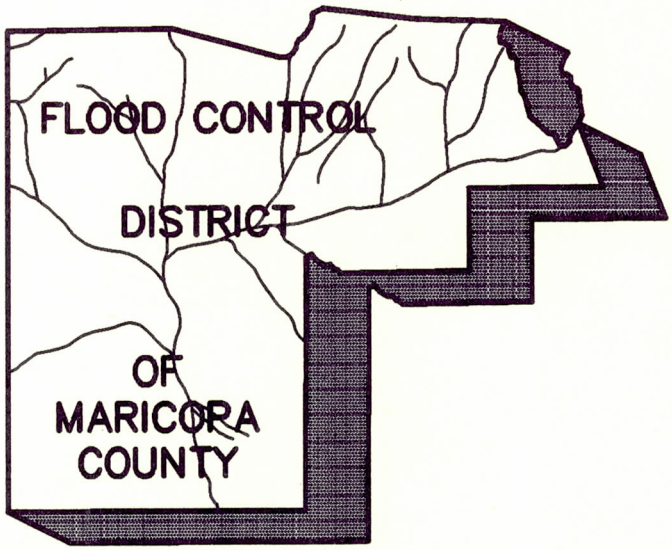
CUDIA CITY WASH TO 10TH STREET WASH WATERSHED

VOLUME 1.8

ARIZONA CANAL DIVERSION CHANNEL AREA DRAINAGE MASTER STUDY

ACDC/ADMS PHASE 1



HYDROLOGY REPORT

NOVEMBER 1994

KAMINSKI HUBBARD engineering, inc.
SURVEYING * CIVIL * HYDROLOGY

Property of
Flood Control District of MC Library
Please Return to
2801 W. Durango
Phoenix, AZ 85009

CUDIA CITY WASH TO 10TH STREET WASH WATERSHED

Volume 1.8

Arizona Canal Diversion Channel
Area Drainage Master Study
ACDC/ADMS Phase I

HYDROLOGY REPORT

November, 1994

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO. 25957
DARRYL L. BRADLEY
Date Signed 11-29-94
ARIZONA, U.S.A.

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO. 18153
JAMES O. HUBBARD
Date Signed 11/29/94
ARIZONA, U.S.A.

Prepared For:

Flood Control District Of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(60) 506-1501

Prepared By:

Kaminski-Hubbard Engineering, Inc.
4550 North Black Canyon Highway, Suite C
Phoenix, Arizona 85017
(602) 242-5588

CUDIA CITY WASH TO
10TH STREET WASH WATERSHED
HYDROLOGY REPORT

TABLE OF CONTENT

		Page No.
1.0	Synopsis	1
2.0	Introduction	4
3.0	Study Parameters	5
3.1	Study Area	5
3.2	Mapping	5
3.3	Study Criteria	6
4.0	Hydrology	8
4.1	General	8
4.2	Previous Hydrologic Investigations	8
4.3	Parameter Estimation	11
4.3.1	Drainage Area Boundaries	11
4.3.2	Rainfall Parameters	12
4.3.3	Physical Parameters	13
4.3.4	Routing Parameters	15
4.4	Special Considerations	17
4.4.1	Storm Drain Pipes	17
4.4.2	On-site Retention	17
5.0	Results and Conclusions	18
6.0	References	23

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 25957 DARRYL L. BRADLEY Date Signed 11-29-94 ARIZONA, U.S.A.

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 18153 JAMES O. HUBBARD Date Signed 11/29/94 ARIZONA, U.S.A.

LIST OF TABLES

		Page No.
Table 1	Controlling Peak Discharge (Existing Conditions)	2
Table 2	Controlling Peak Discharge (Future Conditions)	2
Table 3	Existing Peak Discharges at ACDC	20
Table 4	Future Peak Discharges at ACDC	21
Table 5	Comparison of 100-Year Peak Discharges w/ Previous Studies	22
Table 6	Point Precipitation Values for Cudia City Wash To 10th Street Wash Study Area	Section I
Table 7	Areal Precipitation Reduction Data	Section I
Table 8	6-Hour Storm Rainfall Distributions	Section I
Table 9	24-Hour Storm Rainfall Distribution	Section I
Table 10	Percent Impervious Estimates for Zoning/Land Use Classification	Section I
Table 11	Average Green-Ampt Parameters (Existing Conditions)	Section II
Table 12	Average Green-Ampt Parameters (Future Conditions)	Section II
Table 13	Existing Hydrologic Sub-Basin Characteristics (2-Year Storm)	Section III
Table 14	Existing Hydrologic Sub-Basin Characteristics (10-Year Storm)	Section III
Table 15	Existing Hydrologic Sub-Basin Characteristics (100-Year Storm)	Section III
Table 16	Summary of Sub-Basin Peak Discharges (Existing Conditions)	Section III
Table 17	Future Hydrologic Sub-Basin Characteristics (2-Year Storm)	Section III
Table 18	Future Hydrologic Sub-Basin Characteristics (10-Year Storm)	Section III
Table 19	Future Hydrologic Sub-Basin Characteristics (100-Year Storm)	Section III
Table 20	Summary of Sub-Basin Peak Discharges (Future Conditions)	Section III

CUDIA CITY WASH TO
10TH STREET WASH WATERSHED
HYDROLOGY REPORT EXHIBITS

LIST OF PLATES & FIGURES

		Page No.
Figure 1	Vicinity Map	3
Plate 1	Drainage Area Map & HEC-1 Schematic (Existing Conditions)	Section VIII
Plate 2	Drainage Basin Land Use Map (Existing Conditions)	Section VIII
Plate 3	Soil Classification Map (Existing Conditions)	Section VIII
Plate 4	Flow Routing Map (Existing Conditions)	Section VIII
Plate 5	Drainage Area Map and HEC-1 Schematic (Future Conditions)	Section VIII
Plate 6	Drainage Basin Land Use Map (Future Conditions)	Section VIII
Plate 7	Soil Classification Map (Future Conditions)	Section VIII
Plate 8	Flow Routing Map (Future Conditions)	Section VIII

APPENDIX

SECTION I	Rainfall and Physical Hydrologic Parameters
SECTION II	Green-Ampt & Land Use Parameters
SECTION III	Hydrologic Sub-Basin Characteristics
SECTION IV	Hydrograph Routing Parameters
SECTION V	Divert & Onsite Retention Parameters
SECTION VI	HEC-1 Hydrology Results, 100-Year 24-Hour Storm (Existing Conditions)
SECTION VII	HEC-1 Hydrology Results, 100-Year 24-Hour Storm (Future Conditions)
SECTION VIII	Plates 1-8
SECTION IX	HEC-1 Data Files On Computer Diskette

1.0 SYNOPSIS

Kaminski-Hubbard Engineering, Inc. (KHE) was retained by the Flood Control District of Maricopa County (FCDMC) to prepare a comprehensive hydrologic analysis of the watershed contributing to the Arizona Canal Diversion Channel (ACDC) from Cudia City Wash to 10th Street Wash for existing and future conditions. This study area, as indicated in Figure 1, is one of several subwatersheds analyzed as a part of the ACDC Area Drainage Master Study (ADMS). This watershed drains the southern portion of the Phoenix Mountains from the 10th Street Wash boundary to the Indian Bend Wash boundary.

Within the watershed, twelve sub-basin area groupings were defined to address the precipitation depth/areal reduction issue for side inflow to the ACDC. The size of area groupings ranged between 0.25 square miles to 4.82 square miles.

There are seven existing detention basins within the watershed that collect runoff from the Phoenix Mountains for flood control purposes. The largest of these detention basins is impounded behind the Dreamy Draw Dam. These detention basins greatly reduce the amount of runoff reaching the ACDC from the Phoenix Mountains. The only significant future condition improvement would be the extension of the Squaw Peak Highway from Northern Avenue to Shea Boulevard.

This report presents the hydrologic analysis of the Cudia City Wash to 10th Street Wash watershed for both existing and future conditions upstream of the ACDC. Table 1 summarizes the controlling peak discharges for existing conditions at specific locations along the ACDC. Table 2 presents the controlling peak discharges for future conditions.

TABLE 1

Controlling Peak Discharge (Existing Conditions)

Location	Drainage Area (Sq. Mi.)	2-Yr. (cfs)	10-Yr. (cfs)	100-Yr. (cfs)
Cudia City Wash	4.82	589	2,512	5,411
Stanford Drive Wash	1.17	131	551	1,329
Flynn Lane Wash	1.04	121	577	1,114
Myrtle Avenue Wash	0.80	137	535	1,115
Dreamy Draw East	0.68	154	664	1,230
Dreamy Draw	1.97	141	416	852
Northern Avenue	0.99	95	459	900

TABLE 2

Controlling Peak Discharge (Future Conditions)

Location	Drainage Area (Sq. Mi.)	2-Yr. (cfs)	10-Yr. (cfs)	100-Yr. (cfs)
Cudia City Wash	4.82	726	2,899	5,750
Stanford Drive Wash	1.17	170	644	1,479
Flynn Lane Wash	1.04	148	608	1,152
Myrtle Avenue Wash	0.80	141	532	1,146
Dreamy Draw East	0.68	183	730	1,358
Dreamy Draw	2.07	140	422	897
Northern Avenue	0.98	123	504	966

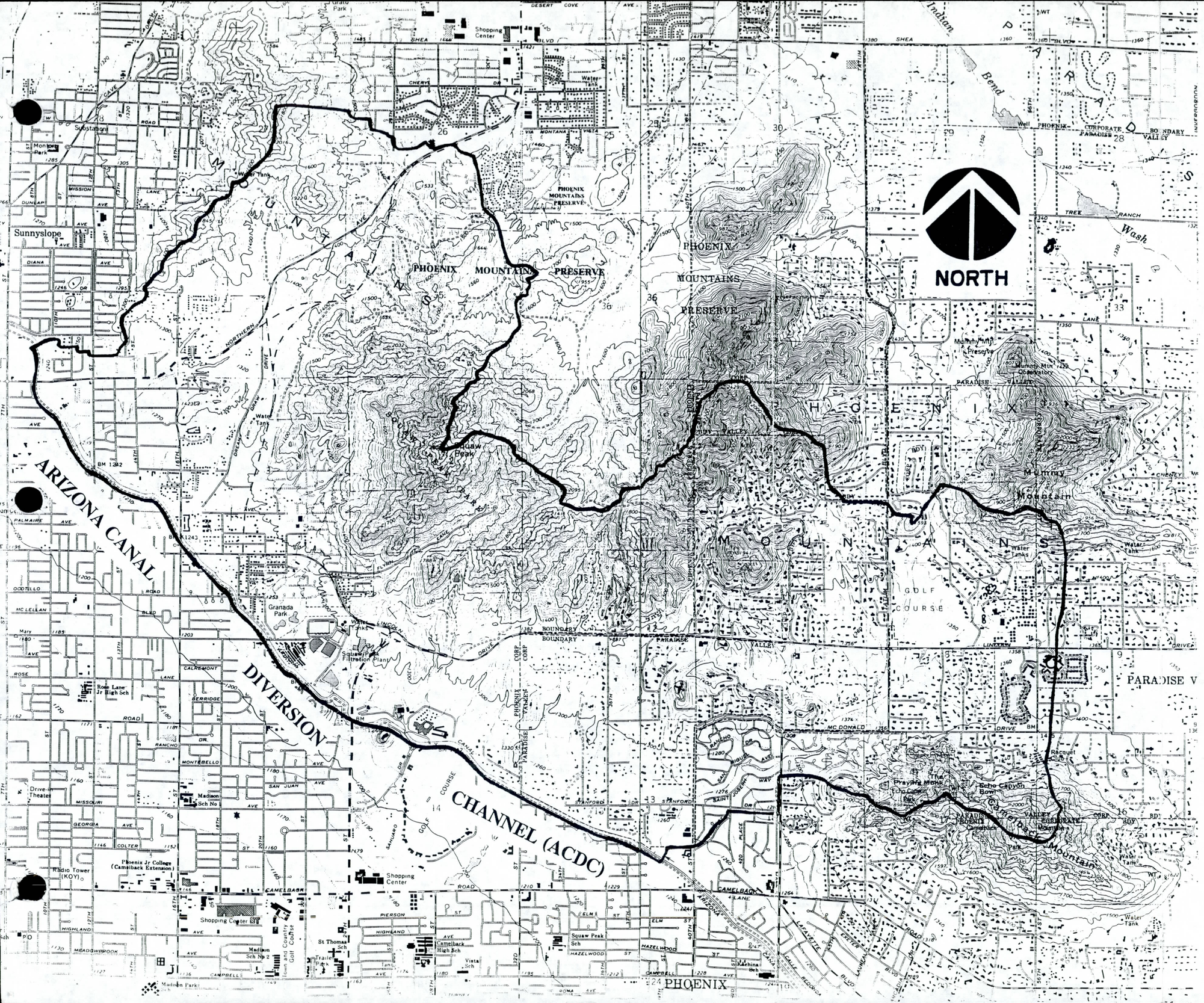


FIGURE 1 - VICINITY MAP

2.0 INTRODUCTION

A hydrologic analysis of the Cudia City Wash to 10th Street Wash watershed for both existing and future conditions was developed by Kaminski-Hubbard Engineering, Inc. (KHE) for the Flood Control District of Maricopa County (FCDMC) as part of the Arizona Canal Diversion Channel (ACDC) Area Drainage Master Study (ADMS), Phase I. The majority of flows contributing to the ACDC originate from the Phoenix Mountains. The watershed is bounded by the Indian Bend Wash boundary to the east and the 10th Street Wash boundary to the west.

