL        0.67  INITIAL ABSTRACTION
                      CRVNBR       75.00  CURVE NUMBER
                       RTIMP       12.70  PERCENT IMPERVIOUS AREA

                 KINEMATIC WAVE
  311 UK           OVERLAND-FLOW ELEMENT NO. 1
                          L         200.  OVERLAND FLOW LENGTH
                          S      0.0250  SLOPE
```

```
                        N       0.200  ROUGHNESS COEFFICIENT
                       PA       100.0  PERCENT OF SUBBASIN
                    DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                KINEMATIC WAVE
 312 RK           MAIN CHANNEL
                        L       4000.  CHANNEL LENGTH
                        S      0.0263  SLOPE
                        N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                       CA        0.17  CONTRIBUTING AREA
                    SHAPE        TRAP  CHANNEL SHAPE
                       WD       35.00  BOTTOM WIDTH OR DIAMETER
                        Z       10.00  SIDE SLOPE
                   NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                   RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH
                                                        ***
                                  COMPUTED KINEMATIC PARAMETERS
                                       VARIABLE TIME STEP
                                     (DT SHOWN IS A MINIMUM)

                 ELEMENT    ALPHA      M        DT       DX      PEAK    TIME TO     VOLUME    MAXIMUM
                                                                          PEAK                  CELERITY
                                                (MIN)     (FT)    (CFS)    (MIN)      (IN)      (FPS)

                 PLANE1      1.18     1.67      2.08    40.00   285.73   190.54      1.61       0.33
                 MAIN        0.87     1.43      3.19  1333.33   237.51   195.88      1.61       7.14

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.1439E+02 OUTFLOW=0.1434E+02 BASIN STORAGE=0.1796E-02 PERCENT ERROR=   0.4

                                     INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                 MAIN        0.87     1.43      5.00             228.17   195.00      1.60
     ***          ***         ***       ***       ***
                       HYDROGRAPH AT STATION      26S

    TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.93, TOTAL EXCESS =    1.61

  PEAK FLOW     TIME                      MAXIMUM AVERAGE FLOW
                                   6-HR      24-HR      72-HR    41.58-HR
+   (CFS)       (HR)
                          (CFS)
+     228.      3.25        28.        7.         4.         4.
                       (INCHES)     1.583      1.602      1.603      1.603
                        (AC-FT)       14.        14.        14.        14.
                       CUMULATIVE AREA =    0.17 SQ MI


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


            **************
            *            *
 313 KK     *    *APEX*  *          CP
            *            *
            **************
                                COMBINE FLOW FROM SUB-BASIN 26 ,
                                   AND ROUTED HYDROGRAPH FROM JOMAX ROAD.
                               *********END SUBAREA 21 REVISIONS************
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 316 HC          HYDROGRAPH COMBINATION
                      ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***
MANE2 NPLAN,NSTM       1      0
      ***             ***            ***            ***            ***

                        HYDROGRAPH AT STATION   *APEX*

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                            (CFS)
+   11938.      3.83                2805.        719.        415.        415.
                          (INCHES)  1.888       1.936       1.936       1.936
                           (AC-FT)  1391.       1425.       1426.       1426.

                         CUMULATIVE AREA =   13.81 SQ MI


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


            **************
            *            *
 318 KK     *     CP27A  *          CP AT HAPPY VALLEY RD
            *            *
            **************
                                ROUTE FLOW FROM CONCENTRATION POINT APEX  TO 27A (HAPPY VALLEY
                                ROAD).  THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION PT.


              HYDROGRAPH ROUTING DATA

 322 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        FLOW  TYPE OF INITIAL CONDITION
                      RSVRIC       -1.00  INITIAL CONDITION
                           X        0.00 WORKING R AND D COEFFICIENT

 323 RC          NORMAL DEPTH CHANNEL
                        ANL       0.055  LEFT OVERBANK N-VALUE
                       ANCH       0.040  MAIN CHANNEL N-VALUE
                        ANR       0.055  RIGHT OVERBANK N-VALUE
                      RLNTH      ' 1600.  REACH LENGTH
                        SEL      0.0196  ENERGY SLOPE
                      ELMAX         0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                      CROSS-SECTION DATA
                          --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 325 RY        ELEVATION     10.00      4.00      2.00      0.00      0.00      2.00      4.00     10.00
 324 RX        DISTANCE       0.00      1.00    201.00    211.00    261.00    271.00    471.00    472.00
                                                                   ***
                                      COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00      1.02      2.14      3.36      4.72      7.50     12.31     19.16     27.88     36.97
          OUTFLOW       0.00     91.04    294.77    591.73    986.85   1576.38   2463.81   3753.15   5635.98   8178.79
        ELEVATION       0.00      0.53      1.05      1.58      2.11      2.63      3.16      3.68      4.21      4.74

          STORAGE      46.06     55.15     64.25     73.36     82.46     91.57    100.69    109.80    118.92    128.04
          OUTFLOW   11173.05  14581.44  18376.29  22535.82  27042.13  31880.16  37036.89  42500.89  48262.05  54311.25
```

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          ELEVATION      5.26      5.79      6.32      6.84      7.37      7.89      8.42      8.95      9.47     10.00

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN     8179. TO    54311.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                        HYDROGRAPH AT STATION    CP27A

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                            (CFS)
+   11952.      3.92                2804.        719.        415.        415.
                         (INCHES)   1.888       1.936       1.936       1.936
                          (AC-FT)   1390.       1425.       1426.       1426.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
      48.       3.92                  13.          3.          2.          2.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
     5.38       3.92                 2.68        0.76        0.44        0.44

                         CUMULATIVE AREA =   13.81 SQ MI


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


            **************
            *            *
  326 KK    *     CP27B  *          CP AT MILLER RD
            *            *
            **************
                                ROUTE FLOW FROM CONCENTRATION POINT 27B TO 27C (MILLER ROAD).
                                THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.

                HYDROGRAPH ROUTING DATA

  329 RS          STORAGE ROUTING
                        NSTPS          1  NUMBER OF SUBREACHES
                         ITYP       FLOW  TYPE OF INITIAL CONDITION
                        RSVRIC      -1.00  INITIAL CONDITION
                             X       0.00 WORKING R AND D COEFFICIENT

  330 RC          NORMAL DEPTH CHANNEL
                          ANL      0.055  LEFT OVERBANK N-VALUE
                         ANCH      0.040  MAIN CHANNEL N-VALUE
                          ANR      0.055  RIGHT OVERBANK N-VALUE
                        RLNTH      3300.  REACH LENGTH
                          SEL     0.0196  ENERGY SLOPE
                        ELMAX        0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                      CROSS-SECTION DATA
                            --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  332 RY        ELEVATION     10.00      4.00      2.00      0.00      0.00      2.00      4.00     10.00
  331 RX        DISTANCE       0.00      1.00    201.00    211.00    261.00    271.00    471.00    472.00

                                                                  ***
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```
                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

           STORAGE      0.00      2.10      4.41      6.93      9.73     15.46     25.39     39.51     57.50     76.24
           OUTFLOW      0.00     91.04    294.77    591.73    986.85   1576.38   2463.81   3753.15   5635.98   8178.79
         ELEVATION      0.00      0.53      1.05      1.58      2.11      2.63      3.16      3.68      4.21      4.74

           STORAGE     95.00    113.76    132.52    151.30    170.08    188.87    207.66    226.47    245.27    264.09
           OUTFLOW  11173.05  14581.44  18376.29  22535.82  27042.13  31880.16  37036.89  42500.89  48262.05  54311.25
         ELEVATION      5.26      5.79      6.32      6.84      7.37      7.89      8.42      8.95      9.47     10.00

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN    37037. TO    54311.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                        HYDROGRAPH AT STATION    CP27B

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR      72-HR     41.58-HR
+   (CFS)       (HR)
                            (CFS)
+   11689.      4.00                2800.       719.       415.        415.
                         (INCHES)   1.885      1.936      1.936       1.936
                          (AC-FT)   1388.      1425.      1426.       1426.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR      72-HR     41.58-HR
+  (AC-FT)      (HR)
      98.       4.00                 27.         7.         4.          4.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR      72-HR     41.58-HR
+   (FEET)      (HR)
     5.34       4.00                2.69       0.77       0.44        0.44

                        CUMULATIVE AREA =   13.81 SQ MI


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


            **************
            *            *
  333 KK    *     CP27C  *          CP AT PINNACLE PEAK RD
            *            *
            **************
                                 ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (PINNACLE PK ROAD).
                                 THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.

                HYDROGRAPH ROUTING DATA

  336 RS          STORAGE ROUTING
                       NSTPS           1  NUMBER OF SUBREACHES
                        ITYP        FLOW  TYPE OF INITIAL CONDITION
                      RSVRIC       -1.00  INITIAL CONDITION
                           X        0.00 WORKING R AND D COEFFICIENT

  337 RC          NORMAL DEPTH CHANNEL
                         ANL       0.055  LEFT OVERBANK N-VALUE
                        ANCH       0.040  MAIN CHANNEL N-VALUE
                         ANR       0.055  RIGHT OVERBANK N-VALUE
                       RLNTH       3300.  REACH LENGTH
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                    SEL      0.0196  ENERGY SLOPE
                  ELMAX         0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                  CROSS-SECTION DATA
                        --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 339 RY     ELEVATION    10.00      4.00      2.00      0.00      0.00      2.00      4.00     10.00
 338 RX     DISTANCE      0.00      1.00    201.00    211.00    261.00    271.00    471.00    472.00

                                                  ***

                                  COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00      2.10      4.41      6.93      9.73     15.46     25.39     39.51     57.50     76.24
          OUTFLOW       0.00     91.04    294.77    591.73    986.85   1576.38   2463.81   3753.15   5635.98   8178.79
        ELEVATION       0.00      0.53      1.05      1.58      2.11      2.63      3.16      3.68      4.21      4.74

          STORAGE      95.00    113.76    132.52    151.30    170.08    188.87    207.66    226.47    245.27    264.09
          OUTFLOW   11173.05  14581.44  18376.29  22535.82  27042.13  31880.16  37036.89  42500.89  48262.05  54311.25
        ELEVATION       5.26      5.79      6.32      6.84      7.37      7.89      8.42      8.95      9.47     10.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN    37037. TO    54311.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                      HYDROGRAPH AT STATION    CP27C

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                              (CFS)
+   11395.      4.08          2796.       719.        415.        415.
                         (INCHES)     1.883       1.936       1.936       1.936
                          (AC-FT)     1386.       1425.       1426.       1426.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
      96.       4.08                 27.         7.          4.          4.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
     5.30       4.08                 2.70       0.77        0.45        0.45

                      CUMULATIVE AREA =   13.81 SQ MI


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


            **************
            *            *
 340 KK     *     CP27D  *          CP AT SCOTTSDALE RD
            *            *
            **************
                                ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (SCOTTSDALE ROAD)
                                THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.

              HYDROGRAPH ROUTING DATA

 343 RS          STORAGE ROUTING
                      NSTPS          1  NUMBER OF SUBREACHES
```

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                        ITYP        FLOW  TYPE OF INITIAL CONDITION
                      RSVRIC       -1.00  INITIAL CONDITION
                           X        0.00 WORKING R AND D COEFFICIENT

 344 RC          NORMAL DEPTH CHANNEL
                         ANL       0.055  LEFT OVERBANK N-VALUE
                        ANCH       0.040  MAIN CHANNEL N-VALUE
                         ANR       0.055  RIGHT OVERBANK N-VALUE
                       RLNTH       1000.  REACH LENGTH
                         SEL      0.0196  ENERGY SLOPE
                       ELMAX         0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                   CROSS-SECTION DATA
                          --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
 346 RY        ELEVATION     10.00      4.00      2.00      0.00      0.00      2.00      4.00     10.00
 345 RX        DISTANCE       0.00      1.00    201.00    211.00    261.00    271.00    471.00    472.00

                                                          ***

                                   COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

           STORAGE       0.00      0.64      1.34      2.10      2.95      4.69      7.69     11.97     17.42     23.10
           OUTFLOW       0.00     91.04    294.77    591.73    986.85   1576.38   2463.81   3753.15   5635.98   8178.79
         ELEVATION       0.00      0.53      1.05      1.58      2.11      2.63      3.16      3.68      4.21      4.74

           STORAGE      28.79     34.47     40.16     45.85     51.54     57.23     62.93     68.63     74.33     80.03
           OUTFLOW   11173.05  14581.44  18376.29  22535.82  27042.13  31880.16  37036.89  42500.89  48262.05  54311.25
         ELEVATION       5.26      5.79      6.32      6.84      7.37      7.89      8.42      8.95      9.47     10.00

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN       91. TO    54311.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

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

                        HYDROGRAPH AT STATION    CP27D

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                             (CFS)
+   11353.      4.08          2796.       719.        415.        415.
                         (INCHES)      1.883       1.936       1.936       1.936
                          (AC-FT)      1386.       1425.       1426.       1426.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
      29.       4.08                 8.          2.          1.          1.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
     5.29       4.08                2.70        0.78        0.45        0.45

                        CUMULATIVE AREA =   13.81 SQ MI


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


           **************
           *            *
 347 KK    *        27  *          SUB
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          *           *
          **************
                          RUNOFF FROM SUB-BASIN 27

             SUBBASIN RUNOFF DATA

349 BA          SUBBASIN CHARACTERISTICS
                      TAREA        1.19  SUBBASIN AREA

                PRECIPITATION DATA

 51 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
                 0.77    1.51    2.65    3.00    3.23    3.66    0.00    0.00    0.00    0.00    0.00    0.00

                                                STORM AREA =   13.70

350 LS          SCS LOSS RATE
                      STRTL        0.67  INITIAL ABSTRACTION
                     CRVNBR       75.00  CURVE NUMBER
                      RTIMP       12.70  PERCENT IMPERVIOUS AREA

                KINEMATIC WAVE
351 UK            OVERLAND-FLOW ELEMENT NO. 1
                          L        200.  OVERLAND FLOW LENGTH
                          S      0.0250  SLOPE
                          N       0.200  ROUGHNESS COEFFICIENT
                         PA       100.0  PERCENT OF SUBBASIN
                      DXMIN           5  MINIMUM NUMBER OF DX INTERVALS

                KINEMATIC WAVE
352 RK            MAIN CHANNEL
                          L       1500.  CHANNEL LENGTH
                          S      0.0263  SLOPE
                          N       0.045  CHANNEL ROUGHNESS COEFFICIENT
                         CA        1.19  CONTRIBUTING AREA
                      SHAPE        TRAP  CHANNEL SHAPE
                         WD       35.00  BOTTOM WIDTH OR DIAMETER
                          Z       10.00  SIDE SLOPE
                     NDXMIN           2  MINIMUM NUMBER OF DX INTERVALS
                     RUPSTQ          NO  ROUTE UPSTREAM HYDROGRAPH

                                                   ***
                                  COMPUTED KINEMATIC PARAMETERS
                                       VARIABLE TIME STEP
                                     (DT SHOWN IS A MINIMUM)

                  ELEMENT    ALPHA       M        DT        DX      PEAK    TIME TO     VOLUME    MAXIMUM
                                                                            PEAK                  CELERITY
                                                (MIN)      (FT)     (CFS)    (MIN)       (IN)      (FPS)

                  PLANE1      1.18     1.67      2.08     40.00   2035.83   190.54       1.61       0.33
                  MAIN        0.87     1.43      0.63    500.00   1991.35   190.65       1.61      13.65

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00  EXCESS=0.1025E+03 OUTFLOW=0.1023E+03 BASIN STORAGE=0.1038E-01 PERCENT ERROR=   0.2

                                       INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                  MAIN        0.87     1.43      5.00             1971.10   190.00       1.61
     ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      27
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     TOTAL RAINFALL =    3.54, TOTAL LOSS =    1.93, TOTAL EXCESS =    1.61
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    1971.      3.17                205.        52.         30.         30.
                         (INCHES)   1.596       1.614       1.614       1.614
                          (AC-FT)   101.        103.        103.        103.

                         CUMULATIVE AREA =    1.19 SQ MI


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


            **************
            *            *
  353 KK    *     CP27   *          CP AT SCOTTSDALE RD
            *            *
            **************

  354 KO          OUTPUT CONTROL VARIABLES
                       IPRNT          3  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE
                                 COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
                                 POINT 27D WITH SUB 27 .  TOTAL FLOW AT
                                 SCOTTSDALE ROAD FOR FAN 4.

  358 HC          HYDROGRAPH COMBINATION
                       ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
MANE2 NPLAN,NSTM       1      0
      ***            ***            ***            ***            ***

                       HYDROGRAPH AT STATION     CP27
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+   11574.      4.08               2974.       770.        445.        445.
                         (INCHES)   1.844       1.910       1.911       1.911
                          (AC-FT)   1475.       1528.       1529.       1529.

                         CUMULATIVE AREA =   15.00 SQ MI
1
                                                RUNOFF SUMMARY
                                          FLOW IN CUBIC FEET PER SECOND
                                       TIME IN HOURS,  AREA IN SQUARE MILES

                                     PEAK   TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN     MAXIMUM     TIME OF
        OPERATION       STATION      FLOW    PEAK                                           AREA      STAGE     MAX STAGE
+                                                                6-HOUR     24-HOUR     72-HOUR

        HYDROGRAPH AT
+                          16       2577.   3.25          319.        80.         46.        1.46

        HYDROGRAPH AT
+                          17       2100.   3.25          258.        65.         38.        1.19
```

+	HYDROGRAPH AT	18	2341.	3.25	269.	68.	39.	1.26		
+	3 COMBINED AT	19A	7018.	3.25	846.	214.	123.	3.91		
+	ROUTED TO	19B	6994.	3.33	846.	214.	123.	3.91		
+									6.95	3.33
+	HYDROGRAPH AT	15	1837.	3.42	277.	70.	40.	1.37		
+	2 COMBINED AT	19C	8628.	3.33	1123.	284.	164.	5.28		
+	ROUTED TO	19.1	8212.	3.33	1123.	284.	164.	5.28		
+									6.00	3.33
+	HYDROGRAPH AT	19	429.	3.25	42.	10.	6.	0.19		
+	HYDROGRAPH AT	20	1045.	3.25	123.	31.	18.	0.57		
+	3 COMBINED AT	CP20	9543.	3.33	1287.	325.	188.	6.03		
+	ROUTED TO	RRCP20	8812.	3.42	1286.	325.	188.	6.03		
+									4.01	3.42
+	HYDROGRAPH AT	21A	758.	3.25	80.	20.	12.	0.42		
+	2 COMBINED AT	CP21A	9269.	3.42	1365.	345.	199.	6.45		
+	ROUTED TO	RR21A	9118.	3.50	1365.	345.	199.	6.45		
+									3.41	3.50
+	HYDROGRAPH AT	21B	495.	3.25	53.	13.	8.	0.28		
+	2 COMBINED AT	CP21B	9357.	3.50	1417.	358.	207.	6.73		
+	ROUTED TO	RR21B	8726.	3.58	1416.	358.	207.	6.73		
+									3.68	3.58
+	HYDROGRAPH AT	21C	1199.	3.25	142.	36.	21.	0.75		
+	2 COMBINED AT	CP21C	9301.	3.58	1557.	394.	228.	7.48		
+	ROUTED TO	RR21C	7742.	3.75	1550.	394.	228.	7.48		
+									4.06	3.75
+	HYDROGRAPH AT	21D	1437.	3.33	201.	51.	29.	1.06		

```
+        2 COMBINED AT
                          CP21D     8489.   3.67      1750.      445.      257.      8.54
         ROUTED TO
+                         RR21D     8466.   3.75      1749.      445.      257.      8.54
+                                                                                   4.12      3.75
         HYDROGRAPH AT
+                           21E      390.   3.33        49.       12.        7.      0.26
         2 COMBINED AT
+                          CP21E     8604.   3.75      1797.      457.      264.      8.79
         ROUTED TO
+                         RR21E     8356.   3.83      1795.      457.      264.      8.79
+                                                                                   6.29      3.83
         HYDROGRAPH AT
+                           21F      640.   3.33        89.       22.       13.      0.47
         2 COMBINED AT
+                          CP21F     8592.   3.83      1882.      480.      277.      9.26
         ROUTED TO
+                         RR21F     8571.   3.83      1879.      480.      277.      9.26
+                                                                                   2.67      3.83
         HYDROGRAPH AT
+                           21G       25.   3.33         3.        1.        0.      0.02
         2 COMBINED AT
+                          CP21G     8580.   3.83      1882.      480.      277.      9.28
         HYDROGRAPH AT
+                            22     2735.   3.25       303.       76.       44.      1.39
         HYDROGRAPH AT
+                            23      750.   3.25        87.       22.       13.      0.39
         2 COMBINED AT
+                           24A     3485.   3.25       390.       98.       57.      1.78
         ROUTED TO
+                           24.1    2831.   3.42       390.       98.       57.      1.78
+                                                                                   5.52      3.42
         HYDROGRAPH AT
+                            24      678.   3.25        83.       21.       12.      0.49
         2 COMBINED AT
+                          24.2A     3363.   3.42       473.      119.       69.      2.27
         HYDROGRAPH AT
+                           25N     1211.   3.42       175.       44.       26.      0.78
         HYDROGRAPH AT
+                           25S     1374.   3.25       150.       38.       22.      0.63
         2 COMBINED AT
+                           25.1    2351.   3.33       325.       82.       47.      1.41
         2 COMBINED AT
+                          24.2B     5463.   3.42       798.      201.      116.      3.68
         ROUTED TO
+                         PIMARD     5381.   3.42       798.      201.      116.      3.68
+                                                                                   6.78      3.42
```

```
          ROUTED TO
+                    RR24.2     5136.   3.50      797.      201.      116.     3.68
+                                                                                      6.89      3.50
          2 COMBINED AT
+                    C21.05    11835.   3.75     2677.      682.      394.    12.96
          ROUTED TO
+                     R21G     11680.   3.83     2670.      682.      394.    12.96
+                                                                                      2.51      3.83
          HYDROGRAPH AT
+                      21H        62.   3.33        8.        2.        1.     0.04
          HYDROGRAPH AT
+                      26N       669.   3.50      108.       28.       16.     0.64
          3 COMBINED AT
+                    CP21H     12041.   3.83     2784.      711.      411.    13.64
          ROUTED TO
+                    RR21H     11876.   3.83     2779.      711.      411.    13.64
+                                                                                      2.55      3.83
          HYDROGRAPH AT
+                      26S       228.   3.25       28.        7.        4.     0.17
          2 COMBINED AT
+                    *APEX*    11938.   3.83     2805.      719.      415.    13.81
          ROUTED TO
+                    CP27A     11952.   3.92     2804.      719.      415.    13.81
+                                                                                      5.38      3.92
          ROUTED TO
+                    CP27B     11689.   4.00     2800.      719.      415.    13.81
+                                                                                      5.34      4.00
          ROUTED TO
+                    CP27C     11395.   4.08     2796.      719.      415.    13.81
+                                                                                      5.30      4.08
          ROUTED TO
+                    CP27D     11353.   4.08     2796.      719.      415.    13.81
+                                                                                      5.29      4.08
          HYDROGRAPH AT
+                       27      1971.   3.17      205.       52.       30.     1.19
          2 COMBINED AT
+                     CP27     11574.   4.08     2974.      770.      445.    15.00
1
                                   SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                       (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                   INTERPOLATED TO
                                                                 COMPUTATION INTERVAL
     ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                            PEAK                                      PEAK
                         (MIN)     (CFS)     (MIN)      (IN)    (MIN)     (CFS)     (MIN)       (IN)
        16  MANE          3.31   2698.28    197.99      2.05     5.00   2576.99    195.00       2.05

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1599E+03 OUTFLOW=0.1592E+03 BASIN STORAGE=0.1500E-01 PERCENT ERROR=   0.4
```

```
          17  MANE        3.73   2164.39    195.52      2.05      5.00   2099.53    195.00        2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1300E+03 OUTFLOW=0.1293E+03 BASIN STORAGE=0.1764E-01 PERCENT ERROR=   0.6

          18  MANE        3.07   2389.56    196.85      1.99      5.00   2341.41    195.00        2.00

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1350E+03 OUTFLOW=0.1343E+03 BASIN STORAGE=0.1763E-01 PERCENT ERROR=   0.5

          15  MANE        3.61   1841.94    207.76      1.90      5.00   1836.90    205.00        1.90

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1398E+03 OUTFLOW=0.1390E+03 BASIN STORAGE=0.1918E-01 PERCENT ERROR=   0.5

          19  MANE        1.73    438.42    193.74      2.08      5.00    428.52    195.00        2.08

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2084E+02 OUTFLOW=0.2078E+02 BASIN STORAGE=0.1363E-02 PERCENT ERROR=   0.3

          20  MANE        3.80   1097.76    196.23      2.02      5.00   1045.16    195.00        2.02

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6172E+02 OUTFLOW=0.6137E+02 BASIN STORAGE=0.5960E-02 PERCENT ERROR=   0.6

         21A  MANE        2.40    776.53    193.64      1.78      5.00    758.45    195.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4013E+02 OUTFLOW=0.3997E+02 BASIN STORAGE=0.4387E-02 PERCENT ERROR=   0.4

         21B  MANE        2.60    501.85    194.28      1.78      5.00    494.55    195.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2637E+02 OUTFLOW=0.2626E+02 BASIN STORAGE=0.2931E-02 PERCENT ERROR=   0.4

         21C  MANE        3.27   1254.71    196.67      1.78      5.00   1198.51    195.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7147E+02 OUTFLOW=0.7107E+02 BASIN STORAGE=0.9525E-02 PERCENT ERROR=   0.5

         21D  MANE        3.14   1482.46    200.86      1.78      5.00   1436.69    200.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1012E+03 OUTFLOW=0.1006E+03 BASIN STORAGE=0.1920E-01 PERCENT ERROR=   0.5

         21E  MANE        3.07    406.69    198.47      1.78      5.00    389.90    200.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2455E+02 OUTFLOW=0.2442E+02 BASIN STORAGE=0.4121E-02 PERCENT ERROR=   0.5

         21F  MANE        4.38    663.78    201.46      1.78      5.00    639.63    200.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4481E+02 OUTFLOW=0.4446E+02 BASIN STORAGE=0.8833E-02 PERCENT ERROR=   0.8
```

```
              21G  MANE        4.22     25.16    199.35      1.78      5.00     24.97    200.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1643E+01 OUTFLOW=0.1633E+01 BASIN STORAGE=0.2774E-03 PERCENT ERROR=   0.6

               22  MANE        3.75   2753.82    194.54      2.04      5.00   2735.12    195.00        2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1519E+03 OUTFLOW=0.1510E+03 BASIN STORAGE=0.1238E-01 PERCENT ERROR=   0.5

               23  MANE        4.01    752.31    194.24      2.06      5.00    750.06    195.00        2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4362E+02 OUTFLOW=0.4339E+02 BASIN STORAGE=0.3522E-02 PERCENT ERROR=   0.5

               24  MANE        2.82    707.64    195.94      1.60      5.00    677.96    195.00        1.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4200E+02 OUTFLOW=0.4178E+02 BASIN STORAGE=0.6062E-02 PERCENT ERROR=   0.5