The watershed contains seven existing detention basins that significantly affect the amount of runoff reaching the ACDC. The largest detention basin is impounded by the Dreamy Draw Dam and was modelled in the U.S. Army Corps of Engineers (COE) 1982 hydrology study (Ref. 16). However, the other detention basins were not included in the COE model which have necessitated a revision to this hydrologic analysis.

Currently, the Squaw Peak Highway from Glendale Avenue to Northern Avenue has an impact on the original flow patterns in the Dreamy Draw area. Associated with the highway improvements was the construction of the Myrtle Wash detention basin. For future considerations, the Squaw Peak Highway will be extended through the Dreamy Draw area from Northern Avenue to Shea Boulevard. These improvements will not greatly affect the flow patterns in the area.

This report presents the existing and future hydrologic analysis for the watershed contributing to the ACDC from Cudia City Wash to 10th Street Wash. The hydrology was developed using the FCDMC's new design criteria and included detention basin modelling excluded from the previous COE report (Ref. 16).

3.0 STUDY PARAMETERS

3.1 Study Area

The watershed contributing storm runoff to the ACDC from Cudia City Wash to 10th Street Wash contains approximately 13.1 square miles. The watershed is characterized by moderate to steep mountains having moderate vegetation. The watershed is bounded by the Phoenix Mountains to the north, the Indian Bend Wash boundary to the east, the ACDC and Camelback Mountain to the south, and the 10th Street Wash boundary to the west.

The watershed was divided into twelve sub-basin area groupings having concentration points at the ACDC. The contributing areas at each concentration point range between 0.25 square miles to 4.82 square miles. The largest sub-basin area grouping is the subwatershed contributing to the Cudia City Wash. The Cudia City Wash outlet is the beginning of the ACDC and drains approximately 4.8 square miles.

The watershed contains seven detention basins which are included in the computer model. The largest detention basin is Dreamy Draw Dam, which has a contributing area of 1.30 square miles. The Myrtle Wash detention basin is located upstream of the Squaw Peak Parkway and provides detention storage for parkway drainage. Two detention basins are located within the Squaw Peak Park boundaries. The remaining three detention basins are situated to collect runoff from the Phoenix Mountains to lessen its effect on the downstream residential areas.

The extension of the Outer Loop Highway (OLH) from Northern Avenue to Shea Boulevard will slightly modify drainage patterns near the Dreamy Draw area for future conditions.

3.2 Mapping

The available mapping utilized in this study are as follows:

1. **FCDMC Mapping:** The watershed was flown as a part of this study for the purpose of obtaining 1 inch = 400 foot contour and aerial mapping. The contour interval is 2 feet. These maps were flown between November 1990 and August 1991. These maps were used to establish the sub-basin drainage delineation, flow patterns, and storage volume calculations for detention facilities. The aerial maps were also utilized to provide land use information for existing conditions.

2. **USGS Quadrangle Maps:** Paradise Valley and Sunnyslope, Arizona, 7.5 minute series. The horizontal scale is 1 inch = 2000 feet. The contour interval is 20 feet. These maps were photo revised in 1982.

3. **City of Phoenix Storm Drain Maps:** These maps are at a scale of 1 inch = 400 feet and provide a schematic location of storm drains and culverts in the area.

4. **City of Phoenix Zoning Maps:** These maps are at a scale of 1 inch = 400 feet and provide zoning designations and boundaries in the area.

5. **Construction Plans:** Construction plans for drainage structures associated with Lincoln Drive, McDonald Drive, Tatum Boulevard, Glendale Avenue, Northern Avenue, 16th Street, 32nd Street, 40th Street, and 44th Street were used for routing and sub-basin delineation purposes. Construction plans for the following detention basins were utilized for reservoir routing purposes: Dreamy Draw Dam; Myrtle Wash detention basin; Squaw Peak Park Detention Basin Nos. 1 and 2; Detention Basin Nos. 4 and 6; and the Biltmore Mountain Estates detention basin. Construction plans for the ACDC were used to determine sub-area grouping concentration points. Construction plans for the Squaw Peak Highway from Glendale Avenue to Shea Boulevard were used for drainage delineation purposes.

6. **General Plan for Phoenix:** This general plan was used to determine the extent of future development. Areas of future parks, open-spaces, and traffic corridors were considered during the future hydrologic analysis.

7. **Field Reconnaissance:** Field investigations were undertaken to verify hydrologic information obtained from aerial and topographic mapping. Areas of new development or developments under construction and existing on-site retention areas were identified. All major drainage structures within the watershed were identified. The flow paths of all major mile and half-mile streets were identified. Some drainage patterns were documented for local streets.

3.3 Study Criteria

The following criteria and guidelines were set forth by the FCDMC prior to and during the drainage study:

1. Hydrology calculations will be completed for the 2-, 10-, and 100-year storms;

2. Storm durations of 6- and 24-hour will be evaluated for all three storms;

3. The U.S. Army Corps of Engineers (COE) HEC-1 computer program will be used for hydrograph computations;

4. Sub-basins will be limited to a maximum of five square miles in area;

5. The Clark Unit Hydrograph method will be utilized;

6. The Green-Ampt Loss Method will be utilized for estimation of precipitation losses;

7. The Maricopa County Unit Hydrograph Procedure 1 (MCUHP1) computer program, as provided by the FCDMC, will be used to compute times of concentration and storage coefficients for the Clark Unit Hydrograph Method.

8. Rainfall distributions and depth-area relations for the 6-hour storm duration will be based on NOAA HYDRO-40 (Ref. 21) and COE (Ref. 15) data, as presented in the FCDMC's Drainage Design Manual (Ref. 6). This data is included in the MCUHP1 program to develop areal reduction for the watershed.

9. The SCS Type II rainfall distribution will be used for the 24-hour storm, with corresponding depth-area ratios based on NOAA HYDRO-40 (Ref. 21). This data is included in the MCUHP1 program.

10. Existing and future flow rates are to be determined.

11. Transmission losses will be estimated based on existing field data or literature. Existing field data or literature was not available to estimate infiltration losses. Due to this study's detailed determination for the watershed roughness coefficient (Kb), the exclusion of transmission losses has little impact on the flow peaks and volumes.

4.0 HYDROLOGY

4.1 General

The existing and future hydrology for the Cudia City Wash to 10th Street Wash watershed was analyzed for the 2-, 10-, and 100-year storms. The 6- and 24-hour storm durations were evaluated for all three storms. The Cudia City Wash to 10th Street Wash watershed was modeled using the COE HEC-1 computer program. The May, 1991, version of HEC-1 was used for this study. The Clark Unit Graph, the Green-Ampt Loss Rate, and the Muskingum-Cunge Routing options were used in the HEC-1 computer model. The HEC-1 modeling also included allowances for routing hydrographs through detention basins using the Modified Puls Method. This section describes the assumptions and methodologies used to develop the HEC-1 computer model for existing and future conditions within the Cudia City Wash to 10th Street Wash watershed.

4.2 Previous Hydrologic Investigations

Previous hydrologic investigations of the watershed were reviewed for historical, as well as, hydrologic information that could be used as part of our analysis for both existing and future conditions. Particular attention was given to hydrologic modeling techniques, sub-basin delineation, storm frequency and duration, reach routing methods, location of concentration points, treatment of detention basin areas, and location of future drainage structures. A brief summary of previous investigations performed for the Cudia City Wash to 10th Street Wash watershed are presented below.

Gila River Basin, New River and Phoenix City Streams, Arizona, Design Memorandum No. 2, Hydrology Part 2 (Ref. 16)

In 1982, a hydrologic investigation was performed by the COE for flood control projects in the Phoenix area. The COE procedure of watershed modelling is to determine the Standard Project Flood (SPF) that would result from the most severe combination of meteorologic and hydrologic conditions that are considered reasonable for the area. The lesser storm frequency events are calculated as a percentage of the SPF. As an example, the 100-year peak discharge is 45 percent of the SPF.

The Cudia City Wash to 10th Street Wash watershed was divided into seven sub-basins and evaluated for future fully developed conditions. The COE uses local dimensionless S-graphs to produce hydrographs from the rainfall excess.

Cudia City Wash Runoff Analysis (Ref. 23)

In 1986, a hydrologic investigation was performed by W.S. Gookin and Associates (WSG) for the Cudia City Wash watershed. Cudia City Wash drains a 5.12 square mile watershed bounded by the eastern slopes of the Phoenix Mountains, the southern slope of Mummy Mountain, and the west half of the northern slope of Camelback Mountain.

The watershed was divided into fourteen sub-basins. The SCS Method was used to compute a hydrograph of each sub-basin for the 100-year, 24-hour duration storm. A 100-year, 24-hour storm precipitation depth of 3.8 inches was used in conjunction with a Type IIA rainfall distribution. A Lotus spreadsheet was used to combine and route the sub-basin hydrographs.

Review of W.S. Gookin and Associates Analyses of Cudia City Wash Hydrology (Ref. 7)

The FCDMC perform a review of the WSG report for the Cudia City Wash watershed. The following concerns with the hydrologic model were discovered for the study area: inappropriate design rainfall depth and distribution, too long a computation interval, in appropriate combining and routing of hydrographs from various sub-basins, and suspect times of concentration.

The FCDMC created a HEC-1 computer model for the watershed using the WSG modelling parameters. The kinematic wave method was used for hydrograph routing. The HEC-1 model peak discharge results from each sub-basin ranged between 19% - 51% lower than the WSG estimates. However, the final routed and combined HEC-1 model result at the Arizona Canal was 13% greater than the WSG result.

The FCDMC developed their own independent HEC-1 model for the Cudia City Wash watershed. A combination of the kinematic wave and SCS methods were used to generate hydrographs from the study area. The kinematic wave option was used on urbanized basins having moderately steep slopes. The SCS method was used on two sub-basins having steep slopes. A 100-year, 24-hour storm depth of 4.04 inches and the City of Phoenix storm distribution was used.

Final Drainage Report, SR-51 Squaw Peak Hwy., Glendale Avenue to Northern Avenue (Ref. 8)

The drainage design concept for the Squaw Peak Highway from Glendale Avenue to Northern Avenue was prepared by Howard Needles Tammen and Bergendoff (HNTB) for the Arizona Department of Transportation (ADOT). The project area is located near the western boundary of the Phoenix Mountain Preserve and is characterized by numerous steep washes flowing westerly to the Squaw Peak Highway.

The study area was divided into ten sub-basins, of which, the area contributing to Myrtle Wash is the largest. The two northernmost and southernmost sub-basins contribute directly to the Dreamy Draw East Wash. The middle five areas flow into a detention basin and storm drain system located at the Pointe development. The Dreamy Draw East Wash eventually discharges into Myrtle Wash, which outfalls into the ACDC.

The Myrtle Wash detention basin was designed to provide 100-year detention storage for flows generated from the Squaw Peak Highway and a residential subdivision area east of the highway. This basin is necessary to maintain the peak flow in Myrtle Wash downstream of the highway to pre-existing conditions. The pavement drainage structures and storm drain systems were designed for the 10-year return period. The cross drainage culverts at Myrtle Wash, Pleasant Drive, and Dreamy Draw Wash were design for the 100-year return period. All other cross drainage pipe culverts were designed for the 50-year return period.

Final Drainage Report for Squaw Peak Hwy., Section 2, Northern Avenue to 29th Street (Ref. 11)
The drainage design concept report for the Squaw Peak Highway from Northern Avenue to 29th Street was prepared by Urban Engineering for the ADOT. The project area is located in the Dreamy Draw watershed and is characterized by steep washes flowing southwesterly to the Squaw Peak Highway. Dreamy Draw Dam is a major flood control structure constructed by the COE within the watershed.

The watershed is divided into two components, onsite and offsite areas. The onsite areas consist of pavement and median areas associated with the Squaw Peak Highway. The rational method was used to determine onsite runoff for a 10-year return period. The intensity factor was determined using a time of concentration of 10 minutes. The offsite hydrology impacting the highway was developed by Baker Engineers (Ref. 1). This report identified twenty-two sub-basins within the Dreamy Draw watershed that impact the project. Baker Engineers used the COE HEC-1 program to determine the peak discharges for 50- and 100-year frequency storms using the SCS Method. Based on an evaluation of the watershed by Urban Engineering, additional sub-basins were developed which directly impact the project.

Final Drainage Report for Squaw Peak Hwy. - SR-51, Section 3, 29th Street to Shea Boulevard (Ref. 4)
The drainage plan for the Squaw Peak Highway from 29th Street to Shea Boulevard was prepared by Entranco Engineers for the ADOT. The project is located within the northern foothills of the Phoenix Mountains, which is northeast of the Dreamy Draw Dam. The overland flow in the area is typically to the north-northeast. However, an existing detention basin at 32nd Street and Mountain View Road is drained to the Dreamy Draw Dam.

A General Plan Drainage Report was prepared by Baker Engineers for the Squaw Peak Highway (Ref. 1). The study area was found to have two main drainage basins resulting from a crest in the Squaw Peak Highway at Station 173+30. West of the crest, drainage will flow to the southwest toward Dreamy Draw Dam. East of the crest, drainage will flow north to the Indian Bend Wash. The trunk line that drains the area west of the crest begins at the above mentioned detention basin and outfalls into the Dreamy Draw Dam. Along the trunk line offsite and onsite pavement drainage enters the system.

East of the crest, the basin is drained by two trunk lines. Onsite pavement drainage from the Squaw Peak Highway is collected an conveyed by one trunk line to a temporary detention basin south of Shea Boulevard. In the future, this line will extend northward and discharge into the Indian Bend Wash near Thunderbird Road. Offsite flows are collected and conveyed by the second trunk line to a detention basin south of Shea Boulevard. In the future, this trunk line will connect with the existing 78-inch storm drain in Shea Boulevard which outlets to the Indian Bend Wash.

4.3 Parameter Estimation

4.3.1 Drainage Area Boundaries

Existing Condition

The initial delineation of sub-basins for the Cudia City Wash to 10th Street Wash watershed was developed using information presented in previous drainage reports (Ref. 1, 8, 16 & 23). Next, this initial delineation was evaluated using the new 1-inch to 400 feet topographic and aerial maps flown as a part of this study. Particular attention was given to the areas contributing to detention basins and major roadway cross drainage structures. The initial delineation was also supplemented by construction drawings of major collector streets and the Squaw Peak Highway.

The initial delineation was then verified or revised based on field investigations. This field investigation included driving major mile and half-mile streets to distinguish flow pattern. These flow patterns were recorded and later referred to during time of concentration calculations for each sub-basin. The field investigations also included the determination of onsite retention locations and non-contributing areas within the watershed. The non-contributing areas were evaluated for each storm frequency. A parcel area labeled as non-contributing for a two-year storm may be contributing for a 10- and 100-year storm analysis.

The sub-basins were delineated so that concentration points were provided at major street intersections, impoundment areas and stream confluences. Concentration points were also located such that comparisons could be made with other hydrologic investigations. The major concentration points along the ACDC were chosen at major wash inlets to the channel based on sub-basin area groupings. The sub-basin delineations are presented in Plate 1 for existing conditions.

Future Condition

The drainage delineation for future conditions were predominantly the same as presented for the existing conditions. However, a slight modification was made within the Dreamy Draw sub-basin area grouping as a result of the Squaw Peak Highway extension from Northern Avenue to Shea Boulevard. The modified delineations were taken from drainage plans developed for ADOT by various consultants (Ref. 4, 11, 12, & 13). Based on this information and other discussions with the FCDMC, the sub-basin delineations are as shown in Plate 5.

4.3.2 Rainfall Parameters

Rainfall Distributions

The rainfall distribution used for the 6-hour storm duration are as documented in the FCDMC's Drainage Design Manual (Ref. 6) and contained in the MCUHP1 program. The SCS Type II distribution was used for the 24-hour storm. The rainfall distributions are presented in Tables 8 & 9 in Section I of the Appendix.

Precipitation Data

The point precipitation values were obtained using the NOAA Atlas isopluvial maps for Maricopa County, Arizona. The point precipitation values are presented in Table 6 in Section I of the Appendix.

Areal Reduction Factors

The point precipitation values used for the various sub-basin area groupings were adjusted to account for the reduction in precipitation depth over a spatial area. Reduction factors for the 6-hour duration storms were obtained from the FCDMC's Drainage Design Manual (Ref. 6). This information was also included in the FCDMC's MCUHP1 program. The 24-hour storm reduction factors were obtained from the NOAA Technical Memorandum NWS HYDRO-40 (Ref. 21). These factors are presented in Table 7 in Section I of the Appendix.

4.3.3 Physical Parameters

Loss Rate Estimation

The Green-Ampt loss rate method in HEC-1 was used to estimate rainfall losses for both existing and future conditions. This method involves a two phase process in simulating rainfall losses. The first phase involves no infiltration of rainfall until the accumulated rainfall equals the initial loss (IA). Recommended IA values are presented in Table 4.1 in the Drainage Design Manual (Ref. 6).

The second phase is the infiltration of rainfall into the soil immediately after IA is completely satisfied. The three Green-Ampt infiltration parameters as coded in HEC-1 are: hydraulic conductivity at natural saturation (XKSAT); wetting front capillary suction (PSIF); and volumetric soil moisture deficit at the start of rainfall (DTHETA).

The Green-Ampt parameters were determined using a spreadsheet provided by the FCDMC, Watershed Management Branch. The XKSAT values were determined by the FCDMC for all map units contained in the SCS Soil Survey (Ref. 19) using log averaging of major and minor soil XKSAT values. These map units along with their corresponding XKSAT and percent rock outcrop values are presented in lookup tables within the Green-Ampt Spreadsheet.

The area of each soil unit within each sub-basin was determined and used as input into the Green-Ampt Loss Parameter spreadsheet. The soil units within each sub-basin are shown on Plate 3 for existing conditions and Plate 7 for future conditions. These area calculations were determined using ARC INFO GIS. The spreadsheet subsequently computed average sub-basin XKSAT values using log averaging methods. Next, values for PSIF and each DTHETA condition (i.e. dry, normal, wet) were interpolated using the computed XKSAT. These tables were contained within the spreadsheet and were similar to Table 4.2 in Drainage Design Manual (Ref. 6).

The computed Green-Ampt parameters were based strictly on soil characteristics and adjustments were necessary to account for vegetative cover and land use. These guidelines are presented in the FCDMC's Drainage Design Manual (Ref. 6) and are incorporated in the Green-Ampt Loss Parameter Spreadsheet. The area of each land use within each sub-basin was also determined and used as input into the spreadsheet. The various land uses categories within each sub-basin are shown on Plate 2 for existing conditions and Plate 6 for future conditions. Again, these area calculations were performed using ARC INFO GIS.

The "percent impervious" for each sub-basin was computed as a function of both natural rock outcrop and land use. The percentage of impervious rock outcrop within each sub-basin was estimated from soil unit data provided in the SCS Soil Survey (Ref. 19). A factor of 0.6 was used to convert the "percentage of rock outcrops" to the "percent impervious" for each sub-basin.

Next, the impervious areas associated with various land use categories were determined for each sub-basin. The City of Phoenix zoning designations were classified into land use categories based on aerial mapping and are presented in Table 10 in Section I of the Appendix.

The total "percent impervious" value for each sub-basin was computed as a summation of the above two "percent impervious" values. This computation was also incorporated into the Green-Ampt Loss Parameter spreadsheet. The average Green-Ampt parameters for existing and future conditions are presented in Tables 11 and 12, respectively in Section II of the Appendix.

Time Of Concentration

The Clark Unit Hydrograph method requires the estimation of the time of concentration, T_c. The following empirical equation was used to compute the time of concentration as a function of watershed characteristics (Ref. 6):

$$T_c = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$$

where:

T_c = time of concentration, in hours.

L = length of the flow path for T_c, in miles.

K_b = representative watershed resistance coefficient.

S = watercourse slope, in feet/mile.

i = the average rainfall excess intensity, during the time T_c, in inches/hour.

The length of the flow path for T_c and its corresponding slope within each sub-basin were determined using 1 inch to 400 feet topographic maps. Street flow patterns observed from the field investigations were also used to determine the flow path for T_c considerations. The MCUHP1 program, as provided by the FCDMC, was used to calculate the time of concentration, T_c, and storage coefficient, R, for each sub-basin.

The watershed resistance coefficient, K_b, necessary to determine T_c was estimated using the following equation (Ref. 6):

$$K_b = m \log A + b$$

where:

K_b = watershed resistance coefficient.

A = drainage area, in acres.

m&b = parameters dependent on land use and vegetation cover.

The watershed resistance coefficient, K_b, for each sub-basin was weighted to account for varying roughness conditions associated with mixed land use classifications. The land use classifications within each sub-basin were categorized into roughness types using the descriptions presented in Table 5.1 (Ref. 6). All vacant areas were placed under the category of moderately high roughness (Type C). Low and very low density residential areas were labelled as having moderately low roughness (Type B). Medium density and multi-family residential areas were placed under the category of minimal roughness (Type A).

The time of concentration flow paths for existing and future conditions are presented in Plate 4 and 8, respectively. The hydrologic sub-basin characteristics for existing conditions are presented in Tables 13, 14 and 15 in Section III of the Appendix. The characteristics for future conditions are presented in Tables 17, 18 and 19 in Section III of the Appendix.

4.3.4 Routing Parameters

Channel Routing

For this study, the Muskingum-Cunge method was used to route a hydrograph through a downstream sub-basin. Channel cross-section information, slopes, and Manning's roughness coefficients were estimated using topographic mapping and observations made during the field investigation. Channel routing flow paths for existing and future conditions are presented in Plates 4 and 8, respectively. Channel routing work sheets are presented in Section IV of the Appendix.

Existing field data or literature was not available to estimate infiltration losses. Based on the watershed topography and this study's detail for the watershed resistance coefficient, not including transmission losses has little impact on the flow peaks and volumes.

Reservoir Routing

The Modified Puls method was used for reservoir routing through a detention basin. A total of seven detention basins were located within the Cudia City Wash to 10th Street Wash watershed. The largest detention basin was impounded behind the Dreamy Draw Dam as a part of the COE flood control plan for Phoenix. The reservoir routing parameters were obtained from the COE report for Dreamy Draw Dam (Ref. 14), verified by KHE, and used in this study.

There are two detention basins, Nos. 1 and 2, located within the Squaw Peak Park boundaries that control the amount of runoff from the Phoenix Mountains. Both detention basins are drained by 24-inch diameter concrete pipes with parking lots functioning as overflow spillways. The storage volumes were determined using 1 inch to 400 feet topographic maps. The overflow spillway sections were surveyed for weir flow calculations.

The North Mountain Detention Basin No. 4 is located north of Northern Avenue between 18th Street and the Squaw Peak Highway. This basin limits the amount of runoff from the Phoenix Mountains that ultimately reach the ACDC south of Northern Avenue. This basin is drained by a 27-inch concrete pipe having a 16-inch by 12-inch orifice inlet. The overflow spillway width is approximately 80 feet. The storage volume was determined using 1 inch to 400 feet topographic maps.

Detention Basin No. 6 is located west of the Squaw Peak Highway and north of Orangewood Avenue within the Pointe development. This basin collects offsite runoff and conveys the low level flows under the Dreamy Draw Condominiums through a 12-inch corrugated metal pipe. The storage volumes were determined using 1 inch to 400 feet topographic maps.

The Myrtle Wash detention basin is located east of the Squaw Peak Highway and just north of Myrtle Wash. This basin provides detention storage for flows generated from the Squaw Peak Highway and a portion of the residential subdivision east of the basin. The reservoir routing parameters were obtained from the HNTB report for the Myrtle Wash detention basin (Ref. 8).

The Biltmore Mountain Estates detention basin is located north of Lincoln Drive and east of Arizona Biltmore Circle. Due to the relatively small capacity of the detention basin, the 100-year peak discharge is not significantly impacted. Therefore, the basin is modelled in HEC-1 as a diversion for the 100-year frequency storms. The diversion is such that the runoff volume, up to the storage capacity of the basin, is diverted out of the watershed. However, the reservoir routing parameters for the basin are used for the 2- and 10-year storm analysis.

The detention storage calculations for the above basins are presented in Section IV of the Appendix. Section IV also contains discharge calculations for both low flow and overflow spillways. In some cases, the pipe and weir flow parameters are also presented as input to the model.

4.4 Special Considerations

4.4.1 Storm Drain Pipes

There are very few storm drain pipes within this watershed. These storm drain systems do not significantly affect the drainage patterns within the watershed, i.e., flows diverted out of the watershed area or from one sub-basin to another. Therefore, all storm drain systems were ignored in the HEC-1 model.