              25N  MANE        4.32   1241.05    204.05      2.10      5.00   1210.99    205.00        2.10

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8840E+02 OUTFLOW=0.8781E+02 BASIN STORAGE=0.1552E-01 PERCENT ERROR=   0.6

              25S  MANE        2.96   1378.67    195.18      2.25      5.00   1374.01    195.00        2.25

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7554E+02 OUTFLOW=0.7520E+02 BASIN STORAGE=0.9709E-02 PERCENT ERROR=   0.4

              21H  MANE        4.21     62.20    199.67      1.78      5.00     61.96    200.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4118E+01 OUTFLOW=0.4088E+01 BASIN STORAGE=0.8180E-03 PERCENT ERROR=   0.7

              26N  MANE        4.40    674.69    209.64      1.60      5.00    668.91    210.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5489E+02 OUTFLOW=0.5457E+02 BASIN STORAGE=0.9370E-02 PERCENT ERROR=   0.6

              26S  MANE        3.19    237.51    195.88      1.61      5.00    228.17    195.00        1.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1439E+02 OUTFLOW=0.1434E+02 BASIN STORAGE=0.1796E-02 PERCENT ERROR=   0.4

               27  MANE        0.63   1991.35    190.65      1.61      5.00   1971.10    190.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1025E+03 OUTFLOW=0.1023E+03 BASIN STORAGE=0.1038E-01 PERCENT ERROR=   0.2


*** NORMAL END OF HEC-1 ***
```

Appendix F

Bypass HEC-1 Model

```
1****************************************                    ****************************************
*                                      *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *   U.S. ARMY CORPS OF ENGINEERS       *
*             JUN 09 1992              *                    *   HYDROLOGIC ENGINEERING CENTER      *
*           VERSION 4.0.3E             *                    *         609 SECOND STREET            *
*                                      *                    *      DAVIS, CALIFORNIA 95616         *
*  RUN DATE  01/21/99  TIME  16:53:10  *                    *         (916) 551-1748               *
*                                      *                    *                                      *
****************************************                    ****************************************


                                    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. THIS IS THE FORTRAN77 VERSION
        NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
        DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
        KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                                HEC-1 INPUT                                                PAGE  1

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

            1           ID        FILE <RWDAM21F.DAT>
            2           ID        THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
            3           ID        THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
            4           ID
            5           ID        THE MODIFICIATION INCLUDE THE FOLLOWING:
            6           ID        1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
            7           ID           TO CONCENTRATION POINT AT THE APEX OF 21F
            8           ID        2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE
            9           ID
           10           ID        NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
           11           ID        1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
           12           ID        MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
           13           ID        25S.
           14           ID
           15           ID        100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
           16           ID        RAINFALL FROM NOAA ATLAS
           17           ID
           18           ID        FILE RAW4A.DAT
           19           ID        WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
           20           ID        FOR 22, 23, 24, 25N, AND 25S.  ROUTE COMBINED HYDROGRAPHS
           21           ID        22, 23, 24, 25N AND 25S TO 21G.  SUN-BASIN 26 COMBINED AT
           22           ID        THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
           23           ID        ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
           24           ID        INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
           25           ID        PROPOSED ROAD CROSSINGS.
           26           ID
           27           ID        REVISED BY GREINER 12-9-93 BY RON FERGUSON
           28           ID        REVISED BY C. J. LOVELY, COS, 3-9-94
           29           ID        Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study
           30           ID           *Eliminate DSS Records
```

```
 31          ID          *Divide #26 into 26N & 26S; 26N is portion north of Jomax
 32          ID          *Add 26N @ CP21H and route with 21H to apex
 33          ID          *Add 26S @ apex
 34          ID          *Modify reach length in 26S & 26N to reflect division
 35          ID
 36          ID        ****************************************************************
 37          ID        * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
 38          ID        * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.      *
 39          ID        ****************************************************************
 40          ID    September 1998 - Added a bypass flow to the two branches of flow in
 41          ID    September 1998 - Section 36. Will bypass the first flows up to 500 cfs each.
 42          ID    September 1998 - Filename <RAWBYPSS.DAT>
 43          ID
 44          ID
 45          ID   ***********************************************************************
             *DIAGRAM
 46          IT       5 03MAR94       0     500
 47          IO       5       0       0       0
             *
1                                        HEC-1 INPUT                                    PAGE  2

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

 48          KK      16     SUB
 49          KM        RUNOFF FROM SUB-BASIN 16
 50          BA  1.4570
 51          PH       0      13    0.77    1.51    2.65    3.00    3.23    3.66
 52          LS       0      83     9.8       0       0       0       0       0
 53          UK     217   .0581     .20     100
 54          RK   14800   .0216    .045       0    TRAP      25       3
             *

 55          KK      17     SUB
 56          KM        RUNOFF FROM SUB-BASIN 17
 57          BA  1.1851       0       0
 58          LS       0      83     9.8
 59          UK     285   .0421     .20     100       0       0       0
 60          RK   12200   .0254    .045       0    TRAP      25       3
             *

 61          KK      18     SUB
 62          KM        RUNOFF FROM SUB-BASIN 18
 63          BA  1.2641
 64          LS       0      83     6.5       0
 65          UK     285   .0421     .20     100       0       0       0
 66          RK   10840   .0259    .045       0    TRAP      25       3
             *

 67          KK     19A      CP
 68          KM        COMBINE HYDROGRAPHS SUB16, SUB17 AND SUB18
 69          HC       3
             *

 70          KK     19B      CP
 71          KM        ROUTE CP19A TO CP19B
 72          RS       1    FLOW      -1       0       0
 73          RC    .055    .040    .055    1100   .0155       0       0       0
 74          RX       0       1     126     132     167     173     298     299
 75          RY      10       8       3       0       0       3       8      10
             *

 76          KK      15     SUB
 77          KM        RUNOFF FROM SUBBASIN 15
 78          BA  1.3702       0       0
 79          LS       0      82     5.4       0
 80          UK     217   .0581     .20     100       0       0       0
```

```
          81          RK   21200   .0236    .045       0    TRAP      25       3
                      *

          82          KK     19C      CP
          83          KM        COMBINE HYDROGRAPHS SUB15 & CP19B
          84          HC       2
                      *
1                                          HEC-1 INPUT                                                    PAGE  3
        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          85          KK    19.1      CP
          86          KM        ROUTE CP 19C TO 19.1
          87          RS       1    FLOW      -1       0       0
          88          RC    .055    .040    .055    1800   .0200       0       0
          89          RX       0       1     151     166     216     231     381     382
          90          RY      10       9       3       0       0       3       9      10
                      *

          91          KK      19     SUB
          92          KM        RUNOFF FROM SUB-BASIN 19
          93          BA  0.1872
          94          LS       0      84     7.2       0
          95          UK     275   .0800     .20     100       0       0       0
          96          RK    3730   .0352    .045    .160    TRAP      15       3
          97          RK    1800   .0200    .045       0    TRAP      50      30
                      *

          98          KK      20     SUB
          99          KM        RUNOFF FROM SUB-BASIN 20
         100          BA  0.5698       0       0
         101          LS       0      84     3.6       0
         102          UK     300   .0750     .20     100       0       0       0
         103          RK    9640   .0197    .045       0    TRAP      15       3
                      *

         104          KK    CP20      CP
         105          KM        COMBINE SUB 19, SUB 20 AND CP 19.1
         106          HC       3
                      *
         107          KM    *******BEGIN SUBAREA 21 BREAKDOWN-3/94 REVISIONS*****

         108          KK  RRCP20      CP
         109          KM        ROUTE CP20 TO CP 21A, WHICH IS 4600'
         110          RS       1    FLOW      -1       0       0
         111          RC    .055    .040    .055    4600   .0217       0       0       0
         112          RX       0      30      60      85     195     220     250     280
         113          RY      10       4       1       0       0       1       4      10
                      *

         114          KK     21A     SUB
         115          KM        RUNOFF FROM SUB-BASIN 21A
         116          BA     .42       0       0
         117          LS       0      80     6.4       0       0       0
         118          UK     297   .0558     .20     100       0       0       0
         119          RK    6400   .0344    .045       0    TRAP      10       3
                      *

         120          KK   CP21A
         121          HC       2
                      *
1                                          HEC-1 INPUT                                                    PAGE  4
        LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

```
 122          KK   RR21A       CP
 123          KM        ROUTE CP21A TO 21B    WHICH IS 960'
 124          RS       1    FLOW      -1       0       0
 125          RC    .055    .040    .055     960   .0156       0       0       0
 126          RX       0      10      60     205     295     440     490     500
 127          RY       6       4       2       0       0       2       4       6
              *

 128          KK     21B     SUB
 129          KM        RUNOFF FROM SUB-BASIN 21B
 130          BA   0.276       0       0
 131          LS       0      80     6.4       0       0       0
 132          UK     297   .0558     .20     100       0       0       0
 133          RK    6300   .0381    .045       0    TRAP      10       3
              *

 134          KK   CP21B
 135          HC       2
              *

 136          KK   RR21B       CP
 137          KM        ROUTE CP21B TO 21C    WHICH IS 4400'
 138          RS       1    FLOW      -1       0       0
 139          RC    .055    .040    .055    4400   .0205       0       0       0
 140          RX       0      10      60     205     295     440     490     500
 141          RY       6       4       2       0       0       2       4       6
              *

 142          KK     21C     SUB
 143          KM        RUNOFF FROM SUB-BASIN 21C
 144          BA    .748       0       0
 145          LS       0      80     6.4       0       0       0
 146          UK     297   .0558     .20     100       0       0       0
 147          RK    9900   .0328    .045       0    TRAP      20       3
              *

 148          KK   CP21C
 149          HC       2
              *

 150          KK   RR21C       CP
 151          KM        ROUTE CP21C TO 21D    WHICH IS 5700'
 152          RS       1    FLOW      -1       0       0
 153          RC    .055    .040    .055    5700   .0181       0       0       0
 154          RX       0      20     175     210     300     335     490     510
 155          RY     5.5     3.5     2.5       0       0     2.5     3.5     5.5
              *

 156          KK     21D     SUB
 157          KM        RUNOFF FROM SUB-BASIN 21D
 158          BA   1.059       0       0
 159          LS       0      80     6.4       0       0       0
 160          UK     297   .0558     .20     100       0       0       0
 161          RK   14500   .0252    .045       0    TRAP      30       3
              *
```



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

 162          KK   CP21D
 163          HC       2
              *

 164          KK   RR21D       CP
 165          KM        ROUTE CP21D TO 21E    WHICH IS 1100'
 166          RS       1    FLOW      -1       0       0
```

```
167          RC    .055    .040    .055    1100   .0200      0      0      0
168          RX      0      20     175     210     300    335    490    510
169          RY     5.5     3.5     2.5       0       0    2.5    3.5    5.5
             *

170          KK     21E     SUB
171          KM        RUNOFF FROM SUB-BASIN 21E
172          BA   0.257       0       0
173          LS       0      80     6.4       0       0      0
174          UK     297   .0333     .20     100       0      0      0
175          RK    6600   .0288    .045       0    TRAP     15      3
             *

176          KK   CP21E
177          HC       2
             *

178          KK   RR21E      CP
179          KM        ROUTE CP21E TO 21F    WHICH IS 2800'
180          RS       1    FLOW      -1       0       0
181          RC    .055    .040    .055    2800   .0143      0      0      0
182          RX       0      70     170     180     230    240    340    410
183          RY    10.5     4.5     3.5       0       0    3.5    4.5   10.5
             *

184          KK     21F     SUB
185          KM        RUNOFF FROM SUB-BASIN 21F
186          BA   0.469       0       0
187          LS       0      80     6.4       0       0      0
188          UK     297   .0333     .20     100       0      0      0
189          RK   10400   .0279    .045       0    TRAP     20      3
             *

190          KK   CP21F
191          HC       2
             *

192          KK   RR21F      CP
193          KM   ROUTE CP21F TO 21G (1900' DOWNSTREAM)
194          RS       1    FLOW      -1       0       0
195          RC    .055    .040    .055    1900   .0158      0      0      0
196          RX       0      20      70     345     455    730    780    800
197          RY      10       8       2       0       0      2      8     10
             *
```



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

198          KK     21G     SUB
199          KM   RUNOFF FROM SUB-BASIN 21G
200          BA   .0172       0       0
201          LS       0      80     6.4       0       0      0
202          UK     297   .0333     .20     100       0      0      0
203          RK    4000   .0300    .045       0    TRAP     10      3
             *

204          KK   CP21G
205          HC       2
             *  DDDDDDDDDDDDDDDDDDDDDDDDDDDDDIVERSIONDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

206          KK     DIV
207          KM   DIVERSION OF THE NORTH INFLOWS TO DETERMINE VOLUME
208          KO       1       2
209          DT     DIVN       0
210          DI       0     200    8841
211          DQ       0     200     500
```

```
                   *  DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

       212         KK      22     SUB
       213         KM       RUNOFF FROM SUB-BASIN 22
       214         BA  1.3860
       215         LS       0      84     5.1       0
       216         UK     225   .0590     .20     100       0       0       0       0
       217         RK   13000   .0238    .045       0    TRAP      25       3
                   *

       218         KK      23     SUB
       219         KM       RUNOFF FROM SUB-BASIN 23
       220         BA  0.3945       0       0
       221         LS       0      84     6.3       0
       222         UK     225   .0590     .20     100       0       0       0
       223         RK   10200   .0304    .045       0    TRAP      20       3
                   *

       224         KK     24A      CP
       225         KM       COMBINE HYDROGRAPHS FOR SUB 22 AND SUB 23
       226         HC       2
                   *

       227         KK    24.1      CP
       228         KM       ROUTE CP 24A TO CP 24.1
       229         RS       3    FLOW      -1       0       0
       230         RC    .055    .040    .055    6800   .0257       0       0       0
       231         RX       0       1     101     107     122     128     228     229
       232         RY      10       8       3       0       0       3       8      10
                   *
1                                   HEC-1 INPUT                                          PAGE  7

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

       233         KK      24     SUB
       234         KM       RUNOFF FROM SUB-BASIN 24
       235         KM       DRAINAGE AREA CHANGED TO MATCH VALUE USED BY MICHAEL BAKER
       236         KM       Jr., INC.
       237         BA  0.4907       0       0
       238         LS       0      77     6.8       0
       239         UK     295   .0438     .20     100       0       0       0
       240         RK    6800   .0257    .045       0    TRAP      15       3
                   *

       241         KK   24.2A      CP
       242         KM       COMBINE SUB 24 & CP 24.1 - APEX
       243         HC       2
                   *

       244         KK     25N     SUB
       245         KM       RUNOFF FROM SUB-BASIN 25N - APEX
       246         BA  0.7834       0       0       0       0       0       0       0
       247         LS       0      84     9.0       0
       248         UK     295   .0438     .20     100       0       0       0
       249         RK   16700   .0302    .045       0    TRAP      25       3
                   *

       250         KK     25S     SUB
       251         KM       RUNOFF FROM SUB-BASIN 25S - APEX
       252         BA  0.6256       0       0       0       0       0       0       0
       253         LS       0      86     9.0       0
       254         UK     295   .0438     .20     100       0       0       0
       255         RK    8900   .0278    .045       0    TRAP      25       3
                   *

       256         KK    25.1      CP
```

```
 257          KM        COMBINE HYDROGRAPHS FOR SUB-BASINS 25N AND 25S
 258          HC       2
              *

 259          KK   24.2B      CP
 260          KM        COMBINE TOTAL HYDROGRAPH 24.2A WITH 25.1
 261          HC       2
              *

 262          KK  PIMARD      CP
 263          KM   ROUTE THE TOTAL HYDROGRAPH AT THE CONCENTRATION POINT
 264          KM   24.2B TO THE CULVERT AT THE PIMA ROAD. THERE IS NO
 265          KM   CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
 266          RS       1    FLOW      -1       0       0
 267          RC    .055    .040    .055    2000   .0287       0       0       0
 268          RX       0       1     101     107     122     128     228     229
 269          RY      10       8       3       0       0       3       8      10
              *
1                                          HEC-1 INPUT                                          PAGE  8

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

 270          KK  RR24.2      CP
 271          KM   ROUTE THE TOTAL HYDROGRAPH AT CONCENTRATION POINT
 272          KM   24.2B FROM THE CULVERT UNDER PIMA ROAD TO CONCENTRATION
 273          KM   POINT 21.05.
 274          RS       1    FLOW      -1       0       0
 275          RC    .055    .040    .055    3050   .0238       0       0       0
 276          RX       0       1     101     107     122     128     228     229
 277          RY      10       8       3       0       0       3       8      10
              *  DDDDDDDDDDDDDDDDDDDDDDDDDDDDDIVERSIONDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

 278          KK     DIV
 279          KM   DIVERSION OF THE NORTH INFLOWS TO DETERMINE VOLUME
 280          KO       1       2
 281          DT     DIVE      0
 282          DI       0     200    5294
 283          DQ       0     200     500
              *  DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
              *

 284          KK  C21.05 CONFLUENCE OF DGB CHANNELS NEAR MID-SECTION 36
 285          KM         COMBINE HYDROGRAPH CP21G WITH HYDROGRAPH RR24.2
 286          KM         (FROM THE PIMA ROAD CULVERT)
 287          KO       3       1
 288          HC       2
              *
              *    THIS IS WHERE THE BASIN FOR ALTERNATIVE 3 WILL GO......
              *
              *
              *

 289          KK    R21G     CP
 290          KM        ROUTE CP21G(21.05)TO 21H WHICH IS 3100'
 291          RS       1    FLOW      -1       0       0
 292          RC    .055    .040    .055    3100   .0194       0       0       0
 293          RX       0      90     120     355     585     820     850     940
 294          RY       9       4     1.5       0       0     1.5       4       9
              *

 295          KK     21H     SUB
 296          KM        RUNOFF FROM SUB-BASIN 21H
 297          BA   .0431       0       0
 298          LS       0      80     6.4       0       0       0
 299          UK     297   .0333     .20     100       0       0       0
 300          RK    4600   .0278    .045       0    TRAP      20       3
```

```
                    *

     301            KK     26N
     302            KM       Runoff from sub-basin 26N
     303            BA   .6376       0       0
     304            LS       0      75    12.7       0
     305            UK     200   .0250     .20     100       0
     306            RK   12000   .0263    .045       0    TRAP      35      10
                    *
1                                        HEC-1 INPUT                                                    PAGE  9

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

     307            KK   CP21H   JOMAX RD
     308            KO       3
     309            HC       3
                    *

     310            KK   RR21H      CP
     311            KM        ROUTE HYDROGRAPH AT CONCENTRATION POINT 21H   DOWNSTREAM FROM
     312            KM        JOMAX ROAD           THERE IS NO ADDITIONAL CONTRIBUTING
     313            KM        DRAINAGE AREA AT THIS CONCENTRATION POINT.  USED CHANNEL
     314            KM        GEOMETRY                          FROM REACH SIX
     315            KM            DEVELOPED BY C. LOVELY
     316            RS       1    FLOW      -1       0       0
     317            RC    .055    .040    .055    2390   .0188       0       0       0
     318            RX       0      90     120     355     585     820     850     940
     319            RY       9       4     1.5       0       0     1.5       4       9
                    *

     320            KK     26S     SUB
     321            KM       RUNOFF FROM SUB-BASIN 26S
     322            BA  0.1672       0       0
     323            LS       0      75    12.7       0
     324            UK     200   .0250     .20     100       0       0       0
     325            RK    4000   .0263    .045       0    TRAP      35      10
                    *

     326            KK  *APEX*      CP
     327            KM        COMBINE FLOW FROM SUB-BASIN 26 ,
     328            KM            AND ROUTED HYDROGRAPH FROM JOMAX ROAD.
     329            HC       2
                    *
     330            KM        *********END SUBAREA 21 REVISIONS************

     331            KK   CP27A      CP AT HAPPY VALLEY RD
     332            KM        ROUTE FLOW FROM CONCENTRATION POINT APEX  TO 27A (HAPPY VALLEY
     333            KM        ROAD).  THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION PT.
     334            KM
     335            RS       1    FLOW      -1       0       0
     336            RC    .055    .040    .055    1600   .0196       0       0       0
     337            RX       0       1     201     211     261     271     471     472
     338            RY      10       4       2       0       0       2       4      10
                    *

     339            KK   CP27B      CP AT MILLER RD
     340            KM        ROUTE FLOW FROM CONCENTRATION POINT 27B TO 27C (MILLER ROAD).
     341            KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
     342            RS       1    FLOW      -1       0       0
     343            RC    .055    .040    .055    3300   .0196       0       0       0
     344            RX       0       1     201     211     261     271     471     472
     345            RY      10       4       2       0       0       2       4      10
                    *
1                                        HEC-1 INPUT                                                    PAGE 10

    LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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```
346          KK   CP27C      CP AT PINNACLE PEAK RD
347          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (PINNACLE PK ROAD).
348          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
349          RS       1    FLOW      -1       0       0
350          RC    .055    .040    .055    3300   .0196       0       0       0
351          RX       0       1     201     211     261     271     471     472
352          RY      10       4       2       0       0       2       4      10
             *

353          KK   CP27D      CP AT SCOTTSDALE RD
354          KM        ROUTE FLOW FROM CONCENTRATION POINT 27C TO 27D (SCOTTSDALE ROAD)
355          KM        THERE IS NO CONTRIBUTING AREA AT THIS CONCENTRATION POINT.
356          RS       1    FLOW      -1       0       0
357          RC    .055    .040    .055    1000   .0196       0       0       0
358          RX       0       1     201     211     261     271     471     472
359          RY      10       4       2       0       0       2       4      10
             *

360          KK      27     SUB
361          KM        RUNOFF FROM SUB-BASIN 27
362          BA  1.1913       0       0
363          LS       0      75    12.7       0
364          UK     200   .0250     .20     100       0       0       0
365          RK    1500   .0263    .045       0    TRAP      35      10
             *

366          KK    CP27      CP AT SCOTTSDALE RD
367          KO       3
368          KM        COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
369          KM        POINT 27D WITH SUB 27 .  TOTAL FLOW AT
370          KM        SCOTTSDALE ROAD FOR FAN 4.
371          HC       2
             *
372          ZZ
1
             SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   48          16
               .
               .
   55          .          17
               .           .
               .           .
   61          .           .          18
               .           .           .
               .           .           .
   67        19A.......................
               V
               V
   70        19B
               .
               .
   76          .          15
               .           .
               .           .
   82        19C............
               V
               V
   85       19.1
               .
               .
```

```
 91          .          19
             .           .
 98          .           .          20
             .           .           .
104       CP20.......................
             V
             V
108     RRCP20
             .
             .
114          .         21A
             .           .
             .           .
120      CP21A............
             V
             V
122      RR21A
             .
             .
128          .         21B
             .           .
             .           .
134      CP21B............
             V
             V
136      RR21B
             .
             .
142          .         21C
             .           .
             .           .
148      CP21C............
             V
             V
150      RR21C
             .
             .
156          .         21D
             .           .
             .           .
162      CP21D............
             V
             V
164      RR21D
             .
             .
170          .         21E
             .           .
             .           .
176      CP21E............
             V
             V
178      RR21E
             .
             .
184          .         21F
             .           .
             .           .
190      CP21F............
             V
             V
192      RR21F
             .
             .
198          .         21G
```

```
                .          .
204        CP21G............
                .
209             .-------->   DIVN
206          DIV
                .
212             .        22
                .          .
218             .          .        23
                .          .         .
224             .       24A............
                .          V
                .          V
227             .      24.1
                .          .
233             .          .        24
                .          .         .
241             .     24.2A............
                .          .
244             .          .       25N
                .          .         .
250             .          .         .        25S
                .          .         .         .
256             .          .     25.1............
                .          .         .
259             .     24.2B............
                .          V
                .          V
262             .    PIMARD
                .          V
                .          V
270             .    RR24.2
                .          .
281             .          .-------->   DIVE
278             .       DIV
                .          .
284        C21.05............
                V
                V
289          R21G
                .
295             .       21H
                .          .
301             .          .       26N
                .          .         .
307        CP21H........................
                V
                V
310        RR21H
                .
                .
```

```
  320          .        26S
               .          .
               .          .
  326      *APEX*............
               V
               V
  331       CP27A
               V
               V
  339       CP27B
               V
               V
  346       CP27C
               V
               V
  353       CP27D
               .
               .
  360          .         27
               .          .
               .          .
  366        CP27............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN 09 1992              *
*           VERSION 4.0.3E             *
*                                      *
*  RUN DATE  01/21/99  TIME  16:53:10  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748             *
*                                      *
****************************************
```

FILE <RWDAM21F.DAT>
THIS FILE IS MODIFIED FROM RAW10024.DAT OBTAINED FROM
THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.

THE MODIFICIATION INCLUDE THE FOLLOWING:
1) RE-ROUTING OF RUNOFF FROM SUB BASINS 22, 23, 24, 25N AND 25S
   TO CONCENTRATION POINT AT THE APEX OF 21F
2) DAM WAS MOVED TO THE APEX OF 21F ACCORDING TO ALTERNATIVE

NORTH SCOTTSDALE FLOOD INSURANCE STUDY, FUTURE CONDITIONS
1992 MODELING REVISIONS BASED ON REATA PASS SENSITIVITY ANALYSIS
MODEL FAN4.6I -- SUB-BASINS 15 THROUGH 21, 22, 23, 24 25N, &
25S.

100-YEAR, 6-HOUR STORM, USING HEC-1 HYPOTHETICAL DISTRIBUTION
RAINFALL FROM NOAA ATLAS

FILE RAW4A.DAT
WITH SUB-BASIN 21 SUBDIVIED PER CJL AND COMBINE HYDROGRAPHS
FOR 22, 23, 24, 25N, AND 25S. ROUTE COMBINED HYDROGRAPHS
22, 23, 24, 25N AND 25S TO 21G. SUN-BASIN 26 COMBINED AT
THE APEX ROUTE THE HYDROGRAPH AT THE APEX TO SCOTTSDALE
ROAD JUST SOUTH OF PINNACLE PEAK ROAD.
INTERMEDIATE CONCENTRATION POINTS ARE CALLED FOR AT FUTURE
PROPOSED ROAD CROSSINGS.

REVISED BY GREINER 12-9-93 BY RON FERGUSON
REVISED BY C. J. LOVELY, COS, 3-9-94
Revised by CH2M Hill, Fuller, 7-94 for Detention Feasibility Study

```
                                  *Eliminate DSS Records
                                  *Divide #26 into 26N & 26S; 26N is portion north of Jomax
                                  *Add 26N @ CP21H and route with 21H to apex
                                  *Add 26S @ apex
                                  *Modify reach length in 26S & 26N to reflect division

                                 ****************************************************************
                                 * ROUTING REACHES AND CP'S ADDED WITHIN SUB AREA 21 TO REFLECT IN *
                                 * MORE DETAIL ACTUAL DRAINAGE AND CHANNEL REACH CONDITIONS.      *
                                 ****************************************************************
                            September 1998 - Added a bypass flow to the two branches of flow in
                            September 1998 - Section 36. Will bypass the first flows up to 500 cfs each.
                            September 1998 - Filename <RAWBYPSS.DAT>


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

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

     IT          HYDROGRAPH TIME DATA
                        NMIN           5  MINUTES IN COMPUTATION INTERVAL
                       IDATE      3MAR94  STARTING DATE
                       ITIME        0000  STARTING TIME
                          NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      4MAR94  ENDING DATE
                      NDTIME        1735  ENDING TIME
                       ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL    0.08 HOURS
                       TOTAL TIME BASE   41.58 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
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0
MANE2 NPLAN,NSTM       1      0


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


            **************
            *            *
  206 KK    *       DIV  *
            *            *
            **************

  208 KO          OUTPUT CONTROL VARIABLES
```

```
                    IPRNT          1  PRINT CONTROL
                    IPLOT          2  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

   DT          DIVERSION
                    ISTAD       DIVN  DIVERSION HYDROGRAPH IDENTIFICATION

   DI             INFLOW       0.00    200.00   8841.00

   DQ       DIVERTED FLOW      0.00    200.00    500.00
                                                        ***
```

****

DIVERSION HYDROGRAPH DIVN

****

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
3	MAR	0000	1	0.	3	MAR	1025	126	58.	3	MAR	2050	251	1.	4	MAR	0715	376	0.
3	MAR	0005	2	0.	3	MAR	1030	127	56.	3	MAR	2055	252	1.	4	MAR	0720	377	0.
3	MAR	0010	3	0.	3	MAR	1035	128	54.	3	MAR	2100	253	1.	4	MAR	0725	378	0.
3	MAR	0015	4	0.	3	MAR	1040	129	51.	3	MAR	2105	254	1.	4	MAR	0730	379	0.
3	MAR	0020	5	0.	3	MAR	1045	130	49.	3	MAR	2110	255	1.	4	MAR	0735	380	0.
3	MAR	0025	6	0.	3	MAR	1050	131	47.	3	MAR	2115	256	1.	4	MAR	0740	381	0.
3	MAR	0030	7	0.	3	MAR	1055	132	45.	3	MAR	2120	257	1.	4	MAR	0745	382	0.
3	MAR	0035	8	0.	3	MAR	1100	133	43.	3	MAR	2125	258	1.	4	MAR	0750	383	0.
3	MAR	0040	9	0.	3	MAR	1105	134	41.	3	MAR	2130	259	1.	4	MAR	0755	384	0.
3	MAR	0045	10	0.	3	MAR	1110	135	39.	3	MAR	2135	260	1.	4	MAR	0800	385	0.
3	MAR	0050	11	0.	3	MAR	1115	136	37.	3	MAR	2140	261	1.	4	MAR	0805	386	0.
3	MAR	0055	12	0.	3	MAR	1120	137	35.	3	MAR	2145	262	1.	4	MAR	0810	387	0.
3	MAR	0100	13	0.	3	MAR	1125	138	34.	3	MAR	2150	263	1.	4	MAR	0815	388	0.
3	MAR	0105	14	0.	3	MAR	1130	139	32.	3	MAR	2155	264	1.	4	MAR	0820	389	0.
3	MAR	0110	15	0.	3	MAR	1135	140	31.	3	MAR	2200	265	1.	4	MAR	0825	390	0.
3	MAR	0115	16	0.	3	MAR	1140	141	29.	3	MAR	2205	266	1.	4	MAR	0830	391	0.
3	MAR	0120	17	0.	3	MAR	1145	142	28.	3	MAR	2210	267	1.	4	MAR	0835	392	0.
3	MAR	0125	18	0.	3	MAR	1150	143	26.	3	MAR	2215	268	1.	4	MAR	0840	393	0.
3	MAR	0130	19	0.	3	MAR	1155	144	25.	3	MAR	2220	269	1.	4	MAR	0845	394	0.
3	MAR	0135	20	0.	3	MAR	1200	145	24.	3	MAR	2225	270	1.	4	MAR	0850	395	0.
3	MAR	0140	21	0.	3	MAR	1205	146	23.	3	MAR	2230	271	1.	4	MAR	0855	396	0.
3	MAR	0145	22	0.	3	MAR	1210	147	22.	3	MAR	2235	272	1.	4	MAR	0900	397	0.
3	MAR	0150	23	1.	3	MAR	1215	148	21.	3	MAR	2240	273	1.	4	MAR	0905	398	0.
3	MAR	0155	24	1.	3	MAR	1220	149	20.	3	MAR	2245	274	1.	4	MAR	0910	399	0.
3	MAR	0200	25	1.	3	MAR	1225	150	19.	3	MAR	2250	275	1.	4	MAR	0915	400	0.
3	MAR	0205	26	1.	3	MAR	1230	151	18.	3	MAR	2255	276	1.	4	MAR	0920	401	0.
3	MAR	0210	27	1.	3	MAR	1235	152	17.	3	MAR	2300	277	1.	4	MAR	0925	402	0.
3	MAR	0215	28	2.	3	MAR	1240	153	16.	3	MAR	2305	278	1.	4	MAR	0930	403	0.
3	MAR	0220	29	2.	3	MAR	1245	154	16.	3	MAR	2310	279	1.	4	MAR	0935	404	0.
3	MAR	0225	30	2.	3	MAR	1250	155	15.	3	MAR	2315	280	1.	4	MAR	0940	405	0.
3	MAR	0230	31	3.	3	MAR	1255	156	14.	3	MAR	2320	281	1.	4	MAR	0945	406	0.
3	MAR	0235	32	4.	3	MAR	1300	157	14.	3	MAR	2325	282	1.	4	MAR	0950	407	0.
3	MAR	0240	33	5.	3	MAR	1305	158	13.	3	MAR	2330	283	1.	4	MAR	0955	408	0.
3	MAR	0245	34	6.	3	MAR	1310	159	13.	3	MAR	2335	284	1.	4	MAR	1000	409	0.
3	MAR	0250	35	8.	3	MAR	1315	160	12.	3	MAR	2340	285	1.	4	MAR	1005	410	0.
3	MAR	0255	36	13.	3	MAR	1320	161	11.	3	MAR	2345	286	1.	4	MAR	1010	411	0.
3	MAR	0300	37	23.	3	MAR	1325	162	11.	3	MAR	2350	287	1.	4	MAR	1015	412	0.
3	MAR	0305	38	54.	3	MAR	1330	163	11.	3	MAR	2355	288	1.	4	MAR	1020	413	0.
3	MAR	0310	39	155.	3	MAR	1335	164	10.	4	MAR	0000	289	1.	4	MAR	1025	414	0.
3	MAR	0315	40	211.	3	MAR	1340	165	10.	4	MAR	0005	290	1.	4	MAR	1030	415	0.
3	MAR	0320	41	241.	3	MAR	1345	166	9.	4	MAR	0010	291	1.	4	MAR	1035	416	0.
3	MAR	0325	42	284.	3	MAR	1350	167	9.	4	MAR	0015	292	1.	4	MAR	1040	417	0.
3	MAR	0330	43	331.	3	MAR	1355	168	9.	4	MAR	0020	293	1.	4	MAR	1045	418	0.
3	MAR	0335	44	385.	3	MAR	1400	169	8.	4	MAR	0025	294	1.	4	MAR	1050	419	0.
3	MAR	0340	45	439.	3	MAR	1405	170	8.	4	MAR	0030	295	1.	4	MAR	1055	420	0.
3	MAR	0345	46	476.	3	MAR	1410	171	8.	4	MAR	0035	296	1.	4	MAR	1100	421	0.

3	MAR	0350	47	493.	*	3	MAR	1415	172	7.	*	4	MAR	0040	297	1.	*	4	MAR	1105	422	0.
3	MAR	0355	48	484.	*	3	MAR	1420	173	7.	*	4	MAR	0045	298	1.	*	4	MAR	1110	423	0.
3	MAR	0400	49	465.	*	3	MAR	1425	174	7.	*	4	MAR	0050	299	1.	*	4	MAR	1115	424	0.
3	MAR	0405	50	441.	*	3	MAR	1430	175	7.	*	4	MAR	0055	300	1.	*	4	MAR	1120	425	0.
3	MAR	0410	51	415.	*	3	MAR	1435	176	6.	*	4	MAR	0100	301	1.	*	4	MAR	1125	426	0.
3	MAR	0415	52	391.	*	3	MAR	1440	177	6.	*	4	MAR	0105	302	1.	*	4	MAR	1130	427	0.
3	MAR	0420	53	368.	*	3	MAR	1445	178	6.	*	4	MAR	0110	303	0.	*	4	MAR	1135	428	0.
3	MAR	0425	54	348.	*	3	MAR	1450	179	6.	*	4	MAR	0115	304	0.	*	4	MAR	1140	429	0.
3	MAR	0430	55	333.	*	3	MAR	1455	180	6.	*	4	MAR	0120	305	0.	*	4	MAR	1145	430	0.
3	MAR	0435	56	317.	*	3	MAR	1500	181	5.	*	4	MAR	0125	306	0.	*	4	MAR	1150	431	0.
3	MAR	0440	57	302.	*	3	MAR	1505	182	5.	*	4	MAR	0130	307	0.	*	4	MAR	1155	432	0.
3	MAR	0445	58	289.	*	3	MAR	1510	183	5.	*	4	MAR	0135	308	0.	*	4	MAR	1200	433	0.
3	MAR	0450	59	278.	*	3	MAR	1515	184	5.	*	4	MAR	0140	309	0.	*	4	MAR	1205	434	0.
3	MAR	0455	60	269.	*	3	MAR	1520	185	5.	*	4	MAR	0145	310	0.	*	4	MAR	1210	435	0.
3	MAR	0500	61	262.	*	3	MAR	1525	186	5.	*	4	MAR	0150	311	0.	*	4	MAR	1215	436	0.
3	MAR	0505	62	256.	*	3	MAR	1530	187	4.	*	4	MAR	0155	312	0.	*	4	MAR	1220	437	0.
3	MAR	0510	63	251.	*	3	MAR	1535	188	4.	*	4	MAR	0200	313	0.	*	4	MAR	1225	438	0.
3	MAR	0515	64	247.	*	3	MAR	1540	189	4.	*	4	MAR	0205	314	0.	*	4	MAR	1230	439	0.
3	MAR	0520	65	243.	*	3	MAR	1545	190	4.	*	4	MAR	0210	315	0.	*	4	MAR	1235	440	0.
3	MAR	0525	66	240.	*	3	MAR	1550	191	4.	*	4	MAR	0215	316	0.	*	4	MAR	1240	441	0.
3	MAR	0530	67	237.	*	3	MAR	1555	192	4.	*	4	MAR	0220	317	0.	*	4	MAR	1245	442	0.
3	MAR	0535	68	235.	*	3	MAR	1600	193	4.	*	4	MAR	0225	318	0.	*	4	MAR	1250	443	0.
3	MAR	0540	69	233.	*	3	MAR	1605	194	4.	*	4	MAR	0230	319	0.	*	4	MAR	1255	444	0.
3	MAR	0545	70	231.	*	3	MAR	1610	195	4.	*	4	MAR	0235	320	0.	*	4	MAR	1300	445	0.
3	MAR	0550	71	230.	*	3	MAR	1615	196	3.	*	4	MAR	0240	321	0.	*	4	MAR	1305	446	0.
3	MAR	0555	72	228.	*	3	MAR	1620	197	3.	*	4	MAR	0245	322	0.	*	4	MAR	1310	447	0.
3	MAR	0600	73	227.	*	3	MAR	1625	198	3.	*	4	MAR	0250	323	0.	*	4	MAR	1315	448	0.
3	MAR	0605	74	226.	*	3	MAR	1630	199	3.	*	4	MAR	0255	324	0.	*	4	MAR	1320	449	0.
3	MAR	0610	75	225.	*	3	MAR	1635	200	3.	*	4	MAR	0300	325	0.	*	4	MAR	1325	450	0.
3	MAR	0615	76	224.	*	3	MAR	1640	201	3.	*	4	MAR	0305	326	0.	*	4	MAR	1330	451	0.
3	MAR	0620	77	223.	*	3	MAR	1645	202	3.	*	4	MAR	0310	327	0.	*	4	MAR	1335	452	0.
3	MAR	0625	78	222.	*	3	MAR	1650	203	3.	*	4	MAR	0315	328	0.	*	4	MAR	1340	453	0.
3	MAR	0630	79	221.	*	3	MAR	1655	204	3.	*	4	MAR	0320	329	0.	*	4	MAR	1345	454	0.
3	MAR	0635	80	220.	*	3	MAR	1700	205	3.	*	4	MAR	0325	330	0.	*	4	MAR	1350	455	0.
3	MAR	0640	81	219.	*	3	MAR	1705	206	3.	*	4	MAR	0330	331	0.	*	4	MAR	1355	456	0.
3	MAR	0645	82	218.	*	3	MAR	1710	207	3.	*	4	MAR	0335	332	0.	*	4	MAR	1400	457	0.
3	MAR	0650	83	217.	*	3	MAR	1715	208	3.	*	4	MAR	0340	333	0.	*	4	MAR	1405	458	0.
3	MAR	0655	84	216.	*	3	MAR	1720	209	2.	*	4	MAR	0345	334	0.	*	4	MAR	1410	459	0.
3	MAR	0700	85	215.	*	3	MAR	1725	210	2.	*	4	MAR	0350	335	0.	*	4	MAR	1415	460	0.
3	MAR	0705	86	214.	*	3	MAR	1730	211	2.	*	4	MAR	0355	336	0.	*	4	MAR	1420	461	0.
3	MAR	0710	87	212.	*	3	MAR	1735	212	2.	*	4	MAR	0400	337	0.	*	4	MAR	1425	462	0.
3	MAR	0715	88	211.	*	3	MAR	1740	213	2.	*	4	MAR	0405	338	0.	*	4	MAR	1430	463	0.
3	MAR	0720	89	210.	*	3	MAR	1745	214	2.	*	4	MAR	0410	339	0.	*	4	MAR	1435	464	0.
3	MAR	0725	90	209.	*	3	MAR	1750	215	2.	*	4	MAR	0415	340	0.	*	4	MAR	1440	465	0.
3	MAR	0730	91	208.	*	3	MAR	1755	216	2.	*	4	MAR	0420	341	0.	*	4	MAR	1445	466	0.
3	MAR	0735	92	207.	*	3	MAR	1800	217	2.	*	4	MAR	0425	342	0.	*	4	MAR	1450	467	0.
3	MAR	0740	93	206.	*	3	MAR	1805	218	2.	*	4	MAR	0430	343	0.	*	4	MAR	1455	468	0.
3	MAR	0745	94	205.	*	3	MAR	1810	219	2.	*	4	MAR	0435	344	0.	*	4	MAR	1500	469	0.
3	MAR	0750	95	205.	*	3	MAR	1815	220	2.	*	4	MAR	0440	345	0.	*	4	MAR	1505	470	0.
3	MAR	0755	96	204.	*	3	MAR	1820	221	2.	*	4	MAR	0445	346	0.	*	4	MAR	1510	471	0.
3	MAR	0800	97	203.	*	3	MAR	1825	222	2.	*	4	MAR	0450	347	0.	*	4	MAR	1515	472	0.
3	MAR	0805	98	202.	*	3	MAR	1830	223	2.	*	4	MAR	0455	348	0.	*	4	MAR	1520	473	0.
3	MAR	0810	99	202.	*	3	MAR	1835	224	2.	*	4	MAR	0500	349	0.	*	4	MAR	1525	474	0.
3	MAR	0815	100	201.	*	3	MAR	1840	225	2.	*	4	MAR	0505	350	0.	*	4	MAR	1530	475	0.
3	MAR	0820	101	201.	*	3	MAR	1845	226	2.	*	4	MAR	0510	351	0.	*	4	MAR	1535	476	0.
3	MAR	0825	102	201.	*	3	MAR	1850	227	2.	*	4	MAR	0515	352	0.	*	4	MAR	1540	477	0.
3	MAR	0830	103	200.	*	3	MAR	1855	228	2.	*	4	MAR	0520	353	0.	*	4	MAR	1545	478	0.
3	MAR	0835	104	196.	*	3	MAR	1900	229	2.	*	4	MAR	0525	354	0.	*	4	MAR	1550	479	0.
3	MAR	0840	105	186.	*	3	MAR	1905	230	2.	*	4	MAR	0530	355	0.	*	4	MAR	1555	480	0.
3	MAR	0845	106	175.	*	3	MAR	1910	231	2.	*	4	MAR	0535	356	0.	*	4	MAR	1600	481	0.
3	MAR	0850	107	165.	*	3	MAR	1915	232	1.	*	4	MAR	0540	357	0.	*	4	MAR	1605	482	0.
3	MAR	0855	108	155.	*	3	MAR	1920	233	1.	*	4	MAR	0545	358	0.	*	4	MAR	1610	483	0.
3	MAR	0900	109	145.	*	3	MAR	1925	234	1.	*	4	MAR	0550	359	0.	*	4	MAR	1615	484	0.
3	MAR	0905	110	136.	*	3	MAR	1930	235	1.	*	4	MAR	0555	360	0.	*	4	MAR	1620	485	0.
3	MAR	0910	111	128.	*	3	MAR	1935	236	1.	*	4	MAR	0600	361	0.	*	4	MAR	1625	486	0.
3	MAR	0915	112	120.	*	3	MAR	1940	237	1.	*	4	MAR	0605	362	0.	*	4	MAR	1630	487	0.
3	MAR	0920	113	112.	*	3	MAR	1945	238	1.	*	4	MAR	0610	363	0.	*	4	MAR	1635	488	0.

3 MAR	0925	114	105.	*	3 MAR	1950	239	1.	*	4 MAR	0615	364	0.	*	4 MAR	1640	489	0.
3 MAR	0930	115	98.	*	3 MAR	1955	240	1.	*	4 MAR	0620	365	0.	*	4 MAR	1645	490	0.
3 MAR	0935	116	93.	*	3 MAR	2000	241	1.	*	4 MAR	0625	366	0.	*	4 MAR	1650	491	0.
3 MAR	0940	117	88.	*	3 MAR	2005	242	1.	*	4 MAR	0630	367	0.	*	4 MAR	1655	492	0.
3 MAR	0945	118	83.	*	3 MAR	2010	243	1.	*	4 MAR	0635	368	0.	*	4 MAR	1700	493	0.
3 MAR	0950	119	79.	*	3 MAR	2015	244	1.	*	4 MAR	0640	369	0.	*	4 MAR	1705	494	0.
3 MAR	0955	120	75.	*	3 MAR	2020	245	1.	*	4 MAR	0645	370	0.	*	4 MAR	1710	495	0.
3 MAR	1000	121	72.	*	3 MAR	2025	246	1.	*	4 MAR	0650	371	0.	*	4 MAR	1715	496	0.
3 MAR	1005	122	69.	*	3 MAR	2030	247	1.	*	4 MAR	0655	372	0.	*	4 MAR	1720	497	0.
3 MAR	1010	123	66.	*	3 MAR	2035	248	1.	*	4 MAR	0700	373	0.	*	4 MAR	1725	498	0.
3 MAR	1015	124	63.	*	3 MAR	2040	249	1.	*	4 MAR	0705	374	0.	*	4 MAR	1730	499	0.
3 MAR	1020	125	61.	*	3 MAR	2045	250	1.	*	4 MAR	0710	375	0.	*	4 MAR	1735	500	0.
				*					*					*				

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PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	41.58-HR
+		(CFS)				
+ 493.	3.83		255.	74.	43.	43.
		(INCHES)	0.255	0.295	0.295	0.295
		(AC-FT)	126.	146.	146.	146.

CUMULATIVE AREA = 9.28 SQ MI

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HYDROGRAPH AT STATION DIV

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
3	MAR	0000	1	0.	3	MAR	1025	126	0.	3	MAR	2050	251	0.	4	MAR	0715	376	0.
3	MAR	0005	2	0.	3	MAR	1030	127	0.	3	MAR	2055	252	0.	4	MAR	0720	377	0.
3	MAR	0010	3	0.	3	MAR	1035	128	0.	3	MAR	2100	253	0.	4	MAR	0725	378	0.
3	MAR	0015	4	0.	3	MAR	1040	129	0.	3	MAR	2105	254	0.	4	MAR	0730	379	0.
3	MAR	0020	5	0.	3	MAR	1045	130	0.	3	MAR	2110	255	0.	4	MAR	0735	380	0.
3	MAR	0025	6	0.	3	MAR	1050	131	0.	3	MAR	2115	256	0.	4	MAR	0740	381	0.
3	MAR	0030	7	0.	3	MAR	1055	132	0.	3	MAR	2120	257	0.	4	MAR	0745	382	0.
3	MAR	0035	8	0.	3	MAR	1100	133	0.	3	MAR	2125	258	0.	4	MAR	0750	383	0.
3	MAR	0040	9	0.	3	MAR	1105	134	0.	3	MAR	2130	259	0.	4	MAR	0755	384	0.
3	MAR	0045	10	0.	3	MAR	1110	135	0.	3	MAR	2135	260	0.	4	MAR	0800	385	0.
3	MAR	0050	11	0.	3	MAR	1115	136	0.	3	MAR	2140	261	0.	4	MAR	0805	386	0.
3	MAR	0055	12	0.	3	MAR	1120	137	0.	3	MAR	2145	262	0.	4	MAR	0810	387	0.
3	MAR	0100	13	0.	3	MAR	1125	138	0.	3	MAR	2150	263	0.	4	MAR	0815	388	0.
3	MAR	0105	14	0.	3	MAR	1130	139	0.	3	MAR	2155	264	0.	4	MAR	0820	389	0.
3	MAR	0110	15	0.	3	MAR	1135	140	0.	3	MAR	2200	265	0.	4	MAR	0825	390	0.
3	MAR	0115	16	0.	3	MAR	1140	141	0.	3	MAR	2205	266	0.	4	MAR	0830	391	0.
3	MAR	0120	17	0.	3	MAR	1145	142	0.	3	MAR	2210	267	0.	4	MAR	0835	392	0.
3	MAR	0125	18	0.	3	MAR	1150	143	0.	3	MAR	2215	268	0.	4	MAR	0840	393	0.
3	MAR	0130	19	0.	3	MAR	1155	144	0.	3	MAR	2220	269	0.	4	MAR	0845	394	0.
3	MAR	0135	20	0.	3	MAR	1200	145	0.	3	MAR	2225	270	0.	4	MAR	0850	395	0.
3	MAR	0140	21	0.	3	MAR	1205	146	0.	3	MAR	2230	271	0.	4	MAR	0855	396	0.
3	MAR	0145	22	0.	3	MAR	1210	147	0.	3	MAR	2235	272	0.	4	MAR	0900	397	0.
3	MAR	0150	23	0.	3	MAR	1215	148	0.	3	MAR	2240	273	0.	4	MAR	0905	398	0.
3	MAR	0155	24	0.	3	MAR	1220	149	0.	3	MAR	2245	274	0.	4	MAR	0910	399	0.
3	MAR	0200	25	0.	3	MAR	1225	150	0.	3	MAR	2250	275	0.	4	MAR	0915	400	0.
3	MAR	0205	26	0.	3	MAR	1230	151	0.	3	MAR	2255	276	0.	4	MAR	0920	401	0.
3	MAR	0210	27	0.	3	MAR	1235	152	0.	3	MAR	2300	277	0.	4	MAR	0925	402	0.
3	MAR	0215	28	0.	3	MAR	1240	153	0.	3	MAR	2305	278	0.	4	MAR	0930	403	0.
3	MAR	0220	29	0.	3	MAR	1245	154	0.	3	MAR	2310	279	0.	4	MAR	0935	404	0.
3	MAR	0225	30	0.	3	MAR	1250	155	0.	3	MAR	2315	280	0.	4	MAR	0940	405	0.
3	MAR	0230	31	0.	3	MAR	1255	156	0.	3	MAR	2320	281	0.	4	MAR	0945	406	0.
3	MAR	0235	32	0.	3	MAR	1300	157	0.	3	MAR	2325	282	0.	4	MAR	0950	407	0.
3	MAR	0240	33	0.	3	MAR	1305	158	0.	3	MAR	2330	283	0.	4	MAR	0955	408	0.