4.4.2 Onsite Retention

The City of Phoenix requires that all new developments retain the 100-year 2-hour duration storm volume that falls onsite. Field investigations within the watershed found that a majority of lots had no onsite retention or minimal retention at best. A few commercial and industrial sites constructed in the last few years had complied with the onsite retention requirements. However, there was no detailed mapping available to accurately determine the retention volume for a given site, much less whether they were 10- or 100-year volumes. Therefore, the retention volume for the parcels in question were assumed to retain the 10-year 2-hour storm volume. The total estimated retention volume for each sub-basin was subtracted from the bottom of the hydrograph by diverting the estimated volume. These computations are presented in Section V of the Appendix.

Particular attention was placed on determining the non-contributing areas associated with a 2-year storm. Those areas that required onsite volume computations were automatically labeled as non-contributing. Next, impervious area associated with land use were assumed to contribute 100% of their areas. The remaining pervious areas were assumed to be non-contributing. These computations are presented in Section V of the Appendix.

5.0 RESULTS AND CONCLUSIONS

The HEC-1 computer model was used to compute the 2-, 10-, and 100-year peak discharges for existing and future conditions within the Cudia City Wash to 10th Street Wash watershed. The 6-hour and 24-hour events were evaluated using the Clark Unit Hydrograph method for each storm frequency. The hydrologic analysis for both existing and future conditions was developed through the consolidation of previous hydrologic investigations and verifying or updating that information with new topographic mapping and our own field investigations.

The existing peak discharge results for the Cudia City Wash to 10th Street Wash watershed are summarized in Table 3. The future peak discharge results of this study are presented in Table 4. Evaluation of the results indicate that larger peak discharges occur from a 6-hour duration storm for all three (3) recurrence intervals.

The total watershed area contributing to the ACDC from Cudia City Wash to 10th Street Wash is approximately 13.1 square miles. However, this study was interested only in side inflows to the ACDC and not the combining and routing of flows within the ACDC. Therefore, sub-basin area groupings were developed to determine the contributing areas at twelve inflow locations along the ACDC. These sub-basin area groupings were also used for precipitation depth/areal reduction purposes.

Six of the seven detention basins within the watershed were found to have sufficient capacity to detain the 100-year 24-hour duration storm runoff. These detention basins provide flood protection against storm runoff from the Phoenix Mountains. Low level outflows from these basins were routed downstream and did not significantly contribute to the downstream peak discharges.

The Biltmore Mountain Estates detention basin had insufficient storage to detain the 100-year 24-hour storm runoff. This detention basin was modelled as a 5.4 acre-feet of storage volume diversion from its corresponding sub-basin peak discharge. For the 2- and 10-year storm frequencies, the reservoir storage parameters are included in the HEC-1 model.

A comparison between this study's 100-year 6-hour future peak discharge results and the results of previous investigations are presented in Table 5. The KHE peak discharge results are considerably lower than the COE results at certain side inflow locations along the ACDC. The only detention basin modelled by the COE was the impoundment area behind the Dreamy Draw Dam. The difference in drainage areas was attributed to the COE sub-basin delineation on 7.5 minute quadrangle maps and this study's 1 inch to 400 feet topographic maps.

TABLE 3

Existing Peak Discharges
At ACDC (CFS)

Location	HEC-I.D.	2-Year		10-Year		100-Year		100-Year 24-Hour Time To Peak (Hrs.)
		6 Hr.	24 Hr.	6 Hr.	24 Hr.	6 Hr.	24 Hr.	
Cudia City Wash	107DC	589	571	2,512	2,336	5,085	5,411	12.3
Taward Wash	110DC	73	48	233	140	453	304	12.1
Stanford Drive Wash	112DC	131	72	551	380	1,329	1,083	12.1
Cunningham Wash	113DC	105	64	480	264	853	516	12.1
Biltmore	115DC	68	40	289	158	1,048	612	12.1
Treatment Plant	116DC	205	106	478	241	757	430	12.0
Maryland Avenue	117DC	40	14	324	144	622	337	12.1
Flynn Lane Wash	121DC	121	72	577	352	1,114	778	12.1
Myrtle Avenue Wash	124DC	137	71	535	337	1,115	811	12.3
Dreamy Draw East	126DC	154	93	664	407	1,230	822	12.1
Dreamy Draw	129DC	141	119	416	320	852	719	12.4
Northern Avenue	131DC	95	60	459	306	900	659	12.1

TABLE 4

Future Peak Discharges
At ACDC (CFS)

Location	HEC-I.D.	2-Year		10-Year		100-Year		100-Year 24-Hour Time To Peak (Hrs.)
		6 Hr.	24 Hr.	6 Hr.	24 Hr.	6 Hr.	24 Hr.	
Cudia City Wash	107DC	716	726	2,899	2,557	5,412	5,750	12.3
Taward Wash	110DC	82	53	249	149	483	320	12.1
Stanford Drive Wash	112DC	170	101	644	445	1,479	1,184	12.1
Cunningham Wash	113DC	137	82	517	279	914	551	12.1
Biltmore	115DC	116	69	519	203	1,274	738	12.1
Treatment Plant	116DC	214	110	493	250	781	440	12.0
Maryland Avenue	117DC	56	23	348	162	645	355	12.1
Flynn Lane Wash	121DC	148	88	608	372	1,152	811	12.1
Myrtle Avenue Wash	124DC	141	75	532	338	1,146	825	12.3
Dreamy Draw East	126DC	183	114	730	432	1,358	902	12.1
Dreamy Draw	129DC	140	129	422	330	897	759	12.3
Northern Avenue	131DC	123	79	504	331	966	699	12.1

TABLE 5

Comparison of 100-Year Peak Discharges with Previous Studies

Location	Kaminski-Hubbard (1994)		COE (Ref. 16) (1982)		FCDMC (Ref. 7) (1987)	
	Drainage Area (Sq. Mi.)	Q (CFS)	Drainage Area (Sq. Mi.)	Q (CFS)	Drainage Area (Sq. Mi.)	Q (CFS)
Cudia City Wash	4.82	5,750	4.91	6,800	4.91	6,540
Stanford Drive Wash	1.17	1,479	1.38	2,400	----	----
Flynn Lane Wash	1.04	1,152	1.10	1,900	----	----
Myrtle Avenue Wash	0.80	1,146	1.18	2,300	----	----
Dreamy Draw East	0.68	1,358	----	----	----	----
Dreamy Draw	2.07	897	3.08	1,300	----	----
Northern Avenue	0.98	966	----	----	----	----

6.0 REFERENCES

1. Baker Engineers. Final Hydrology Report, Squaw Peak Parkway. November, 1988.

2. City of Phoenix, Arizona, Engineering Department. Storm Drain Design Manual, Storm Drains with Paving of Major Streets. August, 1975. Revised July, 1987.

3. City of Phoenix, Arizona, Engineering Department. Storm Drain Design Manual, Subdivision Drainage Design. September, 1985.

4. Entranco Engineers, Inc. Final Drainage Report for Squaw Peak Highway - SR 51, Section 3, 29th Street to Shea Boulevard, Station 160+00 to Station 221+30, State Route 51. May, 1992.

5. Federal Emergency Management Agency. Flood Insurance Study for Maricopa County, Arizona and Incorporated Areas. Revised September 29, 1989.

6. Flood Control District of Maricopa County. Drainage Design Manual for Maricopa County, Arizona, Volume I, Hydrology. June, 1992.

7. Flood Control District of Maricopa County. Review of W.S. Gookin and Associates Analyses of Cudia City Wash Hydrology. April 29, 1987.

8. Howard Needles Tammen and Bergendoff. Final Drainage Design Report, S.R. 51 Squaw Peak Highway, Glendale Avenue to Northern Avenue. September, 1989.

9. John Carollo Engineers. Investigation of North Phoenix Mountains Flood Detention Basins. March, 1973.

10. Keogh and McRae, Inc. Preliminary Drainage Study for Arizona Biltmore Parcel 2, Phase I. August, 1986.

11. Urban Engineering, Inc. Final Drainage Report for Squaw Peak Highway, Section 2, Northern Avenue to 29th Street, Station 87+00 to Station 160+00. November, 1991.

12. Urban Engineering, Inc. Addendum No. 2 to Final Drainage Report for Squaw Peak Highway, Section 2, Northern Avenue to 29th Street, Station 87+00 to Station 160+00. February, 1992.

13. Urban Engineering, Inc. Addendum No. 3 to Final Drainage Report for Squaw Peak Highway, Section 2, Northern Avenue to 29th Street, Station 87+00 to Station 160+00. April, 1992.

14. U.S. Army Corps of Engineers. Gila River Basin, New River and Phoenix City Streams, Arizona, Design Memorandum No. 1, Feature Design for Dreamy Draw Dam. January, 1972.

15. U.S. Army Corps of Engineers. Gila River Basin, Arizona, New Mexico and Phoenix City Streams, Design Memorandum No. 1, Hydrology Part 1. Los Angeles District, 1974.

16. U.S. Army Corps of Engineers. Gila River Basin, New River and Phoenix City Streams, Arizona, Design Memorandum No. 2, Hydrology Part 2. 1982.

17. U.S. Army Corps of Engineers. Gila River Basin, Phoenix, Arizona, and Vicinity (Including New River), Arizona Canal Diversion Channel, Detention Basin Study. March, 1987.

18. U.S. Army Corps of Engineers, The Hydrologic Engineering Center. HEC-1 Flood Hydrograph Package Users Manual. September, 1990.

19. U.S. Department of Agriculture, Soil Conservation Service. Soil Survey of Maricopa County Arizona, Central Part. September, 1977.

20. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service. NOAA Atlas 2. Precipitation - Frequency Atlas at the Western United States, Volume VIII - Arizona. Silver Springs, MD. 1973.

21. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Services. NOAA Technical Memorandum NWS HYDRO-40, Depth-Area Ratios in the Semi-Arid Southwest United States. Silver Springs, MD. August, 1984.

22. U.S. Department of Transportation, Federal Highway Administration. Hydraulic Design of Highway Culverts, Hydraulic Design Series No. 5. September, 1985.

23. W.S. Gookin and Associates. Cudia City Wash Runoff Analysis. October, 1986.

APPENDIX

SECTION I	Rainfall and Physical Hydrologic Parameters
SECTION II	Green-Ampt & Land Use Parameters
SECTION III	Hydrologic Sub-Basin Characteristics
SECTION IV	Hydrograph Routing Parameters
SECTION V	Divert & Onsite Retention Parameters
SECTION VI	HEC-1 Hydrology Results, 100-Year 24-Hour Storm (Existing Conditions)
SECTION VII	HEC-1 Hydrology Results, 100-Year 24-Hour Storm (Future Conditions)
SECTION VIII	Plates 1-8
SECTION IX	HEC-1 Data Files On Computer Diskette

SECTION I

Rainfall & Physical Hydrologic Parameters

TABLE 6

Point Precipitation Values For Cudia City Wash To 10th Street Wash Study Area (Inches)

Return Period (Years)	Storm Duration (Hours)	
	6	24
2	1.20	1.40
10	2.00	2.30
100	3.00	3.80

Source: NOAA Atlas Isopluvial Maps For Arizona

TABLE 7

Areal Precipitation Reduction Data

Watershed Area (Sq. Mi.)	Storm Duration (Hours)	
	6[1]	24[2]
0	1.00	1.00
1	0.99	----
3	----	0.98
5	0.96	----
10	0.94	0.96
20	0.91	0.92
30	0.89	0.90
40	0.87	0.89

[1] Drainage Design Manual For Maricopa County, (Ref. 6)

[2] NOAA Technical Memorandum NWS HYDRO-40, (Ref. 21)

TABLE 8

6-HOUR STORM RAINFALL DISTRIBUTIONS
(Furnished By FCDMC's Maricopa County Unit Hydrograph Procedure 2)
Cumulative Rainfall Table

Storm Time (Hours)	Watershed Area (Sq. Mi.)				
	≤ 0.5	2.8	16	90	500
0.00	0.000	0.000	0.00	0.000	0.000
0.25	0.008	0.009	0.015	0.021	0.024
0.50	0.016	0.016	0.020	0.035	0.043
0.75	0.025	0.025	0.030	0.051	0.059
1.00	0.033	0.034	0.048	0.071	0.078
1.25	0.041	0.042	0.063	0.087	0.098
1.50	0.050	0.051	0.076	0.105	0.119
1.75	0.058	0.059	0.090	0.125	0.141
2.00	0.066	0.067	0.105	0.143	0.162
2.25	0.074	0.076	0.119	0.160	0.186
2.50	0.087	0.087	0.135	0.179	0.212
2.75	0.099	0.100	0.152	0.201	0.239
3.00	0.118	0.120	0.175	0.232	0.271
3.25	0.138	0.163	0.222	0.281	0.321
3.50	0.216	0.252	0.304	0.364	0.408
3.75	0.377	0.451	0.472	0.500	0.515
4.00	0.834	0.694	0.670	0.658	0.627
4.25	0.911	0.837	0.796	0.773	0.735
4.50	0.931	0.900	0.868	0.841	0.814
4.75	0.950	0.938	0.912	0.888	0.864
5.00	0.962	0.950	0.946	0.927	0.907
5.25	0.972	0.963	0.960	0.945	0.930
5.50	0.983	0.975	0.973	0.964	0.954
5.75	0.991	0.988	0.987	0.982	0.977
6.00	1.000	1.000	1.000	1.000	1.000