3	MAR	0245	34	0.	*	3	MAR	1310	159	0.	*	3	MAR	2335	284	0.	*	4	MAR	1000	409	0.
3	MAR	0250	35	0.	*	3	MAR	1315	160	0.	*	3	MAR	2340	285	0.	*	4	MAR	1005	410	0.
3	MAR	0255	36	0.	*	3	MAR	1320	161	0.	*	3	MAR	2345	286	0.	*	4	MAR	1010	411	0.
3	MAR	0300	37	0.	*	3	MAR	1325	162	0.	*	3	MAR	2350	287	0.	*	4	MAR	1015	412	0.
3	MAR	0305	38	0.	*	3	MAR	1330	163	0.	*	3	MAR	2355	288	0.	*	4	MAR	1020	413	0.
3	MAR	0310	39	0.	*	3	MAR	1335	164	0.	*	4	MAR	0000	289	0.	*	4	MAR	1025	414	0.
3	MAR	0315	40	311.	*	3	MAR	1340	165	0.	*	4	MAR	0005	290	0.	*	4	MAR	1030	415	0.
3	MAR	0320	41	1150.	*	3	MAR	1345	166	0.	*	4	MAR	0010	291	0.	*	4	MAR	1035	416	0.
3	MAR	0325	42	2329.	*	3	MAR	1350	167	0.	*	4	MAR	0015	292	0.	*	4	MAR	1040	417	0.
3	MAR	0330	43	3638.	*	3	MAR	1355	168	0.	*	4	MAR	0020	293	0.	*	4	MAR	1045	418	0.
3	MAR	0335	44	5135.	*	3	MAR	1400	169	0.	*	4	MAR	0025	294	0.	*	4	MAR	1050	419	0.
3	MAR	0340	45	6658.	*	3	MAR	1405	170	0.	*	4	MAR	0030	295	0.	*	4	MAR	1055	420	0.
3	MAR	0345	46	7685.	*	3	MAR	1410	171	0.	*	4	MAR	0035	296	0.	*	4	MAR	1100	421	0.
3	MAR	0350	47	8136.	*	3	MAR	1415	172	0.	*	4	MAR	0040	297	0.	*	4	MAR	1105	422	0.
3	MAR	0355	48	7909.	*	3	MAR	1420	173	0.	*	4	MAR	0045	298	0.	*	4	MAR	1110	423	0.
3	MAR	0400	49	7373.	*	3	MAR	1425	174	0.	*	4	MAR	0050	299	0.	*	4	MAR	1115	424	0.
3	MAR	0405	50	6699.	*	3	MAR	1430	175	0.	*	4	MAR	0055	300	0.	*	4	MAR	1120	425	0.
3	MAR	0410	51	5978.	*	3	MAR	1435	176	0.	*	4	MAR	0100	301	0.	*	4	MAR	1125	426	0.
3	MAR	0415	52	5298.	*	3	MAR	1440	177	0.	*	4	MAR	0105	302	0.	*	4	MAR	1130	427	0.
3	MAR	0420	53	4671.	*	3	MAR	1445	178	0.	*	4	MAR	0110	303	0.	*	4	MAR	1135	428	0.
3	MAR	0425	54	4129.	*	3	MAR	1450	179	0.	*	4	MAR	0115	304	0.	*	4	MAR	1140	429	0.
3	MAR	0430	55	3697.	*	3	MAR	1455	180	0.	*	4	MAR	0120	305	0.	*	4	MAR	1145	430	0.
3	MAR	0435	56	3247.	*	3	MAR	1500	181	0.	*	4	MAR	0125	306	0.	*	4	MAR	1150	431	0.
3	MAR	0440	57	2834.	*	3	MAR	1505	182	0.	*	4	MAR	0130	307	0.	*	4	MAR	1155	432	0.
3	MAR	0445	58	2480.	*	3	MAR	1510	183	0.	*	4	MAR	0135	308	0.	*	4	MAR	1200	433	0.
3	MAR	0450	59	2164.	*	3	MAR	1515	184	0.	*	4	MAR	0140	309	0.	*	4	MAR	1205	434	0.
3	MAR	0455	60	1915.	*	3	MAR	1520	185	0.	*	4	MAR	0145	310	0.	*	4	MAR	1210	435	0.
3	MAR	0500	61	1719.	*	3	MAR	1525	186	0.	*	4	MAR	0150	311	0.	*	4	MAR	1215	436	0.
3	MAR	0505	62	1553.	*	3	MAR	1530	187	0.	*	4	MAR	0155	312	0.	*	4	MAR	1220	437	0.
3	MAR	0510	63	1412.	*	3	MAR	1535	188	0.	*	4	MAR	0200	313	0.	*	4	MAR	1225	438	0.
3	MAR	0515	64	1295.	*	3	MAR	1540	189	0.	*	4	MAR	0205	314	0.	*	4	MAR	1230	439	0.
3	MAR	0520	65	1197.	*	3	MAR	1545	190	0.	*	4	MAR	0210	315	0.	*	4	MAR	1235	440	0.
3	MAR	0525	66	1113.	*	3	MAR	1550	191	0.	*	4	MAR	0215	316	0.	*	4	MAR	1240	441	0.
3	MAR	0530	67	1041.	*	3	MAR	1555	192	0.	*	4	MAR	0220	317	0.	*	4	MAR	1245	442	0.
3	MAR	0535	68	976.	*	3	MAR	1600	193	0.	*	4	MAR	0225	318	0.	*	4	MAR	1250	443	0.
3	MAR	0540	69	918.	*	3	MAR	1605	194	0.	*	4	MAR	0230	319	0.	*	4	MAR	1255	444	0.
3	MAR	0545	70	867.	*	3	MAR	1610	195	0.	*	4	MAR	0235	320	0.	*	4	MAR	1300	445	0.
3	MAR	0550	71	823.	*	3	MAR	1615	196	0.	*	4	MAR	0240	321	0.	*	4	MAR	1305	446	0.
3	MAR	0555	72	783.	*	3	MAR	1620	197	0.	*	4	MAR	0245	322	0.	*	4	MAR	1310	447	0.
3	MAR	0600	73	747.	*	3	MAR	1625	198	0.	*	4	MAR	0250	323	0.	*	4	MAR	1315	448	0.
3	MAR	0605	74	717.	*	3	MAR	1630	199	0.	*	4	MAR	0255	324	0.	*	4	MAR	1320	449	0.
3	MAR	0610	75	689.	*	3	MAR	1635	200	0.	*	4	MAR	0300	325	0.	*	4	MAR	1325	450	0.
3	MAR	0615	76	661.	*	3	MAR	1640	201	0.	*	4	MAR	0305	326	0.	*	4	MAR	1330	451	0.
3	MAR	0620	77	634.	*	3	MAR	1645	202	0.	*	4	MAR	0310	327	0.	*	4	MAR	1335	452	0.
3	MAR	0625	78	607.	*	3	MAR	1650	203	0.	*	4	MAR	0315	328	0.	*	4	MAR	1340	453	0.
3	MAR	0630	79	579.	*	3	MAR	1655	204	0.	*	4	MAR	0320	329	0.	*	4	MAR	1345	454	0.
3	MAR	0635	80	551.	*	3	MAR	1700	205	0.	*	4	MAR	0325	330	0.	*	4	MAR	1350	455	0.
3	MAR	0640	81	523.	*	3	MAR	1705	206	0.	*	4	MAR	0330	331	0.	*	4	MAR	1355	456	0.
3	MAR	0645	82	495.	*	3	MAR	1710	207	0.	*	4	MAR	0335	332	0.	*	4	MAR	1400	457	0.
3	MAR	0650	83	466.	*	3	MAR	1715	208	0.	*	4	MAR	0340	333	0.	*	4	MAR	1405	458	0.
3	MAR	0655	84	437.	*	3	MAR	1720	209	0.	*	4	MAR	0345	334	0.	*	4	MAR	1410	459	0.
3	MAR	0700	85	407.	*	3	MAR	1725	210	0.	*	4	MAR	0350	335	0.	*	4	MAR	1415	460	0.
3	MAR	0705	86	376.	*	3	MAR	1730	211	0.	*	4	MAR	0355	336	0.	*	4	MAR	1420	461	0.
3	MAR	0710	87	345.	*	3	MAR	1735	212	0.	*	4	MAR	0400	337	0.	*	4	MAR	1425	462	0.
3	MAR	0715	88	315.	*	3	MAR	1740	213	0.	*	4	MAR	0405	338	0.	*	4	MAR	1430	463	0.
3	MAR	0720	89	285.	*	3	MAR	1745	214	0.	*	4	MAR	0410	339	0.	*	4	MAR	1435	464	0.
3	MAR	0725	90	255.	*	3	MAR	1750	215	0.	*	4	MAR	0415	340	0.	*	4	MAR	1440	465	0.
3	MAR	0730	91	227.	*	3	MAR	1755	216	0.	*	4	MAR	0420	341	0.	*	4	MAR	1445	466	0.
3	MAR	0735	92	200.	*	3	MAR	1800	217	0.	*	4	MAR	0425	342	0.	*	4	MAR	1450	467	0.
3	MAR	0740	93	175.	*	3	MAR	1805	218	0.	*	4	MAR	0430	343	0.	*	4	MAR	1455	468	0.
3	MAR	0745	94	151.	*	3	MAR	1810	219	0.	*	4	MAR	0435	344	0.	*	4	MAR	1500	469	0.
3	MAR	0750	95	128.	*	3	MAR	1815	220	0.	*	4	MAR	0440	345	0.	*	4	MAR	1505	470	0.
3	MAR	0755	96	106.	*	3	MAR	1820	221	0.	*	4	MAR	0445	346	0.	*	4	MAR	1510	471	0.
3	MAR	0800	97	87.	*	3	MAR	1825	222	0.	*	4	MAR	0450	347	0.	*	4	MAR	1515	472	0.
3	MAR	0805	98	69.	*	3	MAR	1830	223	0.	*	4	MAR	0455	348	0.	*	4	MAR	1520	473	0.
3	MAR	0810	99	53.	*	3	MAR	1835	224	0.	*	4	MAR	0500	349	0.	*	4	MAR	1525	474	0.
3	MAR	0815	100	37.	*	3	MAR	1840	225	0.	*	4	MAR	0505	350	0.	*	4	MAR	1530	475	0.

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     3 MAR 0820  101        26.   *    3 MAR 1845  226        0.   *    4 MAR 0510  351        0.   *    4 MAR 1535  476        0.
     3 MAR 0825  102        17.   *    3 MAR 1850  227        0.   *    4 MAR 0515  352        0.   *    4 MAR 1540  477        0.
     3 MAR 0830  103         7.   *    3 MAR 1855  228        0.   *    4 MAR 0520  353        0.   *    4 MAR 1545  478        0.
     3 MAR 0835  104         0.   *    3 MAR 1900  229        0.   *    4 MAR 0525  354        0.   *    4 MAR 1550  479        0.
     3 MAR 0840  105         0.   *    3 MAR 1905  230        0.   *    4 MAR 0530  355        0.   *    4 MAR 1555  480        0.
     3 MAR 0845  106         0.   *    3 MAR 1910  231        0.   *    4 MAR 0535  356        0.   *    4 MAR 1600  481        0.
     3 MAR 0850  107         0.   *    3 MAR 1915  232        0.   *    4 MAR 0540  357        0.   *    4 MAR 1605  482        0.
     3 MAR 0855  108         0.   *    3 MAR 1920  233        0.   *    4 MAR 0545  358        0.   *    4 MAR 1610  483        0.
     3 MAR 0900  109         0.   *    3 MAR 1925  234        0.   *    4 MAR 0550  359        0.   *    4 MAR 1615  484        0.
     3 MAR 0905  110         0.   *    3 MAR 1930  235        0.   *    4 MAR 0555  360        0.   *    4 MAR 1620  485        0.
     3 MAR 0910  111         0.   *    3 MAR 1935  236        0.   *    4 MAR 0600  361        0.   *    4 MAR 1625  486        0.
     3 MAR 0915  112         0.   *    3 MAR 1940  237        0.   *    4 MAR 0605  362        0.   *    4 MAR 1630  487        0.
     3 MAR 0920  113         0.   *    3 MAR 1945  238        0.   *    4 MAR 0610  363        0.   *    4 MAR 1635  488        0.
     3 MAR 0925  114         0.   *    3 MAR 1950  239        0.   *    4 MAR 0615  364        0.   *    4 MAR 1640  489        0.
     3 MAR 0930  115         0.   *    3 MAR 1955  240        0.   *    4 MAR 0620  365        0.   *    4 MAR 1645  490        0.
     3 MAR 0935  116         0.   *    3 MAR 2000  241        0.   *    4 MAR 0625  366        0.   *    4 MAR 1650  491        0.
     3 MAR 0940  117         0.   *    3 MAR 2005  242        0.   *    4 MAR 0630  367        0.   *    4 MAR 1655  492        0.
     3 MAR 0945  118         0.   *    3 MAR 2010  243        0.   *    4 MAR 0635  368        0.   *    4 MAR 1700  493        0.
     3 MAR 0950  119         0.   *    3 MAR 2015  244        0.   *    4 MAR 0640  369        0.   *    4 MAR 1705  494        0.
     3 MAR 0955  120         0.   *    3 MAR 2020  245        0.   *    4 MAR 0645  370        0.   *    4 MAR 1710  495        0.
     3 MAR 1000  121         0.   *    3 MAR 2025  246        0.   *    4 MAR 0650  371        0.   *    4 MAR 1715  496        0.
     3 MAR 1005  122         0.   *    3 MAR 2030  247        0.   *    4 MAR 0655  372        0.   *    4 MAR 1720  497        0.
     3 MAR 1010  123         0.   *    3 MAR 2035  248        0.   *    4 MAR 0700  373        0.   *    4 MAR 1725  498        0.
     3 MAR 1015  124         0.   *    3 MAR 2040  249        0.   *    4 MAR 0705  374        0.   *    4 MAR 1730  499        0.
     3 MAR 1020  125         0.   *    3 MAR 2045  250        0.   *    4 MAR 0710  375        0.   *    4 MAR 1735  500        0.
                                  *                                  *                                  *
 ************************************************************************************************************************************

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR      41.58-HR
+   (CFS)       (HR)
                                  (CFS)
+    8136.      3.83                1632.         408.         235.         235.
                                 (INCHES)      1.635        1.635        1.635        1.635
                                  (AC-FT)       809.         809.         809.         809.

                                 CUMULATIVE AREA =    9.28 SQ MI

MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0


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


            **************
            *            *
  278 KK    *      DIV   *
            *            *
            **************

  280 KO          OUTPUT CONTROL VARIABLES
                       IPRNT          1  PRINT CONTROL
                       IPLOT          2  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE

     DT           DIVERSION
                       ISTAD       DIVE  DIVERSION HYDROGRAPH IDENTIFICATION

     DI              INFLOW       0.00    200.00   5294.00

     DQ       DIVERTED FLOW       0.00    200.00    500.00
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DIVERSION HYDROGRAPH DIVE

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
3	MAR	0000	1	0.	3	MAR	1025	126	8.	3	MAR	2050	251	0.	4	MAR	0715	376	0.
3	MAR	0005	2	0.	3	MAR	1030	127	8.	3	MAR	2055	252	0.	4	MAR	0720	377	0.
3	MAR	0010	3	0.	3	MAR	1035	128	8.	3	MAR	2100	253	0.	4	MAR	0725	378	0.
3	MAR	0015	4	0.	3	MAR	1040	129	7.	3	MAR	2105	254	0.	4	MAR	0730	379	0.
3	MAR	0020	5	0.	3	MAR	1045	130	7.	3	MAR	2110	255	0.	4	MAR	0735	380	0.
3	MAR	0025	6	0.	3	MAR	1050	131	7.	3	MAR	2115	256	0.	4	MAR	0740	381	0.
3	MAR	0030	7	0.	3	MAR	1055	132	6.	3	MAR	2120	257	0.	4	MAR	0745	382	0.
3	MAR	0035	8	0.	3	MAR	1100	133	6.	3	MAR	2125	258	0.	4	MAR	0750	383	0.
3	MAR	0040	9	0.	3	MAR	1105	134	6.	3	MAR	2130	259	0.	4	MAR	0755	384	0.
3	MAR	0045	10	0.	3	MAR	1110	135	5.	3	MAR	2135	260	0.	4	MAR	0800	385	0.
3	MAR	0050	11	0.	3	MAR	1115	136	5.	3	MAR	2140	261	0.	4	MAR	0805	386	0.
3	MAR	0055	12	0.	3	MAR	1120	137	5.	3	MAR	2145	262	0.	4	MAR	0810	387	0.
3	MAR	0100	13	0.	3	MAR	1125	138	5.	3	MAR	2150	263	0.	4	MAR	0815	388	0.
3	MAR	0105	14	0.	3	MAR	1130	139	5.	3	MAR	2155	264	0.	4	MAR	0820	389	0.
3	MAR	0110	15	0.	3	MAR	1135	140	4.	3	MAR	2200	265	0.	4	MAR	0825	390	0.
3	MAR	0115	16	0.	3	MAR	1140	141	4.	3	MAR	2205	266	0.	4	MAR	0830	391	0.
3	MAR	0120	17	0.	3	MAR	1145	142	4.	3	MAR	2210	267	0.	4	MAR	0835	392	0.
3	MAR	0125	18	0.	3	MAR	1150	143	4.	3	MAR	2215	268	0.	4	MAR	0840	393	0.
3	MAR	0130	19	1.	3	MAR	1155	144	4.	3	MAR	2220	269	0.	4	MAR	0845	394	0.
3	MAR	0135	20	1.	3	MAR	1200	145	4.	3	MAR	2225	270	0.	4	MAR	0850	395	0.
3	MAR	0140	21	1.	3	MAR	1205	146	3.	3	MAR	2230	271	0.	4	MAR	0855	396	0.
3	MAR	0145	22	1.	3	MAR	1210	147	3.	3	MAR	2235	272	0.	4	MAR	0900	397	0.
3	MAR	0150	23	1.	3	MAR	1215	148	3.	3	MAR	2240	273	0.	4	MAR	0905	398	0.
3	MAR	0155	24	1.	3	MAR	1220	149	3.	3	MAR	2245	274	0.	4	MAR	0910	399	0.
3	MAR	0200	25	2.	3	MAR	1225	150	3.	3	MAR	2250	275	0.	4	MAR	0915	400	0.
3	MAR	0205	26	2.	3	MAR	1230	151	3.	3	MAR	2255	276	0.	4	MAR	0920	401	0.
3	MAR	0210	27	3.	3	MAR	1235	152	3.	3	MAR	2300	277	0.	4	MAR	0925	402	0.
3	MAR	0215	28	3.	3	MAR	1240	153	3.	3	MAR	2305	278	0.	4	MAR	0930	403	0.
3	MAR	0220	29	4.	3	MAR	1245	154	3.	3	MAR	2310	279	0.	4	MAR	0935	404	0.
3	MAR	0225	30	5.	3	MAR	1250	155	2.	3	MAR	2315	280	0.	4	MAR	0940	405	0.
3	MAR	0230	31	6.	3	MAR	1255	156	2.	3	MAR	2320	281	0.	4	MAR	0945	406	0.
3	MAR	0235	32	7.	3	MAR	1300	157	2.	3	MAR	2325	282	0.	4	MAR	0950	407	0.
3	MAR	0240	33	9.	3	MAR	1305	158	2.	3	MAR	2330	283	0.	4	MAR	0955	408	0.
3	MAR	0245	34	12.	3	MAR	1310	159	2.	3	MAR	2335	284	0.	4	MAR	1000	409	0.
3	MAR	0250	35	19.	3	MAR	1315	160	2.	3	MAR	2340	285	0.	4	MAR	1005	410	0.
3	MAR	0255	36	34.	3	MAR	1320	161	2.	3	MAR	2345	286	0.	4	MAR	1010	411	0.
3	MAR	0300	37	94.	3	MAR	1325	162	2.	3	MAR	2350	287	0.	4	MAR	1015	412	0.
3	MAR	0305	38	209.	3	MAR	1330	163	2.	3	MAR	2355	288	0.	4	MAR	1020	413	0.
3	MAR	0310	39	251.	3	MAR	1335	164	2.	4	MAR	0000	289	0.	4	MAR	1025	414	0.
3	MAR	0315	40	316.	3	MAR	1340	165	2.	4	MAR	0005	290	0.	4	MAR	1030	415	0.
3	MAR	0320	41	399.	3	MAR	1345	166	2.	4	MAR	0010	291	0.	4	MAR	1035	416	0.
3	MAR	0325	42	466.	3	MAR	1350	167	2.	4	MAR	0015	292	0.	4	MAR	1040	417	0.
3	MAR	0330	43	492.	3	MAR	1355	168	2.	4	MAR	0020	293	0.	4	MAR	1045	418	0.
3	MAR	0335	44	481.	3	MAR	1400	169	2.	4	MAR	0025	294	0.	4	MAR	1050	419	0.
3	MAR	0340	45	448.	3	MAR	1405	170	2.	4	MAR	0030	295	0.	4	MAR	1055	420	0.
3	MAR	0345	46	408.	3	MAR	1410	171	2.	4	MAR	0035	296	0.	4	MAR	1100	421	0.
3	MAR	0350	47	371.	3	MAR	1415	172	2.	4	MAR	0040	297	0.	4	MAR	1105	422	0.
3	MAR	0355	48	339.	3	MAR	1420	173	1.	4	MAR	0045	298	0.	4	MAR	1110	423	0.
3	MAR	0400	49	312.	3	MAR	1425	174	1.	4	MAR	0050	299	0.	4	MAR	1115	424	0.
3	MAR	0405	50	290.	3	MAR	1430	175	1.	4	MAR	0055	300	0.	4	MAR	1120	425	0.
3	MAR	0410	51	272.	3	MAR	1435	176	1.	4	MAR	0100	301	0.	4	MAR	1125	426	0.
3	MAR	0415	52	259.	3	MAR	1440	177	1.	4	MAR	0105	302	0.	4	MAR	1130	427	0.
3	MAR	0420	53	249.	3	MAR	1445	178	1.	4	MAR	0110	303	0.	4	MAR	1135	428	0.
3	MAR	0425	54	241.	3	MAR	1450	179	1.	4	MAR	0115	304	0.	4	MAR	1140	429	0.
3	MAR	0430	55	235.	3	MAR	1455	180	1.	4	MAR	0120	305	0.	4	MAR	1145	430	0.
3	MAR	0435	56	231.	3	MAR	1500	181	1.	4	MAR	0125	306	0.	4	MAR	1150	431	0.
3	MAR	0440	57	227.	3	MAR	1505	182	1.	4	MAR	0130	307	0.	4	MAR	1155	432	0.
3	MAR	0445	58	224.	3	MAR	1510	183	1.	4	MAR	0135	308	0.	4	MAR	1200	433	0.

3	MAR	0450	59	222.	*	3	MAR	1515	184	1.	*	4	MAR	0140	309	0.	*	4	MAR	1205	434	0.
3	MAR	0455	60	220.	*	3	MAR	1520	185	1.	*	4	MAR	0145	310	0.	*	4	MAR	1210	435	0.
3	MAR	0500	61	218.	*	3	MAR	1525	186	1.	*	4	MAR	0150	311	0.	*	4	MAR	1215	436	0.
3	MAR	0505	62	217.	*	3	MAR	1530	187	1.	*	4	MAR	0155	312	0.	*	4	MAR	1220	437	0.
3	MAR	0510	63	215.	*	3	MAR	1535	188	1.	*	4	MAR	0200	313	0.	*	4	MAR	1225	438	0.
3	MAR	0515	64	214.	*	3	MAR	1540	189	1.	*	4	MAR	0205	314	0.	*	4	MAR	1230	439	0.
3	MAR	0520	65	213.	*	3	MAR	1545	190	1.	*	4	MAR	0210	315	0.	*	4	MAR	1235	440	0.
3	MAR	0525	66	212.	*	3	MAR	1550	191	1.	*	4	MAR	0215	316	0.	*	4	MAR	1240	441	0.
3	MAR	0530	67	211.	*	3	MAR	1555	192	1.	*	4	MAR	0220	317	0.	*	4	MAR	1245	442	0.
3	MAR	0535	68	210.	*	3	MAR	1600	193	1.	*	4	MAR	0225	318	0.	*	4	MAR	1250	443	0.
3	MAR	0540	69	209.	*	3	MAR	1605	194	1.	*	4	MAR	0230	319	0.	*	4	MAR	1255	444	0.
3	MAR	0545	70	209.	*	3	MAR	1610	195	1.	*	4	MAR	0235	320	0.	*	4	MAR	1300	445	0.
3	MAR	0550	71	208.	*	3	MAR	1615	196	1.	*	4	MAR	0240	321	0.	*	4	MAR	1305	446	0.
3	MAR	0555	72	207.	*	3	MAR	1620	197	1.	*	4	MAR	0245	322	0.	*	4	MAR	1310	447	0.
3	MAR	0600	73	207.	*	3	MAR	1625	198	1.	*	4	MAR	0250	323	0.	*	4	MAR	1315	448	0.
3	MAR	0605	74	206.	*	3	MAR	1630	199	1.	*	4	MAR	0255	324	0.	*	4	MAR	1320	449	0.
3	MAR	0610	75	206.	*	3	MAR	1635	200	1.	*	4	MAR	0300	325	0.	*	4	MAR	1325	450	0.
3	MAR	0615	76	205.	*	3	MAR	1640	201	1.	*	4	MAR	0305	326	0.	*	4	MAR	1330	451	0.
3	MAR	0620	77	204.	*	3	MAR	1645	202	1.	*	4	MAR	0310	327	0.	*	4	MAR	1335	452	0.
3	MAR	0625	78	203.	*	3	MAR	1650	203	1.	*	4	MAR	0315	328	0.	*	4	MAR	1340	453	0.
3	MAR	0630	79	203.	*	3	MAR	1655	204	1.	*	4	MAR	0320	329	0.	*	4	MAR	1345	454	0.
3	MAR	0635	80	202.	*	3	MAR	1700	205	1.	*	4	MAR	0325	330	0.	*	4	MAR	1350	455	0.
3	MAR	0640	81	201.	*	3	MAR	1705	206	1.	*	4	MAR	0330	331	0.	*	4	MAR	1355	456	0.
3	MAR	0645	82	194.	*	3	MAR	1710	207	1.	*	4	MAR	0335	332	0.	*	4	MAR	1400	457	0.
3	MAR	0650	83	179.	*	3	MAR	1715	208	1.	*	4	MAR	0340	333	0.	*	4	MAR	1405	458	0.
3	MAR	0655	84	164.	*	3	MAR	1720	209	1.	*	4	MAR	0345	334	0.	*	4	MAR	1410	459	0.
3	MAR	0700	85	150.	*	3	MAR	1725	210	1.	*	4	MAR	0350	335	0.	*	4	MAR	1415	460	0.
3	MAR	0705	86	135.	*	3	MAR	1730	211	1.	*	4	MAR	0355	336	0.	*	4	MAR	1420	461	0.
3	MAR	0710	87	122.	*	3	MAR	1735	212	1.	*	4	MAR	0400	337	0.	*	4	MAR	1425	462	0.
3	MAR	0715	88	110.	*	3	MAR	1740	213	1.	*	4	MAR	0405	338	0.	*	4	MAR	1430	463	0.
3	MAR	0720	89	100.	*	3	MAR	1745	214	1.	*	4	MAR	0410	339	0.	*	4	MAR	1435	464	0.
3	MAR	0725	90	91.	*	3	MAR	1750	215	1.	*	4	MAR	0415	340	0.	*	4	MAR	1440	465	0.
3	MAR	0730	91	84.	*	3	MAR	1755	216	1.	*	4	MAR	0420	341	0.	*	4	MAR	1445	466	0.
3	MAR	0735	92	76.	*	3	MAR	1800	217	1.	*	4	MAR	0425	342	0.	*	4	MAR	1450	467	0.
3	MAR	0740	93	70.	*	3	MAR	1805	218	1.	*	4	MAR	0430	343	0.	*	4	MAR	1455	468	0.
3	MAR	0745	94	64.	*	3	MAR	1810	219	1.	*	4	MAR	0435	344	0.	*	4	MAR	1500	469	0.
3	MAR	0750	95	59.	*	3	MAR	1815	220	1.	*	4	MAR	0440	345	0.	*	4	MAR	1505	470	0.
3	MAR	0755	96	55.	*	3	MAR	1820	221	1.	*	4	MAR	0445	346	0.	*	4	MAR	1510	471	0.
3	MAR	0800	97	51.	*	3	MAR	1825	222	1.	*	4	MAR	0450	347	0.	*	4	MAR	1515	472	0.
3	MAR	0805	98	48.	*	3	MAR	1830	223	0.	*	4	MAR	0455	348	0.	*	4	MAR	1520	473	0.
3	MAR	0810	99	44.	*	3	MAR	1835	224	0.	*	4	MAR	0500	349	0.	*	4	MAR	1525	474	0.
3	MAR	0815	100	41.	*	3	MAR	1840	225	0.	*	4	MAR	0505	350	0.	*	4	MAR	1530	475	0.
3	MAR	0820	101	38.	*	3	MAR	1845	226	0.	*	4	MAR	0510	351	0.	*	4	MAR	1535	476	0.
3	MAR	0825	102	35.	*	3	MAR	1850	227	0.	*	4	MAR	0515	352	0.	*	4	MAR	1540	477	0.
3	MAR	0830	103	33.	*	3	MAR	1855	228	0.	*	4	MAR	0520	353	0.	*	4	MAR	1545	478	0.
3	MAR	0835	104	31.	*	3	MAR	1900	229	0.	*	4	MAR	0525	354	0.	*	4	MAR	1550	479	0.
3	MAR	0840	105	29.	*	3	MAR	1905	230	0.	*	4	MAR	0530	355	0.	*	4	MAR	1555	480	0.
3	MAR	0845	106	28.	*	3	MAR	1910	231	0.	*	4	MAR	0535	356	0.	*	4	MAR	1600	481	0.
3	MAR	0850	107	27.	*	3	MAR	1915	232	0.	*	4	MAR	0540	357	0.	*	4	MAR	1605	482	0.
3	MAR	0855	108	25.	*	3	MAR	1920	233	0.	*	4	MAR	0545	358	0.	*	4	MAR	1610	483	0.
3	MAR	0900	109	24.	*	3	MAR	1925	234	0.	*	4	MAR	0550	359	0.	*	4	MAR	1615	484	0.
3	MAR	0905	110	22.	*	3	MAR	1930	235	0.	*	4	MAR	0555	360	0.	*	4	MAR	1620	485	0.
3	MAR	0910	111	21.	*	3	MAR	1935	236	0.	*	4	MAR	0600	361	0.	*	4	MAR	1625	486	0.
3	MAR	0915	112	20.	*	3	MAR	1940	237	0.	*	4	MAR	0605	362	0.	*	4	MAR	1630	487	0.
3	MAR	0920	113	18.	*	3	MAR	1945	238	0.	*	4	MAR	0610	363	0.	*	4	MAR	1635	488	0.
3	MAR	0925	114	17.	*	3	MAR	1950	239	0.	*	4	MAR	0615	364	0.	*	4	MAR	1640	489	0.
3	MAR	0930	115	16.	*	3	MAR	1955	240	0.	*	4	MAR	0620	365	0.	*	4	MAR	1645	490	0.
3	MAR	0935	116	15.	*	3	MAR	2000	241	0.	*	4	MAR	0625	366	0.	*	4	MAR	1650	491	0.
3	MAR	0940	117	14.	*	3	MAR	2005	242	0.	*	4	MAR	0630	367	0.	*	4	MAR	1655	492	0.
3	MAR	0945	118	13.	*	3	MAR	2010	243	0.	*	4	MAR	0635	368	0.	*	4	MAR	1700	493	0.
3	MAR	0950	119	12.	*	3	MAR	2015	244	0.	*	4	MAR	0640	369	0.	*	4	MAR	1705	494	0.
3	MAR	0955	120	12.	*	3	MAR	2020	245	0.	*	4	MAR	0645	370	0.	*	4	MAR	1710	495	0.
3	MAR	1000	121	11.	*	3	MAR	2025	246	0.	*	4	MAR	0650	371	0.	*	4	MAR	1715	496	0.
3	MAR	1005	122	10.	*	3	MAR	2030	247	0.	*	4	MAR	0655	372	0.	*	4	MAR	1720	497	0.
3	MAR	1010	123	10.	*	3	MAR	2035	248	0.	*	4	MAR	0700	373	0.	*	4	MAR	1725	498	0.
3	MAR	1015	124	9.	*	3	MAR	2040	249	0.	*	4	MAR	0705	374	0.	*	4	MAR	1730	499	0.
3	MAR	1020	125	9.	*	3	MAR	2045	250	0.	*	4	MAR	0710	375	0.	*	4	MAR	1735	500	0.