TABLE 9

24-HOUR STORM RAINFALL DISTRIBUTIONS
(Standard SCS 24-Hour, Type II Distribution
Cumulative Rainfall Table)

Storm Time (Hours)	Precipiation Ratio
0.0	0.000
0.5	0.005
1.0	0.011
1.5	0.016
2.0	0.022
2.5	0.028
3.0	0.035
3.5	0.041
4.0	0.048
4.5	0.056
5.0	0.063
5.5	0.071
6.0	0.080
6.5	0.089
7.0	0.098
7.5	0.109
8.0	0.120
8.5	0.133
9.0	0.147
9.5	0.163
10.0	0.181
10.5	0.204
11.0	0.235
11.5	0.283
12.0	0.663

Storm Time (Hours)	Precipiation Ratio
12.5	0.735
13.0	0.772
13.5	0.799
14.0	0.820
14.5	0.838
15.0	0.854
15.5	0.868
16.0	0.880
16.5	0.891
17.0	0.902
17.5	0.912
18.0	0.921
18.5	0.929
19.0	0.937
19.5	0.945
20.0	0.952
20.5	0.959
21.0	0.965
21.5	0.972
22.0	0.978
22.5	0.984
23.0	0.989
23.5	0.995
24.0	1.000

TABLE 10

Percent Impervious Estimates
For Zoning/Land Use Classifications

Zoning Unit	Zoning Description	Land Use Description	Land Use Unit	Percent Impervious
S-1 S-2 RE-43	Ranch or Farm Res. Ranch or Farm Commercial Single Family, 1 acre min.	Very Low Density Residential	V.L.D.R. or VLO RES	15
RE-35 RE-24 RI-18 RI-14	Single Family, 35000 S.F. min. Single Family, 24000 S.F. min. Single Family, 18000 S.F. min. Single Family, 14000 S.F. min.	Low Density Residential	L.D.R. or LO RES	25
RI-10 RI-8 RI-6 R-0	Single Family, 10000 S.F. min. Single Family, 8000 S.F. min. Single Family, 6000 S.F. min. Residential Office	Medium Density Residential	M.D.R. or MED RES	45
R-2 R-3 R-3A R-4 R-4A R-5 CP/BP R-H	Multi-Family, 4000 S.F. per unit Multi-Family, 3000 S.F. per unit Multi-Family Multi-Family, 1500 S.F. per unit Multi-Family, 1000 S.F. per unit Multi-Family, 1000 S.F. per unit Business Park Resort District	Multiple Density Residential	M.F.R. or MF RES	65
C-1 C-2 C-3 C-O H-R CP/GCP	Neighborhood Commercial Intermediate Commercial General Commercial Commercial Office/Restricted Comm. High Rise District General Commerce Park	Commercial	COMM or COMM.	90
IND PARK A-1 A-2	Industrial Park Light Industrial Heavy Industrial	Industrial	IND or INDUST.	75
PAD PSC	Planned Area Development Planned Shopping Center	Variable Planned Shopping Center	--- PSC or PLND.SHP	Variable 85
P-1 P-2	Parking (Open) Parking (Structure)	Parking Parking	PARKING PARKING	Variable 85
	Miscellaneous Categories (Evaluated on a Case by Case Basis)	Desert Cover	DESERT	0
		Undeveloped Parcel	VACANT or OPEN	0
		Golf Course	GC	0
		Park	PARK	0
		School	SCHOOL	Variable
		Airport	AIRPORT	Variable

SECTION II

Green-Ampt & Land Use Parameters

Green-Ampt Parameters
(Existing Condition)

TABLE 11

Average Green Ampt Parameters
Existing Conditions

Sub-Basin I.D.	IA(in)	DTHETA	PSIF(in)	XKSAT (in/hr)	RTIMP (%)
100	0.122	0.290	4.74	0.253	30.77
101	0.159	0.184	7.78	0.118	17.83
102	0.143	0.272	3.61	0.324	31.54
103	0.150	0.291	4.43	0.256	21.01
104	0.110	0.263	6.78	0.163	19.35
105	0.116	0.283	3.50	0.291	32.87
106	0.132	0.328	4.43	0.256	21.45
107	0.106	0.268	6.60	0.175	20.90
110	0.102	0.160	7.50	0.117	14.71
111	0.121	0.310	5.98	0.198	18.00
112	0.129	0.309	3.87	0.373	19.91
113	0.120	0.168	7.50	0.127	31.53
114	0.146	0.341	3.98	0.396	22.21
115	0.136	0.311	6.78	0.174	30.04
116	0.118	0.183	8.05	0.095	53.25
117	0.136	0.257	3.71	0.405	25.61
118	0.150	0.350	4.03	0.408	21.00
119	0.150	0.350	4.03	0.408	21.00
120	0.128	0.312	4.12	0.268	32.06
121	0.112	0.273	3.82	0.361	39.65
122	0.137	0.332	3.81	0.280	27.31
123	0.118	0.300	5.67	0.194	52.70
124	0.106	0.261	4.30	0.465	45.39
125	0.141	0.333	3.71	0.338	27.11
126	0.114	0.288	6.60	0.175	51.59
127	0.143	0.336	4.19	0.443	24.67
128	0.150	0.350	3.92	0.384	19.38
129	0.112	0.275	3.50	0.289	48.02
130	0.150	0.380	5.05	0.233	11.27
131	0.115	0.289	5.36	0.221	41.00

LOSS PARAMETERS FOR SUBBASIN: 100

Soil Survey Used EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PvC	0.189	40.38	0.4	-0.161	0.00	0.00
CeC	0.112	23.96	0.06	-0.293	0.00	0.00
Ro	0.112	23.90	0.25	-0.144	65.00	15.54
LaB	0.055	11.76	0.25	-0.071	0.00	0.00

TOTAL = 0.468 SQ.MI. XKSAT = 0.21 %ROCK= 15.54

DTHETA

Dry = 0.37
Normal = 0.25
Wet = 0

PSIF

= 4.74

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.155	VACANT	33.00	DRY	25.00	0.00	0.00	0.15	0.050
0.151	V.L.D.R	32.22	NORMAL	25.00	15.00	0.02	0.10	0.032
0.006	L.D.R.	1.27	NORMAL	25.00	25.00	0.00	0.10	0.001
0.087	M.F.R.	18.47	NORMAL	25.00	65.00	0.06	0.10	0.018
0.045	M.D.R.	9.55	NORMAL	25.00	45.00	0.02	0.10	0.010
0.026	GC/PARK	5.49	NORMAL	90.00	0.00	0.00	0.20	0.011
0.468	=TOTAL AREA	OK	AVERAGE =	28.57	TOTAL =	0.10	AVG. =	0.122
					% =	21.45		

PERCENT OF SUBBASIN
DRY = 33.00 %
NORMAL = 67.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.290

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.253

IMPERVIOUS AREA:
URBAN @ 100 % effective = 21.45
ROCK OUTCROP @ 60 % effective = 9.32
% EFFECTIVE IMP. = 30.77

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
100	0.468	1.160	0.052	315.00	0.122	0.290	4.74	0.253	30.77

LOSS PARAMETERS FOR SUBBASIN: 101

Soil Survey Used EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.488	76.34	0.06	-0.933	0.00	0.00
Ro	0.092	14.36	0.25	-0.086	65.00	9.33
109	0.057	8.85	0.35	-0.040	35.00	3.10
LaB	0.003	0.45	0.25	-0.003	0.00	0.00

TOTAL = 0.639 SQ.MI. XKSAT = 0.09 %ROCK= 12.43

DTHETA		PSIF	
Dry =	0.33	=	7.78
Normal =	0.15		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.122	VACANT	19.08	DRY	25.00	0.00	0.00	0.15	0.029
0.371	V.L.D.R	58.08	NORMAL	25.00	15.00	0.06	0.15	0.087
0.003	L.D.R.	0.40	NORMAL	25.00	25.00	0.00	0.10	0.000
0.015	M.F.R.	2.39	NORMAL	25.00	65.00	0.01	0.10	0.002
0.128	GC	20.04	NORMAL	90.00	0.00	0.00	0.20	0.040
0.639	=TOTAL AREA	OK 99.99	AVERAGE =	38.03	TOTAL = % =	0.07 10.37	AVG. =	0.159

PERCENT OF SUBBASIN DRY = 19.08 %
NORMAL = 80.92 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.184

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.118

IMPERVIOUS AREA: URBAN @ 100 % effective = 10.37
ROCK OUTCROP @ 60 % effective = 7.46
% EFFECTIVE IMP. = 17.83

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
101	0.639	1.730	0.047	287.00	0.159	0.184	7.78	0.118	17.83

LOSS PARAMETERS FOR SUBBASIN: 102

Soil Survey Used EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
Ro	0.224	24.71	0.25	-0.149	65.00	16.06
Ru	0.197	21.71	0.4	-0.086	20.00	4.34
PvC	0.129	14.24	0.4	-0.057	0.00	0.00
CeC	0.113	12.43	0.06	-0.152	0.00	0.00
LaB	0.100	11.07	0.25	-0.067	0.00	0.00
AoB	0.080	8.83	0.4	-0.035	0.00	0.00
Va	0.064	7.01	0.4	-0.028	0.00	0.00

TOTAL = 0.907 SQ.MI. XKSAT = 0.27 %ROCK= 20.40

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.61

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.198	VACANT	21.85	DRY	25.00	0.00	0.00	0.15	0.033
0.495	V.L.D.R	54.59	NORMAL	25.00	15.00	0.07	0.15	0.082
0.021	L.D.R.	2.26	NORMAL	25.00	25.00	0.01	0.10	0.002
0.147	M.F.R.	16.22	NORMAL	25.00	65.00	0.10	0.10	0.016
0.046	GC	5.08	NORMAL	90.00	0.00	0.00	0.20	0.010
0.907	=TOTAL AREA	OK	AVERAGE =	28.30	TOTAL =	0.17	AVG. =	0.143
					% =	19.30		

PERCENT OF SUBBASIN
DRY = 21.85 %
NORMAL = 78.15 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.272

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.324

IMPERVIOUS AREA:
URBAN @ 100 % effective = 19.30
ROCK OUTCROP @ 60 % effective = 12.24

% EFFECTIVE IMP. = 31.54

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
102	0.907	1.490	0.046	315.00	0.143	0.272	3.61	0.324	31.54

LOSS PARAMETERS FOR SUBBASIN: 103

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.396	49.81	0.35	-0.227	35.00	17.43
CeC	0.226	28.41	0.06	-0.347	0.00	0.00
PvC	0.126	15.88	0.4	-0.063	0.00	0.00
Ru	0.044	5.57	0.4	-0.022	20.00	1.11
LaB	0.003	0.33	0.25	-0.002	0.00	0.00

TOTAL = 0.795 SQ.MI. XKSAT = 0.22 %ROCK= 18.55

DTHETA

Dry = 0.37
Normal = 0.25
Wet = 0

PSIF

= 4.43

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.271	VACANT	34.14	DRY	25.00	0.00	0.00	0.15	0.051
0.524	V.L.D.R	65.86	NORMAL	25.00	15.00	0.08	0.15	0.099
0.795	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL = % =	0.08 9.88	AVG. =	0.150

PERCENT OF SUBBASIN DRY = 34.14 %
NORMAL = 65.86 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.291

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.256

IMPERVIOUS AREA: URBAN @ 100 % effective = 9.88
ROCK OUTCROP @ 60 % effective = 11.13

% EFFECTIVE IMP. = 21.01

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
103	0.795	2.450	0.056	300.00	0.150	0.291	4.43	0.256	21.01

LOSS PARAMETERS FOR SUBBASIN: 104

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.279	53.85	0.06	-0.658	0.00	0.00
109	0.110	21.23	0.35	-0.097	35.00	7.43
Ru	0.071	13.63	0.4	-0.054	20.00	2.73
PvC	0.058	11.29	0.4	-0.045	0.00	0.00

TOTAL = 0.518 SQ.MI. XKSAT = 0.14 %ROCK= 10.16

DTHETA

Dry = 0.39
Normal = 0.23
Wet = 0

PSIF

= 6.78

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.107	VACANT	20.67	DRY	25.00	0.00	0.00	0.15	0.031
0.380	V.L.D.R	73.43	NORMAL	25.00	15.00	0.06	0.10	0.073
0.011	L.D.R.	2.06	NORMAL	25.00	25.00	0.00	0.10	0.002
0.020	M.D.R.	3.84	NORMAL	25.00	45.00	0.01	0.10	0.004
0.518	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.07	AVG. =	0.110
					% =	13.26		

PERCENT OF SUBBASIN DRY = 20.67 %
NORMAL = 79.33 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.263

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.163

IMPERVIOUS AREA: URBAN @ 100 % effective = 13.26
ROCK OUTCROP @ 60 % effective = 6.09

% EFFECTIVE IMP. = 19.35

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
104	0.518	1.410	0.053	290.00	0.110	0.263	6.78	0.163	19.35

LOSS PARAMETERS FOR SUBBASIN: 105

Soil Survey Used CENTRAL & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
Ru	0.156	38.78	0.4	-0.154	20.00	7.76
Ro	0.109	27.17	0.25	-0.164	65.00	17.66
CeC	0.068	16.87	0.06	-0.206	0.00	0.00
PvC	0.057	14.15	0.4	-0.056	0.00	0.00
LaB	0.008	1.95	0.25	-0.012	0.00	0.00
TrB	0.004	1.08	0.1	-0.011	0.00	0.00

TOTAL = 0.402 SQ.MI. XKSAT = 0.25 %ROCK= 25.42

DTHETA		PSIF	
Dry =	0.35	=	3.5
Normal =	0.25		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.131	VACANT	32.58	DRY	25.00	0.00	0.00	0.15	0.049
0.078	V.L.D.R	19.40	NORMAL	25.00	15.00	0.01	0.10	0.019
0.139	L.D.R.	34.50	NORMAL	25.00	25.00	0.03	0.10	0.034
0.054	M.D.R.	13.52	NORMAL	25.00	45.00	0.02	0.10	0.014
0.402	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.07	AVG. =	0.116
					% =	17.62		

PERCENT OF SUBBASIN DRY = 32.58 %
NORMAL = 67.42 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.283

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.291

IMPERVIOUS AREA: URBAN @ 100 % effective = 17.62
ROCK OUTCROP @ 60 % effective = 15.25
% EFFECTIVE IMP. = 32.87

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
105	0.402	1.100	0.050	315.00	0.116	0.283	3.50	0.291	32.87

LOSS PARAMETERS FOR SUBBASIN: 106

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.316	71.42	0.35	-0.326	35.00	25.00
CeC	0.117	26.34	0.06	-0.322	0.00	0.00
Ru	0.010	2.24	0.4	-0.009	20.00	0.45
TOTAL =	0.443 SQ.MI.		XKSAT =	0.22	%ROCK=	25.44

DTHETA

Dry =	0.37
Normal =	0.25
Wet =	0

PSIF

= 4.43

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.287	VACANT	64.81	DRY	25.00	0.00	0.00	0.15	0.097
0.147	V.L.D.R	33.27	NORMAL	25.00	15.00	0.02	0.10	0.033
0.004	L.D.R.	0.81	NORMAL	25.00	25.00	0.00	0.10	0.001
0.005	COMM	1.10	NORMAL	20.00	90.00	0.00	0.10	0.001
0.443	=TOTAL AREA	OK	AVERAGE =	24.94	TOTAL =	0.03	AVG. =	0.132
					% =	6.19		

PERCENT OF SUBBASIN

DRY =	64.81 %
NORMAL =	35.19 %
WET =	0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.328

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.256

IMPERVIOUS AREA:

URBAN @	100 %	effective =	6.19
ROCK OUTCROP @	60 %	effective =	15.27
	% EFFECTIVE IMP. =		21.45

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
106	0.443	1.720	0.073	310.00	0.132	0.328	4.43	0.256	21.45

LOSS PARAMETERS FOR SUBBASIN: 107

Soil Survey Used EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.246	38.18	0.06	-0.467	0.00	0.00
Ru	0.142	22.03	0.4	-0.088	20.00	4.41
TrB	0.128	19.94	0.1	-0.199	0.00	0.00
AoB	0.107	16.65	0.4	-0.066	0.00	0.00
PvC	0.021	3.20	0.4	-0.013	0.00	0.00

TOTAL = 0.643 SQ.MI. XKSAT = 0.15 %ROCK= 4.41

DTHETA

Dry = 0.4
Normal = 0.25
Wet = 0

PSIF

= 6.6

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.077	VACANT	11.91	DRY	25.00	0.00	0.00	0.15	0.018
0.279	V.L.D.R	43.33	NORMAL	25.00	15.00	0.04	0.10	0.043
0.282	L.D.R.	43.89	NORMAL	25.00	25.00	0.07	0.10	0.044
0.006	COMM	0.87	NORMAL	20.00	90.00	0.01	0.10	0.001
0.643	=TOTAL AREA	OK	AVERAGE =	24.96	TOTAL =	0.12	AVG. =	0.106
					% =	18.25		

PERCENT OF SUBBASIN
DRY = 11.91 %
NORMAL = 88.09 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.268

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.175

IMPERVIOUS AREA:
URBAN @ 100 % effective = 18.25
ROCK OUTCROP @ 60 % effective = 2.64
% EFFECTIVE IMP. = 20.90

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
107	0.643	1.320	0.040	139.00	0.106	0.268	6.60	0.175	20.90

LOSS PARAMETERS FOR SUBBASIN: 110

Soil Survey Used EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.123	44.23	0.06	-0.540	0.00	0.00
TrB	0.111	39.86	0.1	-0.399	0.00	0.00
PvC	0.038	13.84	0.4	-0.055	0.00	0.00
AoB	0.006	2.06	0.4	-0.008	0.00	0.00

TOTAL = 0.278 SQ.MI. XKSAT = 0.10 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.15
Wet = 0

PSIF

= 7.5

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.014	VACANT	4.89	DRY	25.00	0.00	0.00	0.15	0.007
0.260	V.L.D.R	93.63	NORMAL	25.00	15.00	0.04	0.10	0.094
0.004	M.D.R.	1.48	NORMAL	25.00	45.00	0.00	0.10	0.001
0.278	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.04	AVG. =	0.102
					% =	14.71		

PERCENT OF SUBBASIN
DRY = 4.89 %
NORMAL = 95.11 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.160

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.117

IMPERVIOUS AREA:
URBAN @ 100 % effective = 14.71
ROCK OUTCROP @ 60 % effective = 0.00
% EFFECTIVE IMP. = 14.71

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
110	0.278	1.340	0.051	95.00	0.102	0.160	7.50	0.117	14.71

LOSS PARAMETERS FOR SUBBASIN: 111

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.196	36.85	0.06	-0.450	0.00	0.00
109	0.163	30.57	0.35	-0.139	35.00	10.70
PvC	0.067	12.54	0.4	-0.050	0.00	0.00
Ru	0.066	12.43	0.4	-0.049	20.00	2.49
TrB	0.041	7.61	0.1	-0.076	0.00	0.00

TOTAL = 0.533 SQ.MI. XKSAT = 0.17 %ROCK= 13.19

DTHETA

Dry = 0.39
Normal = 0.25
Wet = 0

PSIF

= 5.98

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.229	VACANT	42.97	DRY	25.00	0.00	0.00	0.15	0.064
0.277	V.L.D.R	51.91	NORMAL	25.00	15.00	0.04	0.10	0.052
0.027	M.D.R.	5.12	NORMAL	25.00	45.00	0.01	0.10	0.005
0.533	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL = % =	0.05 10.09	AVG. =	0.121

PERCENT OF SUBBASIN
DRY = 42.97 %
NORMAL = 57.03 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.310

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.198

IMPERVIOUS AREA:
URBAN @ 100 % effective = 10.09
ROCK OUTCROP @ 60 % effective = 7.91
% EFFECTIVE IMP. = 18.00

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
111	0.533	1.940	0.062	296.00	0.121	0.310	5.98	0.198	18.00

LOSS PARAMETERS FOR SUBBASIN: 112

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.315	49.57	0.35	-0.226	35.00	17.35
PvC	0.133	20.95	0.4	-0.083	0.00	0.00
Ru	0.132	20.82	0.4	-0.083	20.00	4.16
CeC	0.028	4.44	0.06	-0.054	0.00	0.00
TrB	0.027	4.22	0.1	-0.042	0.00	0.00

TOTAL = 0.636 SQ.MI. XKSAT = 0.32 %ROCK= 21.51

DTHETA		PSIF	
Dry =	0.35	=	3.87
Normal =	0.25		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.375	VACANT	58.97	DRY	25.00	0.00	0.00	0.15	0.088
0.207	V.L.D.R	32.56	NORMAL	25.00	15.00	0.03	0.10	0.033
0.054	L.D.R.	8.47	NORMAL	25.00	25.00	0.01	0.10	0.008
0.636	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.04	AVG. =	0.129
					% =	7.00		

PERCENT OF SUBBASIN DRY = 58.97 %
NORMAL = 41.03 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.309

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.373

IMPERVIOUS AREA: URBAN @ 100 % effective = 7.00
ROCK OUTCROP @ 60 % effective = 12.91
% EFFECTIVE IMP. = 19.91

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
112	0.636	2.360	0.066	283.00	0.129	0.309	3.87	0.373	19.91

LOSS PARAMETERS FOR SUBBASIN: 113

Soil Survey Used EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.266	71.64	0.06	-0.875	0.00	0.00
Ru	0.071	19.03	0.4	-0.076	20.00	3.81
PvC	0.029	7.95	0.4	-0.032	0.00	0.00
TrB	0.005	1.38	0.1	-0.014	0.00	0.00

TOTAL = 0.371 SQ.MI. XKSAT = 0.10 %ROCK= 3.81

DTHETA

Dry = 0.35
Normal = 0.15
Wet = 0

PSIF

= 7.5

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.034	VACANT	9.19	DRY	25.00	0.00	0.00	0.15	0.014
0.113	V.L.D.R	30.43	NORMAL	25.00	15.00	0.02	0.10	0.030
0.042	M.F.R.	11.22	NORMAL	25.00	65.00	0.03	0.10	0.011
0.108	M.D.R.	29.18	NORMAL	25.00	45.00	0.05	0.10	0.029
0.018	COMM	4.73	NORMAL	20.00	90.00	0.02	0.10	0.005
0.057	GC	15.25	NORMAL	90.00	0.00	0.00	0.20	0.031
0.371	=TOTAL AREA	OK	AVERAGE =	34.68	TOTAL = % =	0.11 29.25	AVG. =	0.120

PERCENT OF SUBBASIN
DRY = 9.19 %
NORMAL = 90.81 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.168

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.127

IMPERVIOUS AREA:
URBAN @ 100 % effective = 29.25
ROCK OUTCROP @ 60 % effective = 2.28
% EFFECTIVE IMP. = 31.53

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
113	0.371	1.280	0.038	140.00	0.120	0.168	7.50	0.127	31.53

LOSS PARAMETERS FOR SUBBASIN: 114

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.175	67.70	0.35	-0.309	35.00	23.70
Ru	0.069	26.93	0.4	-0.107	20.00	5.39
CeC	0.009	3.39	0.06	-0.041	0.00	0.00
Ro	0.005	1.98	0.25	-0.012	65.00	1.29

TOTAL = 0.258 SQ.MI. XKSAT = 0.34 %ROCK= 30.37

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.98

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.235	VACANT	91.13	DRY	25.00	0.00	0.00	0.15	0.137
0.023	M.D.R.	8.87	NORMAL	25.00	45.00	0.01	0.10	0.009
0.258	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.01	AVG. =	0.146
					% =	3.99		

PERCENT OF SUBBASIN DRY = 91.13 %
NORMAL = 8.87 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.341

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.396

IMPERVIOUS AREA: URBAN @ 100 % effective = 3.99
ROCK OUTCROP @ 60 % effective = 18.22

% EFFECTIVE IMP. = 22.21

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
114	0.258	0.690	0.089	301.00	0.146	0.341	3.98	0.396	22.21

LOSS PARAMETERS FOR SUBBASIN: 115

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.141	52.88	0.06	-0.646	0.00	0.00
109	0.078	29.41	0.35	-0.134	35.00	10.29
Ru	0.047	17.71	0.4	-0.070	20.00	3.54