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	41.58-HR
+ 492.	3.50	(CFS)	191.	50.	29.	29.
		(INCHES)	0.481	0.503	0.503	0.503
		(AC-FT)	95.	99.	99.	99.

CUMULATIVE AREA = 3.68 SQ MI

HYDROGRAPH AT STATION DIV

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
3	MAR	0000	1	0.	3	MAR	1025	126	0.	3	MAR	2050	251	0.	4	MAR	0715	376	0.
3	MAR	0005	2	0.	3	MAR	1030	127	0.	3	MAR	2055	252	0.	4	MAR	0720	377	0.
3	MAR	0010	3	0.	3	MAR	1035	128	0.	3	MAR	2100	253	0.	4	MAR	0725	378	0.
3	MAR	0015	4	0.	3	MAR	1040	129	0.	3	MAR	2105	254	0.	4	MAR	0730	379	0.
3	MAR	0020	5	0.	3	MAR	1045	130	0.	3	MAR	2110	255	0.	4	MAR	0735	380	0.
3	MAR	0025	6	0.	3	MAR	1050	131	0.	3	MAR	2115	256	0.	4	MAR	0740	381	0.
3	MAR	0030	7	0.	3	MAR	1055	132	0.	3	MAR	2120	257	0.	4	MAR	0745	382	0.
3	MAR	0035	8	0.	3	MAR	1100	133	0.	3	MAR	2125	258	0.	4	MAR	0750	383	0.
3	MAR	0040	9	0.	3	MAR	1105	134	0.	3	MAR	2130	259	0.	4	MAR	0755	384	0.
3	MAR	0045	10	0.	3	MAR	1110	135	0.	3	MAR	2135	260	0.	4	MAR	0800	385	0.
3	MAR	0050	11	0.	3	MAR	1115	136	0.	3	MAR	2140	261	0.	4	MAR	0805	386	0.
3	MAR	0055	12	0.	3	MAR	1120	137	0.	3	MAR	2145	262	0.	4	MAR	0810	387	0.
3	MAR	0100	13	0.	3	MAR	1125	138	0.	3	MAR	2150	263	0.	4	MAR	0815	388	0.
3	MAR	0105	14	0.	3	MAR	1130	139	0.	3	MAR	2155	264	0.	4	MAR	0820	389	0.
3	MAR	0110	15	0.	3	MAR	1135	140	0.	3	MAR	2200	265	0.	4	MAR	0825	390	0.
3	MAR	0115	16	0.	3	MAR	1140	141	0.	3	MAR	2205	266	0.	4	MAR	0830	391	0.
3	MAR	0120	17	0.	3	MAR	1145	142	0.	3	MAR	2210	267	0.	4	MAR	0835	392	0.
3	MAR	0125	18	0.	3	MAR	1150	143	0.	3	MAR	2215	268	0.	4	MAR	0840	393	0.
3	MAR	0130	19	0.	3	MAR	1155	144	0.	3	MAR	2220	269	0.	4	MAR	0845	394	0.
3	MAR	0135	20	0.	3	MAR	1200	145	0.	3	MAR	2225	270	0.	4	MAR	0850	395	0.
3	MAR	0140	21	0.	3	MAR	1205	146	0.	3	MAR	2230	271	0.	4	MAR	0855	396	0.
3	MAR	0145	22	0.	3	MAR	1210	147	0.	3	MAR	2235	272	0.	4	MAR	0900	397	0.
3	MAR	0150	23	0.	3	MAR	1215	148	0.	3	MAR	2240	273	0.	4	MAR	0905	398	0.
3	MAR	0155	24	0.	3	MAR	1220	149	0.	3	MAR	2245	274	0.	4	MAR	0910	399	0.
3	MAR	0200	25	0.	3	MAR	1225	150	0.	3	MAR	2250	275	0.	4	MAR	0915	400	0.
3	MAR	0205	26	0.	3	MAR	1230	151	0.	3	MAR	2255	276	0.	4	MAR	0920	401	0.
3	MAR	0210	27	0.	3	MAR	1235	152	0.	3	MAR	2300	277	0.	4	MAR	0925	402	0.
3	MAR	0215	28	0.	3	MAR	1240	153	0.	3	MAR	2305	278	0.	4	MAR	0930	403	0.
3	MAR	0220	29	0.	3	MAR	1245	154	0.	3	MAR	2310	279	0.	4	MAR	0935	404	0.
3	MAR	0225	30	0.	3	MAR	1250	155	0.	3	MAR	2315	280	0.	4	MAR	0940	405	0.
3	MAR	0230	31	0.	3	MAR	1255	156	0.	3	MAR	2320	281	0.	4	MAR	0945	406	0.
3	MAR	0235	32	0.	3	MAR	1300	157	0.	3	MAR	2325	282	0.	4	MAR	0950	407	0.
3	MAR	0240	33	0.	3	MAR	1305	158	0.	3	MAR	2330	283	0.	4	MAR	0955	408	0.
3	MAR	0245	34	0.	3	MAR	1310	159	0.	3	MAR	2335	284	0.	4	MAR	1000	409	0.
3	MAR	0250	35	0.	3	MAR	1315	160	0.	3	MAR	2340	285	0.	4	MAR	1005	410	0.
3	MAR	0255	36	0.	3	MAR	1320	161	0.	3	MAR	2345	286	0.	4	MAR	1010	411	0.
3	MAR	0300	37	0.	3	MAR	1325	162	0.	3	MAR	2350	287	0.	4	MAR	1015	412	0.
3	MAR	0305	38	137.	3	MAR	1330	163	0.	3	MAR	2355	288	0.	4	MAR	1020	413	0.
3	MAR	0310	39	811.	3	MAR	1335	164	0.	4	MAR	0000	289	0.	4	MAR	1025	414	0.
3	MAR	0315	40	1847.	3	MAR	1340	165	0.	4	MAR	0005	290	0.	4	MAR	1030	415	0.
3	MAR	0320	41	3182.	3	MAR	1345	166	0.	4	MAR	0010	291	0.	4	MAR	1035	416	0.
3	MAR	0325	42	4247.	3	MAR	1350	167	0.	4	MAR	0015	292	0.	4	MAR	1040	417	0.
3	MAR	0330	43	4671.	3	MAR	1355	168	0.	4	MAR	0020	293	0.	4	MAR	1045	418	0.
3	MAR	0335	44	4496.	3	MAR	1400	169	0.	4	MAR	0025	294	0.	4	MAR	1050	419	0.
3	MAR	0340	45	3965.	3	MAR	1405	170	0.	4	MAR	0030	295	0.	4	MAR	1055	420	0.

3	MAR	0345	46	3325.	*	3	MAR	1410	171	0.	*	4	MAR	0035	296	0.	*	4	MAR	1100	421	0.
3	MAR	0350	47	2725.	*	3	MAR	1415	172	0.	*	4	MAR	0040	297	0.	*	4	MAR	1105	422	0.
3	MAR	0355	48	2216.	*	3	MAR	1420	173	0.	*	4	MAR	0045	298	0.	*	4	MAR	1110	423	0.
3	MAR	0400	49	1788.	*	3	MAR	1425	174	0.	*	4	MAR	0050	299	0.	*	4	MAR	1115	424	0.
3	MAR	0405	50	1436.	*	3	MAR	1430	175	0.	*	4	MAR	0055	300	0.	*	4	MAR	1120	425	0.
3	MAR	0410	51	1155.	*	3	MAR	1435	176	0.	*	4	MAR	0100	301	0.	*	4	MAR	1125	426	0.
3	MAR	0415	52	937.	*	3	MAR	1440	177	0.	*	4	MAR	0105	302	0.	*	4	MAR	1130	427	0.
3	MAR	0420	53	776.	*	3	MAR	1445	178	0.	*	4	MAR	0110	303	0.	*	4	MAR	1135	428	0.
3	MAR	0425	54	655.	*	3	MAR	1450	179	0.	*	4	MAR	0115	304	0.	*	4	MAR	1140	429	0.
3	MAR	0430	55	563.	*	3	MAR	1455	180	0.	*	4	MAR	0120	305	0.	*	4	MAR	1145	430	0.
3	MAR	0435	56	492.	*	3	MAR	1500	181	0.	*	4	MAR	0125	306	0.	*	4	MAR	1150	431	0.
3	MAR	0440	57	436.	*	3	MAR	1505	182	0.	*	4	MAR	0130	307	0.	*	4	MAR	1155	432	0.
3	MAR	0445	58	389.	*	3	MAR	1510	183	0.	*	4	MAR	0135	308	0.	*	4	MAR	1200	433	0.
3	MAR	0450	59	352.	*	3	MAR	1515	184	0.	*	4	MAR	0140	309	0.	*	4	MAR	1205	434	0.
3	MAR	0455	60	320.	*	3	MAR	1520	185	0.	*	4	MAR	0145	310	0.	*	4	MAR	1210	435	0.
3	MAR	0500	61	292.	*	3	MAR	1525	186	0.	*	4	MAR	0150	311	0.	*	4	MAR	1215	436	0.
3	MAR	0505	62	267.	*	3	MAR	1530	187	0.	*	4	MAR	0155	312	0.	*	4	MAR	1220	437	0.
3	MAR	0510	63	246.	*	3	MAR	1535	188	0.	*	4	MAR	0200	313	0.	*	4	MAR	1225	438	0.
3	MAR	0515	64	226.	*	3	MAR	1540	189	0.	*	4	MAR	0205	314	0.	*	4	MAR	1230	439	0.
3	MAR	0520	65	208.	*	3	MAR	1545	190	0.	*	4	MAR	0210	315	0.	*	4	MAR	1235	440	0.
3	MAR	0525	66	192.	*	3	MAR	1550	191	0.	*	4	MAR	0215	316	0.	*	4	MAR	1240	441	0.
3	MAR	0530	67	177.	*	3	MAR	1555	192	0.	*	4	MAR	0220	317	0.	*	4	MAR	1245	442	0.
3	MAR	0535	68	164.	*	3	MAR	1600	193	0.	*	4	MAR	0225	318	0.	*	4	MAR	1250	443	0.
3	MAR	0540	69	151.	*	3	MAR	1605	194	0.	*	4	MAR	0230	319	0.	*	4	MAR	1255	444	0.
3	MAR	0545	70	140.	*	3	MAR	1610	195	0.	*	4	MAR	0235	320	0.	*	4	MAR	1300	445	0.
3	MAR	0550	71	129.	*	3	MAR	1615	196	0.	*	4	MAR	0240	321	0.	*	4	MAR	1305	446	0.
3	MAR	0555	72	119.	*	3	MAR	1620	197	0.	*	4	MAR	0245	322	0.	*	4	MAR	1310	447	0.
3	MAR	0600	73	111.	*	3	MAR	1625	198	0.	*	4	MAR	0250	323	0.	*	4	MAR	1315	448	0.
3	MAR	0605	74	101.	*	3	MAR	1630	199	0.	*	4	MAR	0255	324	0.	*	4	MAR	1320	449	0.
3	MAR	0610	75	92.	*	3	MAR	1635	200	0.	*	4	MAR	0300	325	0.	*	4	MAR	1325	450	0.
3	MAR	0615	76	81.	*	3	MAR	1640	201	0.	*	4	MAR	0305	326	0.	*	4	MAR	1330	451	0.
3	MAR	0620	77	69.	*	3	MAR	1645	202	0.	*	4	MAR	0310	327	0.	*	4	MAR	1335	452	0.
3	MAR	0625	78	55.	*	3	MAR	1650	203	0.	*	4	MAR	0315	328	0.	*	4	MAR	1340	453	0.
3	MAR	0630	79	40.	*	3	MAR	1655	204	0.	*	4	MAR	0320	329	0.	*	4	MAR	1345	454	0.
3	MAR	0635	80	25.	*	3	MAR	1700	205	0.	*	4	MAR	0325	330	0.	*	4	MAR	1350	455	0.
3	MAR	0640	81	9.	*	3	MAR	1705	206	0.	*	4	MAR	0330	331	0.	*	4	MAR	1355	456	0.
3	MAR	0645	82	0.	*	3	MAR	1710	207	0.	*	4	MAR	0335	332	0.	*	4	MAR	1400	457	0.
3	MAR	0650	83	0.	*	3	MAR	1715	208	0.	*	4	MAR	0340	333	0.	*	4	MAR	1405	458	0.
3	MAR	0655	84	0.	*	3	MAR	1720	209	0.	*	4	MAR	0345	334	0.	*	4	MAR	1410	459	0.
3	MAR	0700	85	0.	*	3	MAR	1725	210	0.	*	4	MAR	0350	335	0.	*	4	MAR	1415	460	0.
3	MAR	0705	86	0.	*	3	MAR	1730	211	0.	*	4	MAR	0355	336	0.	*	4	MAR	1420	461	0.
3	MAR	0710	87	0.	*	3	MAR	1735	212	0.	*	4	MAR	0400	337	0.	*	4	MAR	1425	462	0.
3	MAR	0715	88	0.	*	3	MAR	1740	213	0.	*	4	MAR	0405	338	0.	*	4	MAR	1430	463	0.
3	MAR	0720	89	0.	*	3	MAR	1745	214	0.	*	4	MAR	0410	339	0.	*	4	MAR	1435	464	0.
3	MAR	0725	90	0.	*	3	MAR	1750	215	0.	*	4	MAR	0415	340	0.	*	4	MAR	1440	465	0.
3	MAR	0730	91	0.	*	3	MAR	1755	216	0.	*	4	MAR	0420	341	0.	*	4	MAR	1445	466	0.
3	MAR	0735	92	0.	*	3	MAR	1800	217	0.	*	4	MAR	0425	342	0.	*	4	MAR	1450	467	0.
3	MAR	0740	93	0.	*	3	MAR	1805	218	0.	*	4	MAR	0430	343	0.	*	4	MAR	1455	468	0.
3	MAR	0745	94	0.	*	3	MAR	1810	219	0.	*	4	MAR	0435	344	0.	*	4	MAR	1500	469	0.
3	MAR	0750	95	0.	*	3	MAR	1815	220	0.	*	4	MAR	0440	345	0.	*	4	MAR	1505	470	0.
3	MAR	0755	96	0.	*	3	MAR	1820	221	0.	*	4	MAR	0445	346	0.	*	4	MAR	1510	471	0.
3	MAR	0800	97	0.	*	3	MAR	1825	222	0.	*	4	MAR	0450	347	0.	*	4	MAR	1515	472	0.
3	MAR	0805	98	0.	*	3	MAR	1830	223	0.	*	4	MAR	0455	348	0.	*	4	MAR	1520	473	0.
3	MAR	0810	99	0.	*	3	MAR	1835	224	0.	*	4	MAR	0500	349	0.	*	4	MAR	1525	474	0.
3	MAR	0815	100	0.	*	3	MAR	1840	225	0.	*	4	MAR	0505	350	0.	*	4	MAR	1530	475	0.
3	MAR	0820	101	0.	*	3	MAR	1845	226	0.	*	4	MAR	0510	351	0.	*	4	MAR	1535	476	0.
3	MAR	0825	102	0.	*	3	MAR	1850	227	0.	*	4	MAR	0515	352	0.	*	4	MAR	1540	477	0.
3	MAR	0830	103	0.	*	3	MAR	1855	228	0.	*	4	MAR	0520	353	0.	*	4	MAR	1545	478	0.
3	MAR	0835	104	0.	*	3	MAR	1900	229	0.	*	4	MAR	0525	354	0.	*	4	MAR	1550	479	0.
3	MAR	0840	105	0.	*	3	MAR	1905	230	0.	*	4	MAR	0530	355	0.	*	4	MAR	1555	480	0.
3	MAR	0845	106	0.	*	3	MAR	1910	231	0.	*	4	MAR	0535	356	0.	*	4	MAR	1600	481	0.
3	MAR	0850	107	0.	*	3	MAR	1915	232	0.	*	4	MAR	0540	357	0.	*	4	MAR	1605	482	0.
3	MAR	0855	108	0.	*	3	MAR	1920	233	0.	*	4	MAR	0545	358	0.	*	4	MAR	1610	483	0.
3	MAR	0900	109	0.	*	3	MAR	1925	234	0.	*	4	MAR	0550	359	0.	*	4	MAR	1615	484	0.
3	MAR	0905	110	0.	*	3	MAR	1930	235	0.	*	4	MAR	0555	360	0.	*	4	MAR	1620	485	0.
3	MAR	0910	111	0.	*	3	MAR	1935	236	0.	*	4	MAR	0600	361	0.	*	4	MAR	1625	486	0.
3	MAR	0915	112	0.	*	3	MAR	1940	237	0.	*	4	MAR	0605	362	0.	*	4	MAR	1630	487	0.

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    3 MAR 0920  113        0.   *    3 MAR 1945  238        0.   *    4 MAR 0610  363        0.   *    4 MAR 1635  488        0.
    3 MAR 0925  114        0.   *    3 MAR 1950  239        0.   *    4 MAR 0615  364        0.   *    4 MAR 1640  489        0.
    3 MAR 0930  115        0.   *    3 MAR 1955  240        0.   *    4 MAR 0620  365        0.   *    4 MAR 1645  490        0.
    3 MAR 0935  116        0.   *    3 MAR 2000  241        0.   *    4 MAR 0625  366        0.   *    4 MAR 1650  491        0.
    3 MAR 0940  117        0.   *    3 MAR 2005  242        0.   *    4 MAR 0630  367        0.   *    4 MAR 1655  492        0.
    3 MAR 0945  118        0.   *    3 MAR 2010  243        0.   *    4 MAR 0635  368        0.   *    4 MAR 1700  493        0.
    3 MAR 0950  119        0.   *    3 MAR 2015  244        0.   *    4 MAR 0640  369        0.   *    4 MAR 1705  494        0.
    3 MAR 0955  120        0.   *    3 MAR 2020  245        0.   *    4 MAR 0645  370        0.   *    4 MAR 1710  495        0.
    3 MAR 1000  121        0.   *    3 MAR 2025  246        0.   *    4 MAR 0650  371        0.   *    4 MAR 1715  496        0.
    3 MAR 1005  122        0.   *    3 MAR 2030  247        0.   *    4 MAR 0655  372        0.   *    4 MAR 1720  497        0.
    3 MAR 1010  123        0.   *    3 MAR 2035  248        0.   *    4 MAR 0700  373        0.   *    4 MAR 1725  498        0.
    3 MAR 1015  124        0.   *    3 MAR 2040  249        0.   *    4 MAR 0705  374        0.   *    4 MAR 1730  499        0.
    3 MAR 1020  125        0.   *    3 MAR 2045  250        0.   *    4 MAR 0710  375        0.   *    4 MAR 1735  500        0.
                                *                                *                                *
*****************************************************************************************************************************************

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+    4671.      3.50                609.        152.         88.         88.
                        (INCHES)    1.537       1.537       1.537       1.537
                         (AC-FT)    302.        302.        302.        302.

                        CUMULATIVE AREA =    3.68 SQ MI


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


            **************
            *            *
  284 KK    *    C21.05  *      CONFLUENCE OF DGB CHANNELS NEAR MID-SECTION 36
            *            *
            **************

  287 KO          OUTPUT CONTROL VARIABLES
                        IPRNT          3  PRINT CONTROL
                        IPLOT          1  PLOT CONTROL
                        QSCAL         0.  HYDROGRAPH PLOT SCALE

  288 HC          HYDROGRAPH COMBINATION
                        ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
MANE2 NPLAN,NSTM       1      0
      ***             ***            ***            ***            ***

                        HYDROGRAPH AT STATION   C21.05

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+   11010.      3.75                2241.        560.        323.        323.
                        (INCHES)    1.607       1.607       1.607       1.607
                         (AC-FT)    1111.       1111.       1111.       1111.

                        CUMULATIVE AREA =   12.96 SQ MI


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

```
                **************
                *            *
  307 KK        *     CP21H  *        JOMAX RD
                *            *
                **************

  308 KO            OUTPUT CONTROL VARIABLES
                          IPRNT           3  PRINT CONTROL
                          IPLOT           0  PLOT CONTROL
                          QSCAL          0.  HYDROGRAPH PLOT SCALE

  309 HC            HYDROGRAPH COMBINATION
                          ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                    ***
MANE2 NPLAN,NSTM        1      0
MANE2 NPLAN,NSTM        1      0

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

                          HYDROGRAPH AT STATION    CP21H

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                            (CFS)
+   11208.      3.83               2356.        590.        340.        340.
                         (INCHES)   1.606       1.608       1.608       1.608
                          (AC-FT)   1168.       1170.       1170.       1170.

                          CUMULATIVE AREA =   13.64 SQ MI

MANE2 NPLAN,NSTM        1      0


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


                **************
                *            *
  366 KK        *      CP27  *          CP AT SCOTTSDALE RD
                *            *
                **************

  367 KO            OUTPUT CONTROL VARIABLES
                          IPRNT           3  PRINT CONTROL
                          IPLOT           0  PLOT CONTROL
                          QSCAL          0.  HYDROGRAPH PLOT SCALE
                                   COMBINE TOTAL HYDROGRAPH FROM CONCENTRATION
                                   POINT 27D WITH SUB 27 .  TOTAL FLOW AT
                                   SCOTTSDALE ROAD FOR FAN 4.

  371 HC            HYDROGRAPH COMBINATION
                          ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                    ***
MANE2 NPLAN,NSTM        1      0

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

                          HYDROGRAPH AT STATION     CP27

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
```

```
+   (CFS)       (HR)
                          (CFS)
+   10647.      4.08                2571.       649.       374.       374.
                          (INCHES)  1.594      1.609      1.609      1.609
                          (AC-FT)   1275.      1287.      1287.      1287.

                          CUMULATIVE AREA =   15.00 SQ MI

1
                                        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	16	2595.	3.25	319.	81.	47.	1.46		
+	HYDROGRAPH AT	17	2114.	3.25	259.	65.	38.	1.19		
+	HYDROGRAPH AT	18	2357.	3.25	270.	68.	39.	1.26		
+	3 COMBINED AT	19A	7066.	3.25	848.	214.	124.	3.91		
+	ROUTED TO	19B	7034.	3.33	848.	214.	124.	3.91		
+									6.96	3.33
+	HYDROGRAPH AT	15	1848.	3.42	278.	70.	41.	1.37		
+	2 COMBINED AT	19C	8679.	3.33	1125.	284.	164.	5.28		
+	ROUTED TO	19.1	8266.	3.33	1125.	284.	164.	5.28		
+									6.02	3.33
+	HYDROGRAPH AT	19	431.	3.25	42.	11.	6.	0.19		
+	HYDROGRAPH AT	20	1052.	3.25	123.	31.	18.	0.57		
+	3 COMBINED AT	CP20	9603.	3.33	1290.	326.	188.	6.03		
+	ROUTED TO	RRCP20	8867.	3.42	1289.	326.	188.	6.03		
+									4.02	3.42
+	HYDROGRAPH AT	21A	763.	3.25	80.	20.	12.	0.42		
+	2 COMBINED AT	CP21A	9325.	3.42	1368.	346.	200.	6.45		
+	ROUTED TO	RR21A	9163.	3.50	1368.	346.	200.	6.45		
+									3.42	3.50
	HYDROGRAPH AT									

```
+                    21B    497.  3.25    53.   13.    8.   0.28
        2 COMBINED AT
+                   CP21B  9404.  3.50  1420.  359.  207.   6.73
        ROUTED TO
+                   RR21B  8768.  3.58  1419.  359.  207.   6.73
+                                                            3.69     3.58
        HYDROGRAPH AT
+                    21C   1207.  3.25   142.   36.   21.   0.75
        2 COMBINED AT
+                   CP21C  9344.  3.58  1560.  395.  228.   7.48
        ROUTED TO
+                   RR21C  7778.  3.75  1554.  395.  228.   7.48
+                                                            4.07     3.75
        HYDROGRAPH AT
+                    21D   1447.  3.33   201.   51.   29.   1.06
        2 COMBINED AT
+                   CP21D  8537.  3.67  1754.  446.  257.   8.54
        ROUTED TO
+                   RR21D  8506.  3.75  1753.  446.  257.   8.54
+                                                            4.13     3.75
        HYDROGRAPH AT
+                    21E    392.  3.33    49.   12.    7.   0.26
        2 COMBINED AT
+                   CP21E  8645.  3.75  1801.  458.  265.   8.79
        ROUTED TO
+                   RR21E  8393.  3.83  1799.  458.  265.   8.79
+                                                            6.30     3.83
        HYDROGRAPH AT
+                    21F    644.  3.33    89.   22.   13.   0.47
        2 COMBINED AT
+                   CP21F  8636.  3.75  1886.  481.  278.   9.26
        ROUTED TO
+                   RR21F  8620.  3.83  1883.  481.  278.   9.26
+                                                            2.68     3.83
        HYDROGRAPH AT
+                    21G     25.  3.33     3.    1.    0.   0.02
        2 COMBINED AT
+                   CP21G  8629.  3.83  1887.  482.  278.   9.28
        DIVERSION TO
+                   DIVN    493.  3.83   255.   74.   43.   9.28
        HYDROGRAPH AT
+                    DIV   8136.  3.83  1632.  408.  235.   9.28
        HYDROGRAPH AT
+                     22   2753.  3.25   304.   76.   44.   1.39
        HYDROGRAPH AT
+                     23    756.  3.25    87.   22.   13.   0.39
```