TOTAL = 0.267 SQ.MI. XKSAT = 0.14 %ROCK= 13.84

DTHETA		PSIF	
Dry =	0.39	=	6.78
Normal =	0.23		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.135	VACANT	50.46	DRY	25.00	0.00	0.00	0.15	0.076
0.048	M.F.R.	17.82	NORMAL	25.00	65.00	0.03	0.10	0.018
0.052	M.D.R.	19.45	NORMAL	25.00	45.00	0.02	0.10	0.019
0.004	COMM	1.56	NORMAL	20.00	90.00	0.00	0.10	0.002
0.029	GC	10.71	NORMAL	90.00	0.00	0.00	0.20	0.021
0.267	=TOTAL AREA	OK	AVERAGE =	31.88	TOTAL =	0.06	AVG. =	0.136
					% =	21.74		

PERCENT OF SUBBASIN DRY = 50.46 %
NORMAL = 49.54 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.311

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.174

IMPERVIOUS AREA: URBAN @ 100 % effective = 21.74
ROCK OUTCROP @ 60 % effective = 8.30
% EFFECTIVE IMP. = 30.04

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
115	0.267	1.340	0.061	288.00	0.136	0.311	6.78	0.174	30.04

LOSS PARAMETERS FOR SUBBASIN: 116

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.201	80.88	0.06	-0.988	0.00	0.00
109	0.032	12.90	0.35	-0.059	35.00	4.52
Ru	0.014	5.42	0.4	-0.022	20.00	1.08
PvC	0.002	0.80	0.4	-0.003	0.00	0.00
TOTAL =	0.249 SQ.MI.		XKSAT =	0.08	%ROCK=	5.60

DTHETA		PSIF	
Dry =	0.3	=	8.05
Normal =	0.15		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.054	VACANT	21.76	DRY	25.00	0.00	0.00	0.15	0.033
0.049	L.D.R.	19.62	NORMAL	25.00	25.00	0.01	0.10	0.020
0.003	M.F.R.	1.15	NORMAL	25.00	65.00	0.00	0.10	0.001
0.006	M.D.R.	2.56	NORMAL	25.00	45.00	0.00	0.10	0.003
0.119	COMM	47.87	NORMAL	20.00	90.00	0.11	0.10	0.048
0.018	GC	7.04	NORMAL	90.00	0.00	0.00	0.20	0.014
0.249	=TOTAL AREA	OK	AVERAGE =	27.18	TOTAL =	0.12	AVG. =	0.118
					% =	49.89		

PERCENT OF SUBBASIN DRY = 21.76 %
NORMAL = 78.24 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.183

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.095

IMPERVIOUS AREA: URBAN @ 100 % effective = 49.89
ROCK OUTCROP @ 60 % effective = 3.36
% EFFECTIVE IMP. = 53.25

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
116	0.249	0.720	0.041	250.00	0.118	0.183	8.05	0.095	53.25

LOSS PARAMETERS FOR SUBBASIN: 117

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PvC	0.205	79.97	0.4	-0.318	0.00	0.00
CeC	0.026	10.28	0.06	-0.126	0.00	0.00
TrB	0.022	8.40	0.1	-0.084	0.00	0.00
109	0.003	1.35	0.35	-0.006	35.00	0.47
TOTAL =	0.256 SQ.MI.		XKSAT =	0.29	%ROCK=	0.47

DTHETA

Dry =	0.35
Normal =	0.25
Wet =	0

PSIF

= 3.71

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.019	VACANT	7.46	DRY	25.00	0.00	0.00	0.15	0.011
0.050	L.D.R.	19.67	NORMAL	25.00	25.00	0.01	0.10	0.020
0.029	M.F.R.	11.47	NORMAL	25.00	65.00	0.02	0.10	0.011
0.074	M.D.R.	28.79	NORMAL	25.00	45.00	0.03	0.10	0.029
0.083	PARK	32.61	NORMAL	90.00	0.00	0.00	0.20	0.065
0.256	=TOTAL AREA	OK	AVERAGE =	46.20	TOTAL =	0.06	AVG. =	0.136
					% =	25.33		

PERCENT OF SUBBASIN

DRY =	7.46 %
NORMAL =	92.54 %
WET =	0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.257

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.405

IMPERVIOUS AREA:

URBAN @	100 %	effective =	25.33
ROCK OUTCROP @	60 %	effective =	0.28
% EFFECTIVE IMP. =			25.61

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
117	0.256	1.000	0.031	156.00	0.136	0.257	3.71	0.405	25.61

LOSS PARAMETERS FOR SUBBASIN: 118

Soil Survey Used AGUILA

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.299	100.00	0.35	-0.456	35.00	35.00

TOTAL = 0.299 SQ.MI. XKSAT = 0.35 %ROCK= 35.00

DTHETA		PSIF	
Dry =	0.35	=	4.03
Normal =	0.25		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.299	VACANT	100.00	DRY	25.00	0.00	0.00	0.15	0.150
0.299	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.00	AVG. =	0.150
					% =	0.00		

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.408

IMPERVIOUS AREA: URBAN @ 100 % effective = 0.00
ROCK OUTCROP @ 60 % effective = 21.00
% EFFECTIVE IMP. = 21.00

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
118	0.299	0.600	0.093	298.00	0.150	0.350	4.03	0.408	21.00

LOSS PARAMETERS FOR SUBBASIN: 119

Soil Survey Used AGUILA

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.143	100.00	0.35	-0.456	35.00	35.00

TOTAL = 0.143 SQ.MI. XKSAT = 0.35 %ROCK= 35.00

DTHETA		PSIF	
Dry =	0.35	=	4.03
Normal =	0.25		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.143	VACANT	100.00	DRY	25.00	0.00	0.00	0.15	0.150
0.143	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.00	AVG. =	0.150
					% =	0.00		

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.408

IMPERVIOUS AREA: URBAN @ 100 % effective = 0.00
ROCK OUTCROP @ 60 % effective = 21.00
% EFFECTIVE IMP. = 21.00

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
119	0.143	0.570	0.101	320.00	0.150	0.350	4.03	0.408	21.00

LOSS PARAMETERS FOR SUBBASIN: 120

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.153	58.66	0.35	-0.267	35.00	20.53
CeC	0.064	24.54	0.06	-0.300	0.00	0.00
PvC	0.044	16.80	0.4	-0.067	0.00	0.00

TOTAL = 0.260 SQ.MI. XKSAT = 0.23 %ROCK= 20.53

DTHETA		PSIF	
Dry =	0.36	=	4.12
Normal =	0.25		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.146	VACANT	56.12	DRY	25.00	0.00	0.00	0.15	0.084
0.114	M.D.R.	43.88	NORMAL	25.00	45.00	0.05	0.10	0.044
0.260	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL = % =	0.05 19.75	AVG. =	0.128

PERCENT OF SUBBASIN DRY = 56.12 %
NORMAL = 43.88 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.312

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.268

IMPERVIOUS AREA: URBAN @ 100 % effective = 19.75
ROCK OUTCROP @ 60 % effective = 12.32
% EFFECTIVE IMP. = 32.06

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
120	0.260	0.890	0.065	320.00	0.128	0.312	4.12	0.268	32.06

LOSS PARAMETERS FOR SUBBASIN: 121

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PvC	0.230	67.37	0.4	-0.268	0.00	0.00
109	0.052	15.10	0.35	-0.069	35.00	5.28
CeC	0.029	8.48	0.06	-0.104	0.00	0.00
TrB	0.015	4.52	0.1	-0.045	0.00	0.00
AoB	0.011	3.14	0.4	-0.012	0.00	0.00
Ro	0.005	1.39	0.25	-0.008	65.00	0.90

TOTAL = 0.341 SQ.MI. XKSAT = 0.31 %ROCK= 6.19

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.82

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.080	VACANT	23.31	DRY	25.00	0.00	0.00	0.15	0.035
0.024	M.F.R.	7.13	NORMAL	25.00	65.00	0.02	0.10	0.007
0.238	M.D.R.	69.56	NORMAL	25.00	45.00	0.11	0.10	0.070
0.341	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.12	AVG. =	0.112
					% =	35.94		

PERCENT OF SUBBASIN DRY = 23.31 %
NORMAL = 76.69 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.273

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.361

IMPERVIOUS AREA: URBAN @ 100 % effective = 35.94
ROCK OUTCROP @ 60 % effective = 3.71

% EFFECTIVE IMP. = 39.65

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
121	0.341	1.750	0.041	289.00	0.112	0.273	3.82	0.361	39.65

LOSS PARAMETERS FOR SUBBASIN: 122

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.477	70.23	0.35	-0.320	35.00	24.58
CeC	0.149	22.00	0.06	-0.269	0.00	0.00
AoB	0.031	4.57	0.4	-0.018	0.00	0.00
Ro	0.020	2.97	0.25	-0.018	65.00	1.93
PvC	0.002	0.23	0.4	-0.001	0.00	0.00

TOTAL = 0.679 SQ.MI. XKSAT = 0.24 %ROCK= 26.51

DTHETA

Dry = 0.36
Normal = 0.25
Wet = 0

PSIF

= 3.81

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.507	VACANT	74.65	DRY	25.00	0.00	0.00	0.15	0.112
0.172	M.D.R.	25.35	NORMAL	25.00	45.00	0.08	0.10	0.025
0.679	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.08	AVG. =	0.137
					% =	11.41		

PERCENT OF SUBBASIN DRY = 74.65 %
NORMAL = 25.35 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.332

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.280

IMPERVIOUS AREA: URBAN @ 100 % effective = 11.41
ROCK OUTCROP @ 60 % effective = 15.91
% EFFECTIVE IMP. = 27.31

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
122	0.679	1.900	0.069	306.00	0.137	0.332	3.81	0.280	27.31

LOSS PARAMETERS FOR SUBBASIN: 123

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.014	40.87	0.06	-0.499	0.00	0.00
AoB	0.013	36.27	0.4	-0.144	0.00	0.00
109	0.008	22.85	0.35	-0.104	35.00	8.00
TOTAL =	0.035 SQ.MI.		XKSAT =	0.18	%ROCK=	8.00

DTHETA		PSIF	
Dry =	0.39	=	5.67
Normal =	0.25		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.012	VACANT	35.94	DRY	25.00	0.00	0.00	0.15	0.054
0.002	M.F.R.	5.66	NORMAL	25.00	65.00	0.00	0.10	0.006
0.006	M.D.R.	18.53	NORMAL	25.00	45.00	0.00	0.10	0.019
0.014	R.O.W.	39.87	NORMAL	5.00	90.00	0.01	0.10	0.040
0.035	=TOTAL AREA	OK	AVERAGE =	17.03	TOTAL =	0.02	AVG. =	0.118
					% =	47.90		

PERCENT OF SUBBASIN DRY = 35.94 %
NORMAL = 64.06 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.300

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.194

IMPERVIOUS AREA: URBAN @ 100 % effective = 47.90
ROCK OUTCROP @ 60 % effective = 4.80

% EFFECTIVE IMP. = 52.70

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
123	0.035	0.710	0.062	76.00	0.118	0.300	5.67	0.194	52.70

LOSS PARAMETERS FOR SUBBASIN: 124

Soil Survey Used EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PvC	0.062	73.92	0.4	-0.294	0.00	0.00
AoB	0.022	26.08	0.4	-0.104	0.00	0.00
TOTAL =	0.083 SQ.MI.		XKSAT =	0.40	%ROCK=	0.00

DTHETA

Dry =	0.35
Normal =	0.25
Wet =	0

PSIF

= 4.3

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.009	VACANT	11.35	DRY	25.00	0.00	0.00	0.15	0.017
0.018	M.F.R.	21.52	NORMAL	25.00	65.00	0.01	0.10	0.022
0.054	M.D.R.	64.48	NORMAL	25.00	45.00	0.02	0.10	0.064
0.002	COMM	2.65	NORMAL	20.00	90.00	0.00	0.10	0.003
0.083	=TOTAL AREA	OK	AVERAGE =	24.87	TOTAL =	0.04	AVG. =	0.106
					% =	45.39		

PERCENT OF SUBBASIN

DRY =	11.35 %
NORMAL =	88.65 %
WET =	0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.261

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.465

IMPERVIOUS AREA:

URBAN @	100 %	effective =	45.39
ROCK OUTCROP @	60 %	effective =	0.00
	% EFFECTIVE IMP. =		45.39

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
124	0.083	0.600	0.038	67.00	0.106	0.261	4.30	0.465	45.39

LOSS PARAMETERS FOR SUBBASIN: 125

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.050	89.46	0.35	-0.408	35.00	31.31
CeC	0.006	10.54	0.06	-0.129	0.00	0.00
TOTAL =	0.056 SQ.MI.		XKSAT =	0.29	%ROCK=	31.31

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.71

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.046	VACANT	82.60	DRY	25.00	0.00	0.00	0.15	0.124
0.001	M.F.R.	2.47	NORMAL	25.00	65.00	0.00	0.10	0.002
0.008	M.D.R.	14.93	NORMAL	25.00	45.00	0.00	0.10	0.015
0.056	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.00	AVG. =	0.141
					% =	8.32		