```
+        2 COMBINED AT
                          24A     3509.   3.25     391.     98.     57.    1.78
         ROUTED TO
+                         24.1    2849.   3.42     391.     98.     57.    1.78
+                                                                        5.53      3.42
         HYDROGRAPH AT
+                          24      683.   3.25      84.     21.     12.    0.49
         2 COMBINED AT
+                         24.2A   3382.   3.42     474.    120.     69.    2.27
         HYDROGRAPH AT
+                         25N     1217.   3.42     175.     44.     26.    0.78
         HYDROGRAPH AT
+                         25S     1382.   3.25     151.     38.     22.    0.63
         2 COMBINED AT
+                         25.1    2363.   3.33     326.     82.     48.    1.41
         2 COMBINED AT
+                         24.2B   5490.   3.42     800.    202.    117.    3.68
         ROUTED TO
+                         PIMARD  5410.   3.42     800.    202.    117.    3.68
+                                                                        6.79      3.42
         ROUTED TO
+                         RR24.2  5164.   3.50     799.    202.    117.    3.68
+                                                                        6.90      3.50
         DIVERSION TO
+                         DIVE     492.   3.50     191.     50.     29.    3.68
         HYDROGRAPH AT
+                         DIV     4671.   3.50     609.    152.     88.    3.68
         2 COMBINED AT
+                         C21.05 11010.   3.75    2241.    560.    323.   12.96
         ROUTED TO
+                         R21G   10846.   3.83    2240.    560.    323.   12.96
+                                                                        2.42      3.83
         HYDROGRAPH AT
+                         21H       62.   3.33       8.      2.      1.    0.04
         HYDROGRAPH AT
+                         26N      674.   3.50     109.     28.     16.    0.64
         3 COMBINED AT
+                         CP21H  11208.   3.83    2356.    590.    340.   13.64
         ROUTED TO
+                         RR21H  11034.   3.92    2355.    590.    340.   13.64
+                                                                        2.46      3.92
         HYDROGRAPH AT
+                         26S      230.   3.25      29.      7.      4.    0.17
         2 COMBINED AT
+                         *APEX* 11086.   3.92    2383.    597.    345.   13.81
         ROUTED TO
+                         CP27A  11095.   3.92    2383.    597.    345.   13.81
```

```
+                                                                                                  5.25       3.92
          ROUTED TO
+                        CP27B     10804.    4.00        2381.        597.        345.      13.81
+                                                                                                  5.20       4.00
          ROUTED TO
+                        CP27C     10501.    4.08        2378.        597.        345.      13.81
+                                                                                                  5.14       4.08
          ROUTED TO
+                        CP27D     10427.    4.08        2378.        597.        345.      13.81
+                                                                                                  5.13       4.08
          HYDROGRAPH AT
+                           27      1984.    3.17         205.         52.         30.       1.19
          2 COMBINED AT
+                         CP27     10647.    4.08        2571.        649.        374.      15.00
1
                                   SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                       (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                                  INTERPOLATED TO
                                                                              COMPUTATION INTERVAL
          ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                    PEAK                                    PEAK
                               (MIN)     (CFS)     (MIN)      (IN)    (MIN)     (CFS)     (MIN)       (IN)
             16    MANE         3.31   2714.57    197.99      2.05     5.00   2595.35    195.00       2.06

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1602E+03 OUTFLOW=0.1596E+03 BASIN STORAGE=0.1487E-01 PERCENT ERROR=   0.4

             17    MANE         3.72   2179.71    195.53      2.05     5.00   2113.93    195.00       2.05

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1303E+03 OUTFLOW=0.1296E+03 BASIN STORAGE=0.1813E-01 PERCENT ERROR=   0.6

             18    MANE         3.06   2403.41    196.84      2.00     5.00   2357.00    195.00       2.00

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1353E+03 OUTFLOW=0.1346E+03 BASIN STORAGE=0.1762E-01 PERCENT ERROR=   0.5

             15    MANE         3.60   1852.02    207.71      1.91     5.00   1847.60    205.00       1.91

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1401E+03 OUTFLOW=0.1393E+03 BASIN STORAGE=0.1918E-01 PERCENT ERROR=   0.5

             19    MANE         1.73    440.63    193.75      2.09     5.00    430.55    195.00       2.09

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2089E+02 OUTFLOW=0.2083E+02 BASIN STORAGE=0.1376E-02 PERCENT ERROR=   0.3

             20    MANE         3.79   1104.65    196.23      2.02     5.00   1052.10    195.00       2.03

 CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.6186E+02 OUTFLOW=0.6151E+02 BASIN STORAGE=0.5950E-02 PERCENT ERROR=   0.6

            21A    MANE         2.39    781.28    193.64      1.79     5.00    762.73    195.00       1.79
```

```
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4022E+02 OUTFLOW=0.4006E+02 BASIN STORAGE=0.4421E-02 PERCENT ERROR=   0.4

          21B  MANE        2.59    504.98    194.27      1.79      5.00    497.48    195.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2643E+02 OUTFLOW=0.2632E+02 BASIN STORAGE=0.2952E-02 PERCENT ERROR=   0.4

          21C  MANE        3.26   1262.50    196.65      1.79      5.00   1206.94    195.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7164E+02 OUTFLOW=0.7124E+02 BASIN STORAGE=0.9548E-02 PERCENT ERROR=   0.5

          21D  MANE        3.13   1492.11    200.84      1.79      5.00   1447.37    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1014E+03 OUTFLOW=0.1009E+03 BASIN STORAGE=0.1927E-01 PERCENT ERROR=   0.5

          21E  MANE        3.07    409.14    198.46      1.79      5.00    391.91    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.2461E+02 OUTFLOW=0.2448E+02 BASIN STORAGE=0.4121E-02 PERCENT ERROR=   0.5

          21F  MANE        4.37    667.83    201.44      1.78      5.00    644.11    200.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4492E+02 OUTFLOW=0.4457E+02 BASIN STORAGE=0.8835E-02 PERCENT ERROR=   0.8

          21G  MANE        4.21     25.33    199.36      1.78      5.00     25.13    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1647E+01 OUTFLOW=0.1637E+01 BASIN STORAGE=0.2774E-03 PERCENT ERROR=   0.6

           22  MANE        3.74   2772.23    194.54      2.05      5.00   2752.96    195.00        2.05

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1522E+03 OUTFLOW=0.1514E+03 BASIN STORAGE=0.1237E-01 PERCENT ERROR=   0.5

           23  MANE        4.00    758.21    194.26      2.07      5.00    755.94    195.00        2.06

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4372E+02 OUTFLOW=0.4348E+02 BASIN STORAGE=0.3485E-02 PERCENT ERROR=   0.5

           24  MANE        2.81    712.57    195.93      1.60      5.00    683.20    195.00        1.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4211E+02 OUTFLOW=0.4189E+02 BASIN STORAGE=0.6065E-02 PERCENT ERROR=   0.5

          25N  MANE        4.31   1247.82    204.02      2.11      5.00   1216.63    205.00        2.11

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.8859E+02 OUTFLOW=0.8801E+02 BASIN STORAGE=0.1552E-01 PERCENT ERROR=   0.6

          25S  MANE        2.95   1387.24    195.20      2.26      5.00   1382.42    195.00        2.26
```

```
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.7570E+02 OUTFLOW=0.7535E+02 BASIN STORAGE=0.9688E-02 PERCENT ERROR=   0.5

              21H  MANE        4.20     62.60    199.65      1.78      5.00     62.34    200.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.4128E+01 OUTFLOW=0.4098E+01 BASIN STORAGE=0.7793E-03 PERCENT ERROR=   0.7

              26N  MANE        4.38    677.78    209.77      1.61      5.00    673.89    210.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.5502E+02 OUTFLOW=0.5473E+02 BASIN STORAGE=0.9032E-02 PERCENT ERROR=   0.5

              26S  MANE        3.18    239.32    195.89      1.61      5.00    229.95    195.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1443E+02 OUTFLOW=0.1437E+02 BASIN STORAGE=0.1797E-02 PERCENT ERROR=   0.4

               27  MANE        0.62   2007.62    190.77      1.61      5.00   1984.32    190.00        1.62

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.0000E+00 EXCESS=0.1028E+03 OUTFLOW=0.1026E+03 BASIN STORAGE=0.1039E-01 PERCENT ERROR=   0.2


*** NORMAL END OF HEC-1 ***
```

Appendix G

Spillway Design Flood HEC-1 Models

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             JUN 09 1992              *
*           VERSION 4.0.3E             *
*                                      *
*  RUN DATE  01/21/99  TIME  17:13:43  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 551-1748              *
*                                      *
****************************************
```

```
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. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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

  1           ID        RAWHIDE WASH DETENTION BASIN
  2           ID        PMP ESTIMATION
  3           ID        LOCAL STORM, 6 HOUR PMP
  4           ID        REDUCE LAG BY 15%
  5           ID        BASE MODEL                    FILE: RAWPMP.DAT
  6           ID        THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
  7           ID        WATERSHED MANAGEMENT BRANCH, AA, AMM, 8/22/94
  8           ID        REVISED PMP AA, 10-5-94
  9           ID        ALTERNATIVE #4 ALIGNMENT
 10           ID
 11           ID    OCTOBER 1998 - HDR Engineering Recreated the PMP model
 12           ID    OCTOBER 1998 -
 13           ID    OCTOBER 1998 - Filename <RAWPMF1.DAT>
 14           ID
 15           ID
 16           ID   ******************************************************************************
 17           IT       5 03MAR94       0     500
 18           IO       5       0       0       0
 19           JR    FLOW      .5
              *

 20           KK      S1     SUB
 21           KM        THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN:
 22           KM        L = 9.2    Lca = 4.4  S = 108.0   Kn = 0.035  LAG = 72.0
 23           KM        PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 24           KM        BASIN S1                                          KM            04
 25           KO       3
 26           BA    13.7
 27           IN      15
 28           PI       0    0.06    0.06    0.06    0.06    0.12    0.12    0.12    0.12    5.80
```

Feasibility Basin
700' Wier
3.2 Coeff.
2 - 60" Outlet Pipes
H = 4.3'

```
          29          PI    1.18    0.47    0.39    0.28    0.28    0.28    0.28      .1      .1      .1
          30          PI      .1     .04     .04     .04     .04       0
          31          LG     .15     .25     6.6     .16       0
          32          UI     641     641     641    1648    2344    2875    3257    3599    3937    4405
          33          UI    4906    5641    7072    8283    7465    6396    5686    5182    4667    4131
          34          UI    3741    3260    2988    2362    1841    1133    1123    1053    1006     641
          35          UI     196     196     196     196     196     196     196     196     196     196
          36          UI     196     196       0       0       0       0       0       0       0       0
          37          UI       0       0       0       0       0       0       0       0       0       0
                      *
                      *
                      *      <HDR Basin Alternative No. 4A
                      *
                      *  ******************************************************************************
                      * KK   DAM
                      * KO     3
                      * RS     1    FLOW       0
                      * SV     0      45     300     583     890    1221    1577    1962
                      * SE  2179    2180    2185    2190    2195    2200    2205    2210
                      * SS  2200     600    2.88     1.5
                      * * 2 - 36" RCP Culverts for outlet
                      * SL  2179    14.1      .6      .5
                      *  ******************************************************************************
                      *
                      *      <Feasibility Basin #4>
                      *
1                                                HEC-1 INPUT                                          PAGE  2

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


          38          KK     DAM  PROPOSED GRADING PLAN FOR ALTERNATIVE #4
          39          KO       3
          40          RS       1    FLOW       0
          41          SA       0      10    18.9    31.1    39.9    44.8      48
          42          SE  2120.5    2122    2124    2153    2163    2167    2170
          43          SS    2163     700     3.2     1.5
          44          SL    2122      30     0.6     0.5
                      *
                      *
          45          ZZ
1*****************************************                                                  ****************************************
*                                         *                                                  *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)     *                                                  *   U.S. ARMY CORPS OF ENGINEERS       *
*             JUN 09 1992                 *                                                  *   HYDROLOGIC ENGINEERING CENTER      *
*           VERSION 4.0.3E                *                                                  *         609 SECOND STREET            *
*                                         *                                                  *      DAVIS, CALIFORNIA 95616         *
*  RUN DATE  01/21/99  TIME  17:13:43     *                                                  *          (916) 551-1748              *
*                                         *                                                  *                                      *
*****************************************                                                  ****************************************


                                RAWHIDE WASH DETENTION BASIN
                                PMP ESTIMATION
                                LOCAL STORM, 6 HOUR PMP
                                REDUCE LAG BY 15%
                                BASE MODEL                    FILE: RAWPMP.DAT
                                THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
                                WATERSHED MANAGEMENT BRANCH, AA, AMM, 8/22/94
                                REVISED PMP AA, 10-5-94
                                ALTERNATIVE #4 ALIGNMENT

                             OCTOBER 1998 - HDR Engineering Recreated the PMP model
                             OCTOBER 1998 -
```

```
                    OCTOBER 1998 - Filename <RAWPMF1.DAT>

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

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

     IT         HYDROGRAPH TIME DATA
                       NMIN           5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      3MAR94  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      4MAR94  ENDING DATE
                     NDTIME        1735  ENDING TIME
                      ICENT          19  CENTURY MARK

                 COMPUTATION INTERVAL    0.08 HOURS
                      TOTAL TIME BASE   41.58 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

     JP         MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

     JR         MULTI-RATIO OPTION
                    RATIOS OF RUNOFF
                   0.50


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


            **************
            *            *
  20 KK     *        S1  *          SUB
            *            *
            **************

  25 KO         OUTPUT CONTROL VARIABLES
                      IPRNT           3  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

  27 IN         TIME DATA FOR INPUT TIME SERIES
                      JXMIN          15  TIME INTERVAL IN MINUTES
                     JXDATE      3MAR94  STARTING DATE
                     JXTIME           0  STARTING TIME

               SUBBASIN RUNOFF DATA

  26 BA         SUBBASIN CHARACTERISTICS
                      TAREA       13.70  SUBBASIN AREA

                PRECIPITATION DATA

  28 PB               STORM       10.24  BASIN TOTAL PRECIPITATION
```

```
 28 PI          INCREMENTAL PRECIPITATION PATTERN
                  0.00      0.00      0.00      0.02      0.02      0.02      0.02      0.02      0.02      0.02
                  0.02      0.02      0.02      0.02      0.02      0.04      0.04      0.04      0.04      0.04
                  0.04      0.04      0.04      0.04      0.04      0.04      0.04      1.93      1.93      1.93
                  0.39      0.39      0.39      0.16      0.16      0.16      0.13      0.13      0.13      0.09
                  0.09      0.09      0.09      0.09      0.09      0.09      0.09      0.09      0.09      0.09
                  0.09      0.03      0.03      0.03      0.03      0.03      0.03      0.03      0.03      0.03
                  0.03      0.03      0.03      0.01      0.01      0.01      0.01      0.01      0.01      0.01
                  0.01      0.01      0.01      0.01      0.01

 31 LG         GREEN AND AMPT LOSS RATE
                     STRTL        0.15  STARTING LOSS
                       DTH        0.25  MOISTURE DEFICIT
                      PSIF        6.60  WETTING FRONT SUCTION
                     XKSAT        0.16  HYDRAULIC CONDUCTIVITY
                     RTIMP        0.00  PERCENT IMPERVIOUS AREA

 31 UI         INPUT UNITGRAPH,  42 ORDINATES,  VOLUME = 0.99
                 641.0     641.0     641.0    1648.0    2344.0    2875.0    3257.0    3599.0    3937.0    4405.0
                4906.0    5641.0    7072.0    8283.0    7465.0    6396.0    5686.0    5182.0    4667.0    4131.0
                3741.0    3260.0    2988.0    2362.0    1841.0    1133.0    1123.0    1053.0    1006.0     641.0
                 196.0     196.0     196.0     196.0     196.0     196.0     196.0     196.0     196.0     196.0
                 196.0     196.0
                                                                  ***

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

                     HYDROGRAPH AT STATION       S1
                       FOR PLAN 1, RATIO = 0.50

   TOTAL RAINFALL =   10.24, TOTAL LOSS =    2.07, TOTAL EXCESS =    8.17

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+   50387.      3.58                11910.      2978.       1719.        1719.
                         (INCHES)     8.083      8.083       8.083        8.083
                          (AC-FT)     5906.      5906.       5906.        5906.

                       CUMULATIVE AREA =   13.70 SQ MI

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

                     HYDROGRAPH AT STATION       S1
                       FOR PLAN 1, RATIO = 0.50

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+   25194.      3.58                 5955.      1489.        859.         859.
                         (INCHES)     4.041      4.041       4.041        4.041
                          (AC-FT)     2953.      2953.       2953.        2953.

                       CUMULATIVE AREA =   13.70 SQ MI


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

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

```
          *           *
38 KK     *       DAM *       PROPOSED GRADING PLAN FOR ALTERNATIVE #4
          *           *
          **************

39 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           3  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

40 RS          STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        FLOW  TYPE OF INITIAL CONDITION
                    RSVRIC        0.00  INITIAL CONDITION
                         X        0.00 WORKING R AND D COEFFICIENT

41 SA                AREA         0.0      10.0      18.9      31.1      39.9      44.8      48.0

42 SE          ELEVATION     2120.50   2122.00   2124.00   2153.00   2163.00   2167.00   2170.00

44 SL          LOW-LEVEL OUTLET
                     ELEVL     2122.00  ELEVATION AT CENTER OF OUTLET
                     CAREA       30.00  CROSS-SECTIONAL AREA
                      COQL        0.60  COEFFICIENT
                      EXPL        0.50  EXPONENT OF HEAD

43 SS          SPILLWAY
                      CREL     2163.00  SPILLWAY CREST ELEVATION
                     SPWID      700.00  SPILLWAY WIDTH
                      COQW        3.20  WEIR COEFFICIENT
                      EXPW        1.50  EXPONENT OF HEAD
                                                    ***
                                          COMPUTED STORAGE-ELEVATION DATA

          STORAGE       0.00      5.00     33.43    751.13   1105.22   1274.52   1413.69
        ELEVATION    2120.50   2122.00   2124.00   2153.00   2163.00   2167.00   2170.00
                                          COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW       0.00      0.00    257.39    286.97    324.23    372.62    437.97    531.13    674.62    924.35
        ELEVATION    2120.50   2122.00   2125.18   2125.95   2127.04   2128.66   2131.20   2135.54   2143.84   2163.00

          OUTFLOW     968.08   1264.50   2061.55   3607.19   6149.35   9935.97  15214.99  22234.30  31241.85  42485.54
        ELEVATION    2163.07   2163.28   2163.63   2164.12   2164.75   2165.52   2166.43   2167.48   2168.67   2170.00

                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00      5.00     33.43     55.97     71.02     92.70    125.62    179.38    276.92    485.60
          OUTFLOW       0.00      0.00    204.16    257.39    286.97    324.23    372.62    437.97    531.13    674.62
        ELEVATION    2120.50   2122.00   2124.00   2125.18   2125.95   2127.04   2128.66   2131.20   2135.54   2143.84

          STORAGE     751.13   1105.22   1108.07   1116.55   1130.74   1150.83   1177.06   1209.77   1249.36   1274.52
          OUTFLOW     803.76    924.36    968.02   1264.70   2061.70   3607.20   6149.14   9935.48  15215.66  18888.40
        ELEVATION    2153.00   2163.00   2163.07   2163.28   2163.63   2164.12   2164.75   2165.52   2166.43   2167.00

          STORAGE    1296.28   1350.88   1413.69
          OUTFLOW   22234.79  31242.11  42485.54
        ELEVATION    2167.48   2168.67   2170.00

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

                      HYDROGRAPH AT STATION      DAM
```

```
                    FOR PLAN 1, RATIO = 0.50

  PEAK FLOW     TIME                      MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+   20865.      3.83              4082.       1460.        859.        859.
                       (INCHES)   2.770       3.962       4.041       4.041
                        (AC-FT)   2024.       2895.       2953.       2953.

 PEAK STORAGE   TIME                      MAXIMUM AVERAGE STORAGE
                                   6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
     1287.      3.83               1086.        575.        337.        337.

  PEAK STAGE    TIME                      MAXIMUM AVERAGE STAGE
                                   6-HR       24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
   2167.29      3.83            2162.30     2145.53     2135.76     2135.76

                       CUMULATIVE AREA =   13.70 SQ MI

1

              PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                          FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
                                        TIME TO PEAK IN HOURS

                                                                RATIOS APPLIED TO FLOWS
 OPERATION       STATION     AREA    PLAN              RATIO 1
                                                          0.50

 HYDROGRAPH AT
+                    S1     13.70     1   FLOW         25194.
                                         TIME           3.58

 ROUTED TO
+                   DAM     13.70     1   FLOW         20865.
                                         TIME           3.83

                                   ** PEAK STAGES IN FEET **
                                   1   STAGE       2167.29
                                       TIME           3.83


 *** NORMAL END OF HEC-1 ***
```

```
1****************************************                    ****************************************
*                                      *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *   U.S. ARMY CORPS OF ENGINEERS       *
*            JUN 09 1992               *                    *   HYDROLOGIC ENGINEERING CENTER      *
*           VERSION 4.0.3E             *                    *         609 SECOND STREET            *
*                                      *                    *      DAVIS, CALIFORNIA 95616         *
*  RUN DATE  01/21/99  TIME  17:23:37  *                    *          (916) 551-1748              *
*                                      *                    *                                      *
****************************************                    ****************************************


                                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. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                          HEC-1 INPUT                                                PAGE  1

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

       1           ID        RAWHIDE WASH DETENTION BASIN
       2           ID        PMP ESTIMATION
       3           ID        LOCAL STORM, 6 HOUR PMP
       4           ID        REDUCE LAG BY 15%
       5           ID        BASE MODEL                    FILE: RAWPMP.DAT
       6           ID        THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
       7           ID        WATERSHED MANAGEMENT BRANCH, AA, AMM, 8/22/94
       8           ID        REVISED PMP AA, 10-5-94
       9           ID        ALTERNATIVE #4 ALIGNMENT
      10           ID
      11           ID    OCTOBER 1998 - HDR Engineering Recreated the PMP model
      12           ID    OCTOBER 1998 -
      13           ID    OCTOBER 1998 - Filename <RAWPMF2.DAT>
      14           ID
      15           ID
      16           ID   ****************************************************************************
      17           IT       5 03MAR94       0     500
      18           IO       5       0       0       0
      19           JR    FLOW      .5
                   *

      20           KK      S1     SUB
      21           KM        THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN:
      22           KM        L = 9.2    Lca = 4.4  S = 108.0   Kn = 0.035  LAG = 72.0
      23           KM        PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
      24           KM        BASIN S1                                          KM            04
      25           KO       3
      26           BA    13.7
      27           IN      15
      28           PI       0    0.06    0.06    0.06    0.06    0.12    0.12    0.12    0.12    5.80
```

HDR Basin 4A
- 200' Weir
- 3.2 Coeff.
- 2-36" Outlet pipes
- H = 6.93

```
29          PI    1.18    0.47    0.39    0.28    0.28    0.28    0.28      .1      .1      .1
30          PI      .1     .04     .04     .04     .04       0
31          LG     .15     .25     6.6     .16       0
32          UI     641     641     641    1648    2344    2875    3257    3599    3937    4405
33          UI    4906    5641    7072    8283    7465    6396    5686    5182    4667    4131
34          UI    3741    3260    2988    2362    1841    1133    1123    1053    1006     641
35          UI     196     196     196     196     196     196     196     196     196     196
36          UI     196     196       0       0       0       0       0       0       0       0
37          UI       0       0       0       0       0       0       0       0       0       0
            *
            *
            *      <HDR Basin Alternative No. 4A
            *
            *  ******************************************************************************

38          KK     DAM
39          KO       3
40          RS       1    FLOW       0
41          SV       0      65     304     580     878    1196    1536    1897    2125
42          SE    2180    2185    2190    2195    2200    2205    2210    2215    2218
43          SS    2208     200    3.20     1.5
            * 2 - 36" RCP Culverts for outlet
44          SL    2180    14.1      .6      .5
            *  ******************************************************************************
            *
            *       <Feasibility Basin #4>
            *
            * KK   DAM  PROPOSED GRADING PLAN FOR ALTERNATIVE #4
            * KO     3
            * RS     1    FLOW       0
            * SA     0      10    18.9    31.1    39.9    44.8      48
            * SE2120.5    2122    2124    2153    2163    2167    2170
            * SS  2163     700     3.2     1.5
            * SL  2122      30     0.6     0.5
            *
            *
1                                          HEC-1 INPUT                                          PAGE  2

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

45          ZZ
1*****************************************                                  *****************************************
*                                         *                                  *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)     *                                  *    U.S. ARMY CORPS OF ENGINEERS       *
*             JUN 09 1992                 *                                  *    HYDROLOGIC ENGINEERING CENTER      *
*           VERSION 4.0.3E                *                                  *          609 SECOND STREET            *
*                                         *                                  *       DAVIS, CALIFORNIA 95616         *
*  RUN DATE  01/21/99  TIME  17:23:37     *                                  *           (916) 551-1748              *
*                                         *                                  *                                       *
*****************************************                                  *****************************************

                    RAWHIDE WASH DETENTION BASIN
                    PMP ESTIMATION
                    LOCAL STORM, 6 HOUR PMP
                    REDUCE LAG BY 15%
                    BASE MODEL                    FILE: RAWPMP.DAT
                    THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
                    WATERSHED MANAGEMENT BRANCH, AA, AMM, 8/22/94
                    REVISED PMP AA, 10-5-94
                    ALTERNATIVE #4 ALIGNMENT

                  OCTOBER 1998 - HDR Engineering Recreated the PMP model
                  OCTOBER 1998 -
```

```
                    OCTOBER 1998 - Filename <RAWPMF2.DAT>

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

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

     IT         HYDROGRAPH TIME DATA
                       NMIN           5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      3MAR94  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      4MAR94  ENDING DATE
                     NDTIME        1735  ENDING TIME
                      ICENT          19  CENTURY MARK

                 COMPUTATION INTERVAL    0.08 HOURS
                      TOTAL TIME BASE   41.58 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

     JP         MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

     JR         MULTI-RATIO OPTION
                    RATIOS OF RUNOFF
                   0.50


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


            **************
            *            *
  20 KK     *        S1  *          SUB
            *            *
            **************

  25 KO         OUTPUT CONTROL VARIABLES
                      IPRNT           3  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

  27 IN         TIME DATA FOR INPUT TIME SERIES
                      JXMIN          15  TIME INTERVAL IN MINUTES
                     JXDATE      3MAR94  STARTING DATE
                     JXTIME           0  STARTING TIME

               SUBBASIN RUNOFF DATA

  26 BA         SUBBASIN CHARACTERISTICS
                      TAREA       13.70  SUBBASIN AREA

                PRECIPITATION DATA

  28 PB               STORM       10.24  BASIN TOTAL PRECIPITATION
```

```
28 PI          INCREMENTAL PRECIPITATION PATTERN
                 0.00      0.00      0.00      0.02      0.02      0.02      0.02      0.02      0.02      0.02
                 0.02      0.02      0.02      0.02      0.02      0.04      0.04      0.04      0.04      0.04
                 0.04      0.04      0.04      0.04      0.04      0.04      0.04      1.93      1.93      1.93
                 0.39      0.39      0.39      0.16      0.16      0.16      0.13      0.13      0.13      0.09
                 0.09      0.09      0.09      0.09      0.09      0.09      0.09      0.09      0.09      0.09
                 0.09      0.03      0.03      0.03      0.03      0.03      0.03      0.03      0.03      0.03
                 0.03      0.03      0.03      0.01      0.01      0.01      0.01      0.01      0.01      0.01
                 0.01      0.01      0.01      0.01      0.01

31 LG         GREEN AND AMPT LOSS RATE
                STRTL        0.15  STARTING LOSS
                  DTH        0.25  MOISTURE DEFICIT
                 PSIF        6.60  WETTING FRONT SUCTION
                XKSAT        0.16  HYDRAULIC CONDUCTIVITY
                RTIMP        0.00  PERCENT IMPERVIOUS AREA

31 UI         INPUT UNITGRAPH,  42 ORDINATES,  VOLUME = 0.99
                641.0     641.0     641.0    1648.0    2344.0    2875.0    3257.0    3599.0    3937.0    4405.0
               4906.0    5641.0    7072.0    8283.0    7465.0    6396.0    5686.0    5182.0    4667.0    4131.0
               3741.0    3260.0    2988.0    2362.0    1841.0    1133.0    1123.0    1053.0    1006.0     641.0
                196.0     196.0     196.0     196.0     196.0     196.0     196.0     196.0     196.0     196.0
                196.0     196.0
                                                                   ***

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

                    HYDROGRAPH AT STATION       S1
                      FOR PLAN 1, RATIO = 0.50

   TOTAL RAINFALL =   10.24, TOTAL LOSS =    2.07, TOTAL EXCESS =    8.17

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+   50387.      3.58              11910.      2978.       1719.       1719.
                        (INCHES)   8.083      8.083       8.083       8.083
                         (AC-FT)   5906.      5906.       5906.       5906.

                       CUMULATIVE AREA =   13.70 SQ MI

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

                    HYDROGRAPH AT STATION       S1
                      FOR PLAN 1, RATIO = 0.50

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+   25194.      3.58               5955.      1489.        859.        859.
                        (INCHES)   4.041      4.041       4.041       4.041
                         (AC-FT)   2953.      2953.       2953.       2953.

                       CUMULATIVE AREA =   13.70 SQ MI


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

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

```
            *           *
 38 KK      *      DAM  *
            *           *
            **************

 39 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           3  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

              HYDROGRAPH ROUTING DATA

 40 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC        0.00  INITIAL CONDITION
                          X        0.00 WORKING R AND D COEFFICIENT

 41 SV            STORAGE         0.0      65.0     304.0     580.0     878.0    1196.0    1536.0    1897.0    2125.0

 42 SE          ELEVATION     2180.00   2185.00   2190.00   2195.00   2200.00   2205.00   2210.00   2215.00   2218.00

 44 SL          LOW-LEVEL OUTLET
                      ELEVL     2180.00  ELEVATION AT CENTER OF OUTLET
                      CAREA       14.10  CROSS-SECTIONAL AREA
                       COQL        0.60  COEFFICIENT
                       EXPL        0.50  EXPONENT OF HEAD

 43 SS          SPILLWAY
                       CREL     2208.00  SPILLWAY CREST ELEVATION
                      SPWID      200.00  SPILLWAY WIDTH
                       COQW        3.20  WEIR COEFFICIENT
                       EXPW        1.50  EXPONENT OF HEAD
                                                    ***
                                          COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW       0.00     99.02    108.88    120.92    135.94    155.23    180.91    216.75    270.31    359.02
        ELEVATION    2180.00   2182.13   2182.58   2183.18   2184.01   2185.23   2187.11   2190.21   2195.87   2208.00

          OUTFLOW     381.10    527.67    919.36   1676.82   2920.66   4771.49   7349.92  10776.56  15171.99  20656.82
        ELEVATION    2208.10   2208.41   2208.91   2209.61   2210.51   2211.61   2212.91   2214.41   2216.10   2218.00

                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00     27.69     33.48     41.29     52.19     65.00     76.21    165.82    304.00    315.33
          OUTFLOW       0.00     99.03    108.88    120.92    135.94    151.72    155.23    180.91    214.56    216.75
        ELEVATION    2180.00   2182.13   2182.58   2183.18   2184.01   2185.00   2185.23   2187.11   2190.00   2190.21

          STORAGE     580.00    631.98    878.00   1196.00   1400.00   1407.06   1427.66   1461.81   1509.49   1536.00
          OUTFLOW     262.78    270.31    303.43    339.25    359.02    381.08    527.64    919.40   1676.76   2181.82
        ELEVATION    2195.00   2195.87   2200.00   2205.00   2208.00   2208.10   2208.41   2208.91   2209.61   2210.00

          STORAGE    1572.86   1652.25   1746.03   1854.17   1897.00   1980.89   2125.00
          OUTFLOW    2920.55   4771.42   7350.06  10776.50  12254.37  15171.88  20656.83
        ELEVATION    2210.51   2211.61   2212.91   2214.41   2215.00   2216.10   2218.00

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

                     HYDROGRAPH AT STATION      DAM
                       FOR PLAN 1, RATIO = 0.50

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
```

```
                          (CFS)
+   12089.      4.33                3163.       1038.       699.        699.
                         (INCHES)   2.147       2.818       3.288       3.288
                          (AC-FT)   1568.       2059.       2403.       2403.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                      6-HR       24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
     1892.      4.33                1542.       1221.       953.        953.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                      6-HR       24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
   2214.93      4.33              2210.03     2205.27     2200.65     2200.65

                         CUMULATIVE AREA =   13.70 SQ MI

1

              PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                                FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                              TIME TO PEAK IN HOURS

                                                                  RATIOS APPLIED TO FLOWS
 OPERATION       STATION     AREA    PLAN                 RATIO 1
                                                             0.50

 HYDROGRAPH AT
+                  S1       13.70     1   FLOW            25194.
                                          TIME              3.58

 ROUTED TO
+                 DAM       13.70     1   FLOW            12089.
                                          TIME              4.33

                                     ** PEAK STAGES IN FEET **
                                     1   STAGE          2214.93
                                          TIME              4.33


 *** NORMAL END OF HEC-1 ***
```

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1****************************************                    ****************************************
*                                      *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *   U.S. ARMY CORPS OF ENGINEERS       *
*            JUN 09 1992               *                    *   HYDROLOGIC ENGINEERING CENTER      *
*          VERSION 4.0.3E              *                    *         609 SECOND STREET            *
*                                      *                    *      DAVIS, CALIFORNIA 95616         *
*  RUN DATE  01/22/99  TIME  12:32:11  *                    *          (916) 551-1748              *
*                                      *                    *                                      *
****************************************                    ****************************************

                                    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. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                                HEC-1 INPUT                                                PAGE  1

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

       1           ID        RAWHIDE WASH DETENTION BASIN
       2           ID        PMP ESTIMATION
       3           ID        LOCAL STORM, 6 HOUR PMP
       4           ID        REDUCE LAG BY 15%
       5           ID        BASE MODEL                    FILE: RAWPMP.DAT
       6           ID        THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
       7           ID        WATERSHED MANAGEMENT BRANCH, AA, AMM, 8/22/94
       8           ID        REVISED PMP AA, 10-5-94
       9           ID        ALTERNATIVE #4 ALIGNMENT
      10           ID
      11           ID    OCTOBER 1998 - HDR Engineering Recreated the PMP model
      12           ID    OCTOBER 1998 -
      13           ID    OCTOBER 1998 - Filename <RAWPMF3.DAT>
      14           ID
      15           ID
      16           ID   ****************************************************************************
      17           IT       5 03MAR94       0     500
      18           IO       5       0       0       0
      19           JR    FLOW      .5
                   *

      20           KK      S1     SUB
      21           KM        THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN:
      22           KM        L = 9.2    Lca = 4.4  S = 108.0   Kn = 0.035  LAG = 72.0
      23           KM        PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
      24           KM        BASIN S1                                          KM            04
      25           KO       3
      26           BA    13.7
      27           IN      15
      28           PI       0    0.06    0.06    0.06    0.06    0.12    0.12    0.12    0.12    5.80
```

HDR Basin 4A
- 200' Weir
- 2.88 Coeff.
- 2-36" Outlet pipes
- H = 7.25

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29          PI    1.18    0.47    0.39    0.28    0.28    0.28    0.28      .1      .1      .1
30          PI      .1     .04     .04     .04     .04       0
31          LG     .15     .25     6.6     .16       0
32          UI     641     641     641    1648    2344    2875    3257    3599    3937    4405
33          UI    4906    5641    7072    8283    7465    6396    5686    5182    4667    4131
34          UI    3741    3260    2988    2362    1841    1133    1123    1053    1006     641
35          UI     196     196     196     196     196     196     196     196     196     196
36          UI     196     196       0       0       0       0       0       0       0       0
37          UI       0       0       0       0       0       0       0       0       0       0
            *
            *
            *      <HDR Basin Alternative No. 4A
            *
            *  ******************************************************************************

38          KK     DAM
39          KO       3
40          RS       1    FLOW       0
41          SV       0      65     304     580     878    1196    1536    1897    2125
42          SE    2180    2185    2190    2195    2200    2205    2210    2215    2218
43          SS    2208     200    2.88     1.5
            * 2 - 36" RCP Culverts for outlet
44          SL    2180    14.1      .6      .5
            *  ******************************************************************************
            *
            *       <Feasibility Basin #4>
            *
            * KK   DAM  PROPOSED GRADING PLAN FOR ALTERNATIVE #4
            * KO     3
            * RS     1    FLOW       0
            * SA     0      10    18.9    31.1    39.9    44.8      48
            * SE2120.5    2122    2124    2153    2163    2167    2170
            * SS  2163     700     3.2     1.5
            * SL  2122      30     0.6     0.5
            *
            *
1                                          HEC-1 INPUT                                          PAGE  2

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

        45          ZZ
1****************************************                                  ****************************************
*                                      *                                  *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                  *   U.S. ARMY CORPS OF ENGINEERS       *
*            JUN 09 1992               *                                  *   HYDROLOGIC ENGINEERING CENTER      *
*           VERSION 4.0.3E             *                                  *         609 SECOND STREET            *
*                                      *                                  *      DAVIS, CALIFORNIA 95616         *
*  RUN DATE  01/22/99  TIME  12:32:11  *                                  *          (916) 551-1748              *
*                                      *                                  *                                      *
****************************************                                  ****************************************


                    RAWHIDE WASH DETENTION BASIN
                    PMP ESTIMATION
                    LOCAL STORM, 6 HOUR PMP
                    REDUCE LAG BY 15%
                    BASE MODEL                    FILE: RAWPMP.DAT
                    THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
                    WATERSHED MANAGEMENT BRANCH, AA, AMM, 8/22/94
                    REVISED PMP AA, 10-5-94
                    ALTERNATIVE #4 ALIGNMENT

                  OCTOBER 1998 - HDR Engineering Recreated the PMP model
                  OCTOBER 1998 -
```

```
                    OCTOBER 1998 - Filename <RAWPMF3.DAT>

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

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

     IT         HYDROGRAPH TIME DATA
                       NMIN           5  MINUTES IN COMPUTATION INTERVAL
                      IDATE      3MAR94  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      4MAR94  ENDING DATE
                     NDTIME        1735  ENDING TIME
                      ICENT          19  CENTURY MARK

                 COMPUTATION INTERVAL    0.08 HOURS
                      TOTAL TIME BASE   41.58 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

     JP         MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

     JR         MULTI-RATIO OPTION
                    RATIOS OF RUNOFF
                   0.50


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


            **************
            *            *
  20 KK     *        S1  *          SUB
            *            *
            **************

  25 KO         OUTPUT CONTROL VARIABLES
                      IPRNT           3  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

  27 IN         TIME DATA FOR INPUT TIME SERIES
                       JXMIN          15  TIME INTERVAL IN MINUTES
                      JXDATE      3MAR94  STARTING DATE
                      JXTIME           0  STARTING TIME

               SUBBASIN RUNOFF DATA

  26 BA         SUBBASIN CHARACTERISTICS
                      TAREA       13.70  SUBBASIN AREA

                PRECIPITATION DATA

  28 PB               STORM       10.24  BASIN TOTAL PRECIPITATION
```

```
28 PI          INCREMENTAL PRECIPITATION PATTERN
                 0.00      0.00      0.00      0.02      0.02      0.02      0.02      0.02      0.02      0.02
                 0.02      0.02      0.02      0.02      0.02      0.04      0.04      0.04      0.04      0.04
                 0.04      0.04      0.04      0.04      0.04      0.04      0.04      1.93      1.93      1.93
                 0.39      0.39      0.39      0.16      0.16      0.16      0.13      0.13      0.13      0.09
                 0.09      0.09      0.09      0.09      0.09      0.09      0.09      0.09      0.09      0.09
                 0.09      0.03      0.03      0.03      0.03      0.03      0.03      0.03      0.03      0.03
                 0.03      0.03      0.03      0.01      0.01      0.01      0.01      0.01      0.01      0.01
                 0.01      0.01      0.01      0.01      0.01

31 LG          GREEN AND AMPT LOSS RATE
                 STRTL        0.15  STARTING LOSS
                   DTH        0.25  MOISTURE DEFICIT
                  PSIF        6.60  WETTING FRONT SUCTION
                 XKSAT        0.16  HYDRAULIC CONDUCTIVITY
                 RTIMP        0.00  PERCENT IMPERVIOUS AREA

31 UI          INPUT UNITGRAPH,  42 ORDINATES,  VOLUME = 0.99
                 641.0     641.0     641.0    1648.0    2344.0    2875.0    3257.0    3599.0    3937.0    4405.0
                4906.0    5641.0    7072.0    8283.0    7465.0    6396.0    5686.0    5182.0    4667.0    4131.0
                3741.0    3260.0    2988.0    2362.0    1841.0    1133.0    1123.0    1053.0    1006.0     641.0
                 196.0     196.0     196.0     196.0     196.0     196.0     196.0     196.0     196.0     196.0
                 196.0     196.0
                                                                  ***

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

                     HYDROGRAPH AT STATION       S1
                       FOR PLAN 1, RATIO = 0.50

    TOTAL RAINFALL =   10.24, TOTAL LOSS =    2.07, TOTAL EXCESS =    8.17

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+   50387.      3.58                11910.      2978.       1719.       1719.
                        (INCHES)     8.083      8.083       8.083       8.083
                         (AC-FT)     5906.      5906.       5906.       5906.

                       CUMULATIVE AREA =   13.70 SQ MI

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

                     HYDROGRAPH AT STATION       S1
                       FOR PLAN 1, RATIO = 0.50

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+   25194.      3.58                 5955.      1489.        859.        859.
                        (INCHES)     4.041      4.041       4.041       4.041
                         (AC-FT)     2953.      2953.       2953.       2953.

                       CUMULATIVE AREA =   13.70 SQ MI


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

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

```
                *            *
 38 KK          *      DAM   *
                *            *
                **************

 39 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           3  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

              HYDROGRAPH ROUTING DATA

 40 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC        0.00  INITIAL CONDITION
                          X        0.00 WORKING R AND D COEFFICIENT

 41 SV            STORAGE         0.0      65.0     304.0     580.0     878.0    1196.0    1536.0    1897.0    2125.0

 42 SE          ELEVATION     2180.00   2185.00   2190.00   2195.00   2200.00   2205.00   2210.00   2215.00   2218.00

 44 SL          LOW-LEVEL OUTLET
                      ELEVL     2180.00  ELEVATION AT CENTER OF OUTLET
                      CAREA       14.10  CROSS-SECTIONAL AREA
                       COQL        0.60  COEFFICIENT
                       EXPL        0.50  EXPONENT OF HEAD

 43 SS          SPILLWAY
                       CREL     2208.00  SPILLWAY CREST ELEVATION
                      SPWID      200.00  SPILLWAY WIDTH
                       COQW        2.88  WEIR COEFFICIENT
                       EXPW        1.50  EXPONENT OF HEAD
                                                        ***
                                          COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW       0.00     99.02    108.88    120.92    135.94    155.23    180.91    216.75    270.31    359.02
        ELEVATION    2180.00   2182.13   2182.58   2183.18   2184.01   2185.23   2187.11   2190.21   2195.87   2208.00

          OUTFLOW     379.09    511.49    864.73   1547.31   2667.69   4334.35   6655.75   9740.35  13696.60  18632.97
        ELEVATION    2208.10   2208.41   2208.91   2209.61   2210.51   2211.61   2212.91   2214.41   2216.10   2218.00

                                       COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00     27.69     33.48     41.29     52.19     65.00     76.21    165.82    304.00    315.33
          OUTFLOW       0.00     99.03    108.88    120.92    135.94    151.72    155.23    180.91    214.56    216.75
        ELEVATION    2180.00   2182.13   2182.58   2183.18   2184.01   2185.00   2185.23   2187.11   2190.00   2190.21

          STORAGE     580.00    631.98    878.00   1196.00   1400.00   1407.09   1427.71   1461.87   1509.57   1536.00
          OUTFLOW     262.78    270.31    303.43    339.25    359.02    379.08    511.45    864.76   1547.35   2000.80
        ELEVATION    2195.00   2195.87   2200.00   2205.00   2208.00   2208.10   2208.41   2208.91   2209.61   2210.00

          STORAGE    1572.95   1652.34   1746.10   1854.22   1897.00   1980.92   2125.00
          OUTFLOW    2667.65   4334.44   6655.85   9740.26  11069.07  13696.66  18632.97
        ELEVATION    2210.51   2211.61   2212.91   2214.41   2215.00   2216.10   2218.00

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

                     HYDROGRAPH AT STATION      DAM
                       FOR PLAN 1, RATIO = 0.50

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
```

```
                          (CFS)
+   11656.      4.33                3153.       1036.       698.        698.
                         (INCHES)   2.140       2.812       3.284       3.284
                          (AC-FT)   1563.       2054.       2399.       2399.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR        24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
     1916.      4.33                1556.       1228.       958.        958.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR        24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
   2215.25      4.33              2210.22     2205.37     2200.72     2200.72

                         CUMULATIVE AREA =   13.70 SQ MI

1

              PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                                FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                          TIME TO PEAK IN HOURS

                                                                  RATIOS APPLIED TO FLOWS
 OPERATION       STATION     AREA    PLAN                 RATIO 1
                                                             0.50

 HYDROGRAPH AT
+                    S1     13.70     1   FLOW            25194.
                                          TIME              3.58

 ROUTED TO
+                   DAM     13.70     1   FLOW            11656.
                                          TIME              4.33

                                     ** PEAK STAGES IN FEET **
                                     1   STAGE          2215.25
                                         TIME              4.33


 *** NORMAL END OF HEC-1 ***
```

```
1****************************************                    ****************************************
*                                      *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *    U.S. ARMY CORPS OF ENGINEERS      *
*             JUN 09 1992              *                    *    HYDROLOGIC ENGINEERING CENTER     *
*           VERSION 4.0.3E             *                    *          609 SECOND STREET           *
*                                      *                    *       DAVIS, CALIFORNIA 95616        *
*  RUN DATE  01/22/99  TIME  12:39:48  *                    *          (916) 551-1748              *
*                                      *                    *                                      *
****************************************                    ****************************************

                                   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. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                                HEC-1 INPUT                                                PAGE  1

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

          1           ID        RAWHIDE WASH DETENTION BASIN
          2           ID        PMP ESTIMATION
          3           ID        LOCAL STORM, 6 HOUR PMP
          4           ID        REDUCE LAG BY 15%
          5           ID        BASE MODEL                    FILE: RAWPMP.DAT
          6           ID        THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
          7           ID        WATERSHED MANAGEMENT BRANCH, AA, AMM, 8/22/94
          8           ID        REVISED PMP AA, 10-5-94
          9           ID        ALTERNATIVE #4 ALIGNMENT
         10           ID
         11           ID    OCTOBER 1998 - HDR Engineering Recreated the PMP model
         12           ID    OCTOBER 1998 -
         13           ID    OCTOBER 1998 - Filename <RAWPMF4.DAT>
         14           ID
         15           ID
         16           ID   ******************************************************************************
         17           IT       5 03MAR94       0     500
         18           IO       5       0       0       0
         19           JR    FLOW      .5
                      *

         20           KK      S1     SUB
         21           KM        THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN:
         22           KM        L = 9.2    Lca = 4.4  S = 108.0   Kn = 0.035  LAG = 72.0
         23           KM        PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
         24           KM        BASIN S1                                          KM            04
         25           KO       3
         26           BA    13.7
         27           IN      15
         28           PI       0    0.06    0.06    0.06    0.06    0.12    0.12    0.12    0.12    5.80
```

HDR Basin 4A
- 400' Weir
- 2.88 Coeff.
- 2-36" Outlet pipes
- H = 5.23

```
29          PI    1.18    0.47    0.39    0.28    0.28    0.28    0.28      .1      .1      .1
30          PI      .1     .04     .04     .04     .04       0
31          LG     .15     .25     6.6     .16       0
32          UI     641     641     641    1648    2344    2875    3257    3599    3937    4405
33          UI    4906    5641    7072    8283    7465    6396    5686    5182    4667    4131
34          UI    3741    3260    2988    2362    1841    1133    1123    1053    1006     641
35          UI     196     196     196     196     196     196     196     196     196     196
36          UI     196     196       0       0       0       0       0       0       0       0
37          UI       0       0       0       0       0       0       0       0       0       0
            *
            *
            *      <HDR Basin Alternative No. 4A
            *
            *  ******************************************************************************

38          KK     DAM
39          KO       3
40          RS       1    FLOW       0
41          SV       0      65     304     580     878    1196    1536    1897    2125
42          SE    2180    2185    2190    2195    2200    2205    2210    2215    2218
43          SS    2208     400    2.88     1.5
            * 2 - 36" RCP Culverts for outlet
44          SL    2180    14.1      .6      .5
            *  ******************************************************************************
            *
            *       <Feasibility Basin #4>
            *
            * KK   DAM  PROPOSED GRADING PLAN FOR ALTERNATIVE #4
            * KO     3
            * RS     1    FLOW       0
            * SA     0      10    18.9    31.1    39.9    44.8      48
            * SE2120.5    2122    2124    2153    2163    2167    2170
            * SS  2163     700     3.2     1.5
            * SL  2122      30     0.6     0.5
            *
            *
```

1 HEC-1 INPUT PAGE 2

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

       45           ZZ
1*****************************************                    *****************************************
 *                                       *                    *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *   U.S. ARMY CORPS OF ENGINEERS        *
 *            JUN 09 1992                *                    *   HYDROLOGIC ENGINEERING CENTER       *
 *          VERSION 4.0.3E               *                    *        609 SECOND STREET              *
 *                                       *                    *      DAVIS, CALIFORNIA 95616          *
 *  RUN DATE  01/22/99  TIME  12:39:48   *                    *          (916) 551-1748               *
 *                                       *                    *                                       *
 *****************************************                    *****************************************
```

RAWHIDE WASH DETENTION BASIN
PMP ESTIMATION
LOCAL STORM, 6 HOUR PMP
REDUCE LAG BY 15%
BASE MODEL FILE: RAWPMP.DAT
THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
WATERSHED MANAGEMENT BRANCH, AA, AMM, 8/22/94
REVISED PMP AA, 10-5-94
ALTERNATIVE #4 ALIGNMENT

OCTOBER 1998 - HDR Engineering Recreated the PMP model
OCTOBER 1998 -

```
                    OCTOBER 1998 - Filename <RAWPMF4.DAT>

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

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

     IT        HYDROGRAPH TIME DATA
                      NMIN          5  MINUTES IN COMPUTATION INTERVAL
                     IDATE     3MAR94  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ        500  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     4MAR94  ENDING DATE
                    NDTIME       1735  ENDING TIME
                     ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL    0.08 HOURS
                      TOTAL TIME BASE   41.58 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

     JP        MULTI-PLAN OPTION
                     NPLAN          1  NUMBER OF PLANS

     JR        MULTI-RATIO OPTION
                   RATIOS OF RUNOFF
                  0.50


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


            **************
            *            *
  20 KK     *        S1  *          SUB
            *            *
            **************

  25 KO        OUTPUT CONTROL VARIABLES
                     IPRNT          3  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

  27 IN        TIME DATA FOR INPUT TIME SERIES
                     JXMIN         15  TIME INTERVAL IN MINUTES
                    JXDATE     3MAR94  STARTING DATE
                    JXTIME          0  STARTING TIME

               SUBBASIN RUNOFF DATA

  26 BA        SUBBASIN CHARACTERISTICS
                     TAREA      13.70  SUBBASIN AREA

               PRECIPITATION DATA

  28 PB              STORM      10.24  BASIN TOTAL PRECIPITATION
```

```
28 PI          INCREMENTAL PRECIPITATION PATTERN
                 0.00      0.00      0.00      0.02      0.02      0.02      0.02      0.02      0.02      0.02
                 0.02      0.02      0.02      0.02      0.02      0.04      0.04      0.04      0.04      0.04
                 0.04      0.04      0.04      0.04      0.04      0.04      0.04      1.93      1.93      1.93
                 0.39      0.39      0.39      0.16      0.16      0.16      0.13      0.13      0.13      0.09
                 0.09      0.09      0.09      0.09      0.09      0.09      0.09      0.09      0.09      0.09
                 0.09      0.03      0.03      0.03      0.03      0.03      0.03      0.03      0.03      0.03
                 0.03      0.03      0.03      0.01      0.01      0.01      0.01      0.01      0.01      0.01
                 0.01      0.01      0.01      0.01      0.01

31 LG         GREEN AND AMPT LOSS RATE
                STRTL        0.15  STARTING LOSS
                  DTH        0.25  MOISTURE DEFICIT
                 PSIF        6.60  WETTING FRONT SUCTION
                XKSAT        0.16  HYDRAULIC CONDUCTIVITY
                RTIMP        0.00  PERCENT IMPERVIOUS AREA

31 UI         INPUT UNITGRAPH,  42 ORDINATES,  VOLUME = 0.99
                 641.0     641.0     641.0    1648.0    2344.0    2875.0    3257.0    3599.0    3937.0    4405.0
                4906.0    5641.0    7072.0    8283.0    7465.0    6396.0    5686.0    5182.0    4667.0    4131.0
                3741.0    3260.0    2988.0    2362.0    1841.0    1133.0    1123.0    1053.0    1006.0     641.0
                 196.0     196.0     196.0     196.0     196.0     196.0     196.0     196.0     196.0     196.0
                 196.0     196.0

                                                                  ***

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

                     HYDROGRAPH AT STATION       S1
                       FOR PLAN 1, RATIO = 0.50

    TOTAL RAINFALL =   10.24, TOTAL LOSS =    2.07, TOTAL EXCESS =    8.17

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+   50387.      3.58                11910.       2978.        1719.        1719.
                        (INCHES)     8.083       8.083        8.083        8.083
                         (AC-FT)     5906.       5906.        5906.        5906.

                        CUMULATIVE AREA =   13.70 SQ MI

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

                     HYDROGRAPH AT STATION       S1
                       FOR PLAN 1, RATIO = 0.50

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+   25194.      3.58                 5955.       1489.         859.         859.
                        (INCHES)     4.041       4.041        4.041        4.041
                         (AC-FT)     2953.       2953.        2953.        2953.

                        CUMULATIVE AREA =   13.70 SQ MI

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

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