PERCENT OF SUBBASIN
DRY = 82.60 %
NORMAL = 17.40 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.333

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.338

IMPERVIOUS AREA:
URBAN @ 100 % effective = 8.32
ROCK OUTCROP @ 60 % effective = 18.79
% EFFECTIVE IMP. = 27.11

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
125	0.056	0.470	0.097	228.00	0.141	0.333	3.71	0.338	27.11

LOSS PARAMETERS FOR SUBBASIN: 126

Soil Survey Used CENTRAL & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.263	42.34	0.06	-0.517	0.00	0.00
AoB	0.105	16.90	0.4	-0.067	0.00	0.00
109	0.085	13.73	0.35	-0.063	35.00	4.81
Ro	0.068	10.96	0.25	-0.066	65.00	7.12
TfB	0.045	7.31	0.36	-0.032	0.00	0.00
TrB	0.031	5.04	0.1	-0.050	0.00	0.00
RS	0.009	1.50	0.4	-0.006	65.00	0.97
AdA	0.007	1.12	0.4	-0.004	0.00	0.00
CrB	0.007	1.10	0.4	-0.004	0.00	0.00

TOTAL = 0.622 SQ.MI. XKSAT = 0.15 %ROCK= 12.90

DTHETA

Dry = 0.4
Normal = 0.25
Wet = 0

PSIF

= 6.6

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.159	VACANT	25.59	DRY	25.00	0.00	0.00	0.15	0.038
0.037	V.L.D.R	6.02	NORMAL	25.00	15.00	0.01	0.10	0.006
0.130	M.F.R.	20.89	NORMAL	25.00	65.00	0.08	0.10	0.021
0.167	M.D.R.	26.81	NORMAL	25.00	45.00	0.08	0.10	0.027
0.120	COMM	19.22	NORMAL	20.00	90.00	0.11	0.10	0.019
0.009	PARK	1.47	NORMAL	90.00	0.00	0.00	0.20	0.003
0.622	=TOTAL AREA	OK	AVERAGE =	24.99	TOTAL =	0.27	AVG. =	0.114
					% =	43.84		

PERCENT OF SUBBASIN DRY = 25.59 %
NORMAL = 74.41 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.288

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.175

IMPERVIOUS AREA: URBAN @ 100 % effective = 43.84
ROCK OUTCROP @ 60 % effective = 7.74

% EFFECTIVE IMP. = 51.59

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
126	0.622	1.990	0.041	258.00	0.114	0.288	6.60	0.175	51.59

LOSS PARAMETERS FOR SUBBASIN: 127

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	1.035	79.44	0.35	-0.362	35.00	27.80
68	0.177	13.56	0.63	-0.027	0.00	0.00
Ru	0.083	6.40	0.4	-0.025	20.00	1.28
21	0.004	0.33	0.38	-0.001	0.00	0.00
98	0.004	0.27	0.37	-0.001	0.00	0.00

TOTAL = 1.302 SQ.MI. XKSAT = 0.38 %ROCK= 29.08

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.19

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
1.117	VACANT	85.77	DRY	25.00	0.00	0.00	0.15	0.129
0.033	M.F.R.	2.57	NORMAL	25.00	65.00	0.02	0.10	0.003
0.143	M.D.R.	10.99	NORMAL	25.00	45.00	0.06	0.10	0.011
0.009	COMM	0.67	NORMAL	20.00	90.00	0.01	0.10	0.001
1.302	=TOTAL AREA	OK	AVERAGE =	24.97	TOTAL =	0.09	AVG. =	0.143
					% =	7.22		

PERCENT OF SUBBASIN DRY = 85.77 %
NORMAL = 14.23 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.336

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.443

IMPERVIOUS AREA: URBAN @ 100 % effective = 7.22
ROCK OUTCROP @ 60 % effective = 17.45

% EFFECTIVE IMP. = 24.67

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
127	1.302	2.390	0.069	263.00	0.143	0.336	4.19	0.443	24.67

LOSS PARAMETERS FOR SUBBASIN: 128

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.287	92.29	0.35	-0.421	35.00	32.30
CeC	0.012	3.91	0.06	-0.048	0.00	0.00
AoB	0.012	3.80	0.4	-0.015	0.00	0.00

TOTAL = 0.311 SQ.MI. XKSAT = 0.33 %ROCK= 32.30

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.92

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.311	VACANT	100.00	DRY	25.00	0.00	0.00	0.15	0.150
0.311	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.00	AVG. =	0.150
					% =	0.00		

PERCENT OF SUBBASIN

DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.384

IMPERVIOUS AREA:

URBAN @ 100 % effective = 0.00
ROCK OUTCROP @ 60 % effective = 19.38

% EFFECTIVE IMP. = 19.38

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
128	0.311	0.940	0.093	290.00	0.150	0.350	3.92	0.384	19.38

LOSS PARAMETERS FOR SUBBASIN: 129

Soil Survey Used AGUILA, CENTRAL & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
AoB	0.201	56.09	0.4	-0.223	0.00	0.00
TrB	0.111	30.83	0.1	-0.308	0.00	0.00
AdA	0.027	7.61	0.4	-0.030	0.00	0.00
CeC	0.009	2.45	0.06	-0.030	0.00	0.00
Ro	0.008	2.34	0.25	-0.014	65.00	1.52
RS	0.002	0.43	0.4	-0.002	65.00	0.28
109	0.001	0.25	0.35	-0.001	35.00	0.09

TOTAL = 0.359 SQ.MI. XKSAT = 0.25 %ROCK= 1.89

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.5

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.090	VACANT	24.99	DRY	25.00	0.00	0.00	0.15	0.037
0.004	V.L.D.R	1.22	NORMAL	25.00	15.00	0.00	0.10	0.001
0.094	M.F.R.	26.22	NORMAL	25.00	65.00	0.06	0.10	0.026
0.105	M.D.R.	29.23	NORMAL	25.00	45.00	0.05	0.10	0.029
0.066	COMM	18.35	NORMAL	20.00	90.00	0.06	0.10	0.018
0.359	=TOTAL AREA	OK 100.01	AVERAGE =	24.08	TOTAL = % =	0.17 46.89	AVG. =	0.112

PERCENT OF SUBBASIN DRY = 24.99 %
NORMAL = 75.01 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.275

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.289

IMPERVIOUS AREA:

URBAN @	100 %	effective =	46.89
ROCK OUTCROP @	60 %	effective =	1.13
	% EFFECTIVE IMP. =		48.02

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
129	0.359	1.610	0.042	72.00	0.112	0.275	3.50	0.289	48.02

LOSS PARAMETERS FOR SUBBASIN: 130

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.193	43.97	0.35	-0.200	35.00	15.39
CeC	0.136	31.12	0.06	-0.380	0.00	0.00
18	0.099	22.59	0.33	-0.109	15.00	3.39
AoB	0.007	1.50	0.4	-0.006	0.00	0.00
TrB	0.004	0.81	0.1	-0.008	0.00	0.00

TOTAL = 0.438 SQ.MI. XKSAT = 0.20 %ROCK= 18.78

DTHETA

Dry = 0.38
Normal = 0.25
Wet = 0

PSIF

= 5.05

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.438	VACANT	100.00	DRY	25.00	0.00	0.00	0.15	0.150
0.438	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.00	AVG. =	0.150
					% =	0.00		

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.380

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.233

IMPERVIOUS AREA: URBAN @ 100 % effective = 0.00
ROCK OUTCROP @ 60 % effective = 11.27

% EFFECTIVE IMP. = 11.27

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
130	0.438	1.250	0.089	308.00	0.150	0.380	5.05	0.233	11.27

LOSS PARAMETERS FOR SUBBASIN: 131

Soil Survey Used AGUILA, CENTRAL & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
TrB	0.221	40.31	0.1	-0.403	0.00	0.00
18	0.192	35.01	0.33	-0.169	15.00	5.25
AdA	0.040	7.33	0.4	-0.029	0.00	0.00
CeC	0.037	6.76	0.06	-0.083	0.00	0.00
AoB	0.027	4.99	0.4	-0.020	0.00	0.00
PvC	0.019	3.52	0.4	-0.014	0.00	0.00
RS	0.010	1.87	0.4	-0.007	65.00	1.21
CO	0.001	0.22	0.29	-0.001	20.00	0.04
TOTAL =	0.548 SQ.MI.		XKSAT =	0.19	%ROCK=	6.51

DTHETA

Dry = 0.38
Normal = 0.25
Wet = 0

PSIF

= 5.36

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.165	VACANT	30.06	DRY	25.00	0.00	0.00	0.15	0.045
0.016	L.D.R.	2.98	NORMAL	25.00	25.00	0.00	0.10	0.003
0.076	M.F.R.	13.84	NORMAL	25.00	65.00	0.05	0.10	0.014
0.249	M.D.R.	45.46	NORMAL	25.00	45.00	0.11	0.10	0.045
0.042	COMM	7.66	NORMAL	20.00	90.00	0.04	0.10	0.008
0.548	=TOTAL AREA	OK	AVERAGE =	24.62	TOTAL =	0.20	AVG. =	0.115
					% =	37.09		

PERCENT OF SUBBASIN DRY = 30.06 %
NORMAL = 69.94 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.289

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.221

IMPERVIOUS AREA: URBAN @ 100 % effective = 37.09
ROCK OUTCROP @ 60 % effective = 3.90

% EFFECTIVE IMP. = 41.00

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
131	0.548	2.060	0.043	257.00	0.115	0.289	5.36	0.221	41.00

Green-Ampt Parameters
(Future Condition)

TABLE 12

Average Green Ampt Parameters
Future Conditions

Sub-Basin I.D.	IA(in)	DTHETA	PSIF(in)	XKSAT (in/hr)	RTIMP (%)
100	0.111	0.263	4.74	0.253	33.99
101	0.159	0.156	7.78	0.118	20.17
102	0.145	0.272	3.61	0.327	30.70
103	0.150	0.265	4.43	0.256	24.31
104	0.100	0.230	6.78	0.163	22.24
105	0.113	0.276	3.50	0.291	35.10
106	0.114	0.284	4.43	0.256	28.26
107	0.102	0.256	6.60	0.174	22.64
110	0.100	0.150	7.50	0.116	17.68
111	0.107	0.270	5.98	0.198	25.36
112	0.126	0.301	3.87	0.372	21.54
113	0.117	0.153	7.50	0.127	36.09
114	0.126	0.302	3.98	0.396	38.60
115	0.121	0.262	6.78	0.172	41.90
116	0.116	0.176	8.05	0.094	64.68
117	0.136	0.257	3.71	0.399	37.08
118	0.150	0.350	4.03	0.408	21.00
119	0.150	0.350	4.03	0.408	21.00
120	0.128	0.312	4.12	0.268	32.06
121	0.109	0.268	3.82	0.354	46.68
122	0.137	0.332	3.81	0.280	27.42
123	0.100	0.250	5.67	0.186	78.29
124	0.100	0.250	4.30	0.461	53.47
125	0.142	0.335	3.71	0.337	26.62
126	0.109	0.273	6.60	0.174	60.54
127	0.138	0.327	4.24	0.452	28.59
128	0.148	0.346	3.92	0.382	22.92
129	0.101	0.251	3.50	0.284	66.74
130	0.147	0.372	5.05	0.230	17.00
131	0.113	0.284	5.36	0.220	44.46

LOSS PARAMETERS FOR SUBBASIN: 100 (FUTURE)

Soil Survey Used EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PvC	0.189	40.38	0.4	-0.161	0.00	0.00
CeC	0.112	23.96	0.06	-0.293	0.00	0.00
Ro	0.112	23.90	0.25	-0.144	65.00	15.54
LaB	0.055	11.76	0.25	-0.071	0.00	0.00

TOTAL = 0.468 SQ.MI. XKSAT = 0.21 %ROCK= 15.54

DTHETA		PSIF	
Dry =	0.37	=	4.74
Normal =	0.25		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.050	VACANT	10.68	DRY	25.00	0.00	0.00	0.15	0.016
0.261	V.L.D.R	55.81	NORMAL	25.00	15.00	0.04	0.10	0.056
0.087	M.F.R.	18.47	NORMAL	25.00	65.00	0.06	0.10	0.018
0.045	M.D.R.	9.55	NORMAL	25.00	45.00	0.02	0.10	0.010
0.026	GC/PARK	5.49	NORMAL	90.00	0.00	0.00	0.20	0.011
0.468	=TOTAL AREA	OK	AVERAGE =	28.57	TOTAL =	0.12	AVG. =	0.111
					% =	24.67		

PERCENT OF SUBBASIN DRY = 10.68 %
NORMAL = 89.32 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.263

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.253

IMPERVIOUS AREA: URBAN @ 100 % effective = 24.67
ROCK OUTCROP