```
                *            *
 38 KK          *     DAM    *
                *            *
                **************

 39 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          3  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

              HYDROGRAPH ROUTING DATA

 40 RS          STORAGE ROUTING
                      NSTPS          1  NUMBER OF SUBREACHES
                       ITYP       FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC       0.00  INITIAL CONDITION
                          X       0.00 WORKING R AND D COEFFICIENT

 41 SV            STORAGE        0.0     65.0    304.0    580.0    878.0   1196.0   1536.0   1897.0   2125.0

 42 SE          ELEVATION    2180.00  2185.00  2190.00  2195.00  2200.00  2205.00  2210.00  2215.00  2218.00

 44 SL          LOW-LEVEL OUTLET
                      ELEVL    2180.00  ELEVATION AT CENTER OF OUTLET
                      CAREA      14.10  CROSS-SECTIONAL AREA
                       COQL       0.60  COEFFICIENT
                       EXPL       0.50  EXPONENT OF HEAD

 43 SS          SPILLWAY
                       CREL    2208.00  SPILLWAY CREST ELEVATION
                      SPWID     400.00  SPILLWAY WIDTH
                       COQW       2.88  WEIR COEFFICIENT
                       EXPW       1.50  EXPONENT OF HEAD
                                                    ***
                                        COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW       0.00     99.02    108.88    120.92    135.94    155.23    180.91    216.75    270.31    359.02
        ELEVATION    2180.00   2182.13   2182.58   2183.18   2184.01   2185.23   2187.11   2190.21   2195.87   2208.00

          OUTFLOW     397.27    657.16   1356.48   2712.99   4944.47   8268.68  12903.36  19066.26  26975.12  36847.68
        ELEVATION    2208.10   2208.40   2208.91   2209.61   2210.51   2211.61   2212.91   2214.40   2216.10   2218.00

                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00     27.69     33.48     41.29     52.19     65.00     76.21    165.82    304.00    315.33
          OUTFLOW       0.00     99.03    108.88    120.92    135.94    151.72    155.23    180.91    214.56    216.75
        ELEVATION    2180.00   2182.13   2182.58   2183.18   2184.01   2185.00   2185.23   2187.11   2190.00   2190.21

          STORAGE     580.00    631.98    878.00   1196.00   1400.00   1406.94   1427.46   1461.54   1509.19   1536.00
          OUTFLOW     262.78    270.31    303.43    339.25    359.02    397.23    657.21   1356.63   2713.16   3629.97
        ELEVATION    2195.00   2195.87   2200.00   2205.00   2208.00   2208.10   2208.40   2208.91   2209.61   2210.00

          STORAGE    1572.52   1651.93   1745.74   1853.95   1897.00   1980.76   2125.00
          OUTFLOW    4944.44   8268.94  12903.74  19066.49  21736.74  26974.82  36847.69
        ELEVATION    2210.51   2211.61   2212.91   2214.40   2215.00   2216.10   2218.00

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

                     HYDROGRAPH AT STATION      DAM
                       FOR PLAN 1, RATIO = 0.50

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
```

```
                          (CFS)
+   14228.      4.17                3204.       1047.       703.        703.
                         (INCHES)   2.174       2.841       3.308       3.308
                          (AC-FT)   1589.       2076.       2417.       2417.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR        24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
     1769.      4.17                1485.       1193.       931.        931.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR        24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
   2213.23      4.17              2209.22     2204.85     2200.31     2200.31

                        CUMULATIVE AREA =   13.70 SQ MI

1

              PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                                FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                          TIME TO PEAK IN HOURS

                                                                  RATIOS APPLIED TO FLOWS
 OPERATION       STATION     AREA    PLAN              RATIO 1
                                                          0.50

 HYDROGRAPH AT
+                   S1      13.70     1   FLOW        25194.
                                          TIME          3.58

 ROUTED TO
+                  DAM      13.70     1   FLOW        14228.
                                          TIME          4.17

                                     ** PEAK STAGES IN FEET **
                                     1   STAGE      2213.23
                                          TIME          4.17


 *** NORMAL END OF HEC-1 ***
```

```
1****************************************                    ****************************************
 *                                      *                    *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *   U.S. ARMY CORPS OF ENGINEERS       *
 *             JUN 09 1992              *                    *   HYDROLOGIC ENGINEERING CENTER      *
 *            VERSION 4.0.3E            *                    *         609 SECOND STREET            *
 *                                      *                    *      DAVIS, CALIFORNIA 95616         *
 *  RUN DATE  01/22/99  TIME  12:41:01  *                    *          (916) 551-1748              *
 *                                      *                    *                                      *
 ****************************************                    ****************************************


                                    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. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                                HEC-1 INPUT                                                PAGE  1

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

        1           ID        RAWHIDE WASH DETENTION BASIN
        2           ID        PMP ESTIMATION
        3           ID        LOCAL STORM, 6 HOUR PMP
        4           ID        REDUCE LAG BY 15%
        5           ID        BASE MODEL                    FILE: RAWPMP.DAT
        6           ID        THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
        7           ID        WATERSHED MANAGEMENT BRANCH, AA, AMM, 8/22/94
        8           ID        REVISED PMP AA, 10-5-94
        9           ID        ALTERNATIVE #4 ALIGNMENT
       10           ID
       11           ID    OCTOBER 1998 - HDR Engineering Recreated the PMP model
       12           ID    OCTOBER 1998 -
       13           ID    OCTOBER 1998 - Filename <RAWPMF5.DAT>
       14           ID
       15           ID
       16           ID   ******************************************************************************
       17           IT       5 03MAR94       0     500
       18           IO       5       0       0       0
       19           JR    FLOW      .5
                    *

       20           KK      S1     SUB
       21           KM        THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN:
       22           KM        L = 9.2    Lca = 4.4  S = 108.0   Kn = 0.035  LAG = 72.0
       23           KM        PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
       24           KM        BASIN S1                                          KM            04
       25           KO       3
       26           BA    13.7
       27           IN      15
       28           PI       0    0.06    0.06    0.06    0.06    0.12    0.12    0.12    0.12    5.80
```

HDR Basin 4A
- 600' Wier
- 2.88 Coeff.
- 2-36" Outlet pipes
- H = 4.23'

```
29          PI    1.18    0.47    0.39    0.28    0.28    0.28    0.28      .1      .1      .1
30          PI      .1     .04     .04     .04     .04       0
31          LG     .15     .25     6.6     .16       0
32          UI     641     641     641    1648    2344    2875    3257    3599    3937    4405
33          UI    4906    5641    7072    8283    7465    6396    5686    5182    4667    4131
34          UI    3741    3260    2988    2362    1841    1133    1123    1053    1006     641
35          UI     196     196     196     196     196     196     196     196     196     196
36          UI     196     196       0       0       0       0       0       0       0       0
37          UI       0       0       0       0       0       0       0       0       0       0
            *
            *
            *      <HDR Basin Alternative No. 4A
            *
            *  ******************************************************************************

38          KK     DAM
39          KO       3
40          RS       1    FLOW       0
41          SV       0      65     304     580     878    1196    1536    1897    2125
42          SE    2180    2185    2190    2195    2200    2205    2210    2215    2218
43          SS    2208     600    2.88     1.5
            * 2 - 36" RCP Culverts for outlet
44          SL    2180    14.1      .6      .5
            *  ******************************************************************************
            *
            *       <Feasibility Basin #4>
            *
            * KK   DAM  PROPOSED GRADING PLAN FOR ALTERNATIVE #4
            * KO     3
            * RS     1    FLOW       0
            * SA     0      10    18.9    31.1    39.9    44.8      48
            * SE2120.5    2122    2124    2153    2163    2167    2170
            * SS  2163     700     3.2     1.5
            * SL  2122      30     0.6     0.5
            *
            *
```

1 HEC-1 INPUT PAGE 2

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

       45           ZZ
1*****************************************                    *****************************************
 *                                       *                    *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *   U.S. ARMY CORPS OF ENGINEERS        *
 *            JUN 09 1992                *                    *   HYDROLOGIC ENGINEERING CENTER       *
 *          VERSION 4.0.3E               *                    *         609 SECOND STREET             *
 *                                       *                    *      DAVIS, CALIFORNIA 95616          *
 *  RUN DATE  01/22/99  TIME  12:41:01   *                    *         (916) 551-1748                *
 *                                       *                    *                                       *
 *****************************************                    *****************************************
```

RAWHIDE WASH DETENTION BASIN
PMP ESTIMATION
LOCAL STORM, 6 HOUR PMP
REDUCE LAG BY 15%
BASE MODEL FILE: RAWPMP.DAT
THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY.
WATERSHED MANAGEMENT BRANCH, AA, AMM, 8/22/94
REVISED PMP AA, 10-5-94
ALTERNATIVE #4 ALIGNMENT

OCTOBER 1998 - HDR Engineering Recreated the PMP model
OCTOBER 1998 -

```
                    OCTOBER 1998 - Filename <RAWPMF5.DAT>

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

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

     IT          HYDROGRAPH TIME DATA
                        NMIN          5  MINUTES IN COMPUTATION INTERVAL
                       IDATE     3MAR94  STARTING DATE
                       ITIME       0000  STARTING TIME
                          NQ        500  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE     4MAR94  ENDING DATE
                      NDTIME       1735  ENDING TIME
                       ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL    0.08 HOURS
                      TOTAL TIME BASE   41.58 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

     JP          MULTI-PLAN OPTION
                       NPLAN          1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF RUNOFF
                   0.50


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


            **************
            *            *
  20 KK     *        S1  *          SUB
            *            *
            **************

  25 KO          OUTPUT CONTROL VARIABLES
                       IPRNT          3  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE

  27 IN          TIME DATA FOR INPUT TIME SERIES
                       JXMIN         15  TIME INTERVAL IN MINUTES
                      JXDATE     3MAR94  STARTING DATE
                      JXTIME          0  STARTING TIME

               SUBBASIN RUNOFF DATA

  26 BA          SUBBASIN CHARACTERISTICS
                       TAREA      13.70  SUBBASIN AREA

               PRECIPITATION DATA

  28 PB                STORM      10.24  BASIN TOTAL PRECIPITATION
```

```
 28 PI          INCREMENTAL PRECIPITATION PATTERN
                  0.00      0.00      0.00      0.02      0.02      0.02      0.02      0.02      0.02      0.02
                  0.02      0.02      0.02      0.02      0.02      0.04      0.04      0.04      0.04      0.04
                  0.04      0.04      0.04      0.04      0.04      0.04      0.04      1.93      1.93      1.93
                  0.39      0.39      0.39      0.16      0.16      0.16      0.13      0.13      0.13      0.09
                  0.09      0.09      0.09      0.09      0.09      0.09      0.09      0.09      0.09      0.09
                  0.09      0.03      0.03      0.03      0.03      0.03      0.03      0.03      0.03      0.03
                  0.03      0.03      0.03      0.01      0.01      0.01      0.01      0.01      0.01      0.01
                  0.01      0.01      0.01      0.01      0.01

 31 LG         GREEN AND AMPT LOSS RATE
                    STRTL        0.15  STARTING LOSS
                      DTH        0.25  MOISTURE DEFICIT
                     PSIF        6.60  WETTING FRONT SUCTION
                    XKSAT        0.16  HYDRAULIC CONDUCTIVITY
                    RTIMP        0.00  PERCENT IMPERVIOUS AREA

 31 UI         INPUT UNITGRAPH,  42 ORDINATES,  VOLUME = 0.99
                 641.0     641.0     641.0    1648.0    2344.0    2875.0    3257.0    3599.0    3937.0    4405.0
                4906.0    5641.0    7072.0    8283.0    7465.0    6396.0    5686.0    5182.0    4667.0    4131.0
                3741.0    3260.0    2988.0    2362.0    1841.0    1133.0    1123.0    1053.0    1006.0     641.0
                 196.0     196.0     196.0     196.0     196.0     196.0     196.0     196.0     196.0     196.0
                 196.0     196.0
                                                                  ***

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

                     HYDROGRAPH AT STATION       S1
                       FOR PLAN 1, RATIO = 0.50

    TOTAL RAINFALL =   10.24, TOTAL LOSS =    2.07, TOTAL EXCESS =    8.17

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+   50387.      3.58                11910.      2978.       1719.       1719.
                        (INCHES)     8.083      8.083       8.083       8.083
                         (AC-FT)     5906.      5906.       5906.       5906.

                       CUMULATIVE AREA =   13.70 SQ MI

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

                     HYDROGRAPH AT STATION       S1
                       FOR PLAN 1, RATIO = 0.50

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+   25194.      3.58                 5955.      1489.        859.        859.
                        (INCHES)     4.041      4.041       4.041       4.041
                         (AC-FT)     2953.      2953.       2953.       2953.

                       CUMULATIVE AREA =   13.70 SQ MI


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

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                *              *
 38 KK          *       DAM    *
                *              *
                **************

 39 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           3  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

              HYDROGRAPH ROUTING DATA

 40 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC        0.00  INITIAL CONDITION
                          X        0.00 WORKING R AND D COEFFICIENT

 41 SV            STORAGE        0.0      65.0     304.0     580.0     878.0    1196.0    1536.0    1897.0    2125.0

 42 SE          ELEVATION     2180.00   2185.00   2190.00   2195.00   2200.00   2205.00   2210.00   2215.00   2218.00

 44 SL          LOW-LEVEL OUTLET
                      ELEVL     2180.00  ELEVATION AT CENTER OF OUTLET
                      CAREA       14.10  CROSS-SECTIONAL AREA
                       COQL        0.60  COEFFICIENT
                       EXPL        0.50  EXPONENT OF HEAD

 43 SS          SPILLWAY
                       CREL     2208.00  SPILLWAY CREST ELEVATION
                      SPWID      600.00  SPILLWAY WIDTH
                       COQW        2.88  WEIR COEFFICIENT
                       EXPW        1.50  EXPONENT OF HEAD
                                                    ***
                                          COMPUTED OUTFLOW-ELEVATION DATA

          OUTFLOW       0.00     99.02    108.88    120.92    135.94    155.23    180.91    216.75    270.31    359.02
        ELEVATION    2180.00   2182.13   2182.58   2183.18   2184.01   2185.23   2187.11   2190.21   2195.87   2208.00

          OUTFLOW     415.48    802.87   1848.25   3878.71   7221.29  12203.04  19151.00  28392.19  40253.66  55062.43
        ELEVATION    2208.10   2208.40   2208.90   2209.60   2210.50   2211.60   2212.90   2214.40   2216.10   2218.00

                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00     27.69     33.48     41.29     52.19     65.00     76.21    165.82    304.00    315.33
          OUTFLOW       0.00     99.03    108.88    120.92    135.94    151.72    155.23    180.91    214.56    216.75
        ELEVATION    2180.00   2182.13   2182.58   2183.18   2184.01   2185.00   2185.23   2187.11   2190.00   2190.21

          STORAGE     580.00    631.98    878.00   1196.00   1400.00   1406.89   1427.38   1461.43   1509.06   1536.00
          OUTFLOW     262.78    270.31    303.43    339.25    359.02    415.40    803.00   1848.33   3878.72   5259.15
        ELEVATION    2195.00   2195.87   2200.00   2205.00   2208.00   2208.10   2208.40   2208.90   2209.60   2210.00

          STORAGE    1572.38   1651.79   1745.62   1853.87   1897.00   1980.70   2125.00
          OUTFLOW    7221.27  12203.06  19151.20  28392.74  32404.41  40252.99  55062.41
        ELEVATION    2210.50   2211.60   2212.90   2214.40   2215.00   2216.10   2218.00

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

                      HYDROGRAPH AT STATION      DAM
                        FOR PLAN 1, RATIO = 0.50

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
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                          (CFS)
+   15557.      4.08                3221.       1050.       705.        705.
                         (INCHES)   2.186       2.851       3.317       3.317
                          (AC-FT)   1597.       2083.       2423.       2423.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                     6-HR        24-HR       72-HR     41.58-HR
+  (AC-FT)      (HR)
     1697.      4.08                1457.       1180.        922.        922.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR        24-HR       72-HR     41.58-HR
+   (FEET)      (HR)
   2212.23      4.08              2208.82     2204.66     2200.16     2200.16

                         CUMULATIVE AREA =   13.70 SQ MI

1

              PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                                FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                              TIME TO PEAK IN HOURS

                                                                  RATIOS APPLIED TO FLOWS
 OPERATION       STATION     AREA    PLAN                 RATIO 1
                                                             0.50

 HYDROGRAPH AT
+                    S1     13.70     1   FLOW            25194.
                                          TIME              3.58

 ROUTED TO
+                   DAM     13.70     1   FLOW            15557.
                                          TIME              4.08

                                     ** PEAK STAGES IN FEET **
                                     1   STAGE          2212.23
                                          TIME              4.08


 *** NORMAL END OF HEC-1 ***
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Appendix H

Sedimentation Analysis Bibliography

Bibliography

ADWR (Arizona Dept. of Water Resources), 1985, *Design Manual for Engineering Analysis of Fluvial Systems.* Phoenix, Arizona

BUREC, 1987, *Design of Small Dams*, U.S. Government Printing Office, Denver, Colorado.

Flaxman, E.M., 1972, "Predicting Sediment Yield in Western United States," *Journal of the Hydraulics Division*, ASCE, Vol. 98 (HY12), pp. 2073-2085.

Flaxman, E.M., 1974, "Progress Report on Development of Sediment Yield Predictive Equations," *Soil Conservation Service TSC Advisory ENG-PO-32,* Portland, Oregon.

Pacific Southwest Inter-Agency Committee, 1968, *Factors Affecting Sediment Yield and Measures for the Reduction of Erosion and Sediment Yield.*

Renard, K.G., 1972, "Sediment Problems in the Arid and Semiarid Southwest," *Proceedings, 27th Annual Meeting, Soil Conservation Society of America, Portland, Oregon*, pp. 225-232.

Sellers, W.D., Hill, R.D., and Sanderson-Rae, M., 1985, *Arizona Climate*, University of Arizona Press, Tucson, Arizona.

Soil Conservation Service, 1986, *Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona.*

Wilson, E.D., Moore, R.T., and Pierce, H.W., 1957, *Geologic Map of Maricopa County, Arizona*, Arizona Bureau of Mines - University of Arizona, Tucson, Arizona, 1:375000.

Yang, C.T., 1984, "Unit Stream Power Equation for Gravel," *Journal of Hydraulic Engineering*, Vol. 110, No. 12, pp. 1783-1797.

Yang, C.T., 1991, "Comparisons of Selected Bed-Material Load Formulas," *Journal of Hydraulic Engineering*, Vol. 117, No. 8, pp. 973-989.

Appendix I

Cost Estimate

Job No.	07162-038-044	No.	

Computation

HDR

Project	Rawhide Detention Basin	Computed	MDH	Date	2/12/99
Subject		Checked		Date	
Task		Sheet	1	Of	1

Item No.	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL	
	RESERVOIR CONSTRUCTION					
1	Clear & Grub	Acres	107	$ 1,600.00	$ 171,680	
2	Prewetting Operation					
3	Develop Water Supply	LS	1	$ 50,000.00	$ 50,000	
4	Excavation (used for embankment)	CY	1,255,683	$ 1.60	$ 2,009,090	
5	Excavation (waste)	CY	145,826	$ 3.00	$ 437,480	
6	Fine Grading (basin floor)	SY	246,171	$ 0.25	$ 61,543	
7	Soil Cement (slope protection @ inlets)	SY	59,290	$ 20.00	$ 1,185,800	
	EARTH DAM EMBANKMENT CONSTRUCTION					
	Earth Embankment Construction					
8	Spread Fill	CY	1,255,683	$ 0.75	$ 941,760	
9	Compact Fill	CY	1,255,683	$ 3.00	$ 3,767,050	
10	Finish Grading (embankment slopes)	SY	273,163	$ 0.25	$ 68,290	
	Chimney Drain Construction					
11	Excavation for chimney drain (L' X 5' X 15')	CY	15,269	$ 2.50	$ 38,170	5497 ft Embankment
12	Placement of drain material (L' X 5' X 15')	CY	15,269	$ 8.00	$ 122,160	5497 ft Embankment
13	Drain collection pipe	LF	1,800	$ 5.00	$ 9,000	
14	Bypass Channel	LF	800	$ 8.00	$ 6,400	800 foot channel through the basin
	SPILLWAY CONSTRUCTION					
15	Concrete (in place)	CY	2,222	$ 295.00	$ 655,490	200' Wide, 100' Long, 3' Thick
	DOWNSTREAM IMPROVEMENTS					
16	Channel Grading	CY	2,500	$ 0.50	$ 1,250	
17	Low Level Outlet Pipe (2 Bbl 36")	LF	1,000	$ 80.00	$ 80,000	
18	Low Level Pipe Headwall Structure	LS	1	$ 3,000.00	$ 3,000	
19	Low Level Pipe Outlet Protection Structure	LS	1	$ 3,000.00	$ 3,000	
20	Jomax Road Improvements	LS	1	$ 100,000.00	$ 100,000	Based on Lost Dog Cost Est.
	SITE DEVELOPMENT					
	Access Road	LF	1,914	$ 5.00	$ 9,570	Along Powerlines
21	Utility Relocation (raise power lines)(steel towers)	LS	6	$ 200,000.00	$ 1,200,000	
22	Utility Relocation (raise power lines)(wood poles)	LS	8	$ 15,000.00	$ 120,000	
	Landscaping					
23	Salvage Existing Plants	Acres	107	$ 22,000.00	$ 2,360,600	From Feasibility Study
24	Exterior Slopes Revegetation	Acres	30	$ 44,000.00	$ 1,328,800	From Feasibility Study
25	Inside Slopes & Basin Floor Vegetation	Acres	65	$ 27,000.00	$ 1,752,300	From Feasibility Study
	BASIN MAINTENANCE (annual, not included in construction cost)					
26	Landscaping (plant growth control)	LS	1	$ 2,500.00	$ 2,500	Crew of 3 for 40 hrs. @ $62.5/hr
27	Spillway and Embankment Inspection and Control	LS	1	$ 2,500.00	$ 2,500	Crew of 3 for 40 hrs. @ $62.5/hr
28	Sediment Removal (based on 5 annual + 100year)	CY	33,000	$ 2.00	$ 66,000	
29	**SUBTOTAL BASIN CONSTRUCTION COST**				$ 16,482,433	
	MARKUPS	Percent	Amount			
30	OVERHEAD AND PROFIT	5%	$ 824,122			
31	MOBILZATION, BONDS & INSURANCE	4%	$ 659,297			
32	CONTINGENCY	20%	$3,296,487			
33	ESCALATION (@ 3% per year - one year)	3%	$ 494,473			
34	**TOTAL BASIN CONSTRUCTION COST**				$ 21,756,811.56	

Job No.	07162-038-044	No.

Computation

HDR

Project	Rawhide Detention Basin	Computed	MDH	Date	2/12/99
Subject	**Comparison of Feasibility and Current Basin Costs**	Checked		Date	
Task		Sheet	1	Of	1

DESCRIPTION	TOTAL	Feasibility	Change	Comments
RESERVOIR CONSTRUCTION				
Clear & Grub	$ 171,680.00	$ 98,843.00	$ 72,837.00	More Total Area
Prewetting Operation			$ -	
Develop Water Supply	$ 50,000.00	$ 50,000.00	$ -	
Excavation (used for embankment)	$ 2,009,090.00	$ 2,990,080.00	$ (980,990.00)	
Excavation (waste)	$ 437,480.00	$ -	$ 437,480.00	Not Separate
Fine Grading (basin floor)	$ 61,543.00	$ 47,250.00	$ 14,293.00	More Total Area
Soil Cement (slope protection @ inlets)	$ 1,185,800.00	$ 128,000.00	$ 1,057,800.00	Two Inlet Locations, Larger Area
			$ -	
EARTH DAM EMBANKMENT CONSTRUCTION			$ -	
Earth Embankment Construction			$ -	
Spread Fill	$ 941,760.00	$ 259,725.00	$ 682,035.00	More Total Fill
Compact Fill	$ 3,767,050.00	$ 1,038,900.00	$ 2,728,150.00	More Total Fill
Finish Grading (embankment slopes)	$ 68,290.00	$ 27,500.00	$ 40,790.00	More Total Area
Chimney Drain Construction			$ -	
Excavation for chimney drain (L' X 5' X 15')	$ 38,170.00	$ 10,500.00	$ 27,670.00	Longer Embankment
Placement of drain material (L' X 5' X 15')	$ 122,160.00	$ 33,600.00	$ 88,560.00	Longer Embankment
Drain collection pipe	$ 9,000.00	$ 5,000.00	$ 4,000.00	Longer Embankment
Bypass Channel	$ 6,400.00	$ -	$ 6,400.00	Not Included
			$ -	
SPILLWAY CONSTRUCTION			$ -	
Concrete (in place)	$ 655,490.00	$ 626,155.00	$ 29,335.00	On Separate Sheet
			$ -	
DOWNSTREAM IMPROVEMENTS			$ -	
Channel Grading	$ 1,250.00	$ 50,000.00	$ (48,750.00)	
Low Level Outlet Pipe (2 Bbl 36")	$ 80,000.00	$ 80,000.00	$ -	Included in Spillway for Feasibility Study
Low Level Pipe Headwall Structure	$ 3,000.00	$ 3,000.00	$ -	Included in Spillway for Feasibility Study
Low Level Pipe Outlet Protection Structure	$ 3,000.00	$ 3,000.00	$ -	Included in Spillway for Feasibility Study
Jomax Road Improvements	$ 100,000.00	$ -	$ 100,000.00	Not Included
			$ -	
SITE DEVELOPMENT			$ -	
Access Road	$ 9,570.00	$ 7,500.00	$ 2,070.00	Farther From Access
Utility Relocation (raise power lines)(steel towers)	$ 1,200,000.00	$ -	$ 1,200,000.00	Not Included
Utility Relocation (raise power lines)(wood poles)	$ 120,000.00	$ -	$ 120,000.00	Not Included
Landscaping			$ -	
Salvage Existing Plants	$ 2,360,600.00	$ 1,345,500.00	$ 1,015,100.00	More Total Area
Exterior Slopes Revegetation	$ 1,328,800.00	$ 990,000.00	$ 338,800.00	More Total Area
Inside Slopes & Basin Floor Vegetation	$ 1,752,300.00	$ 1,054,339.00	$ 697,961.00	More Total Area
(Compare to Line 29 In Cost Estimate)	**$ 16,482,433.00**	**$ 8,848,892.00**	**$ 7,633,541.00**	**Totals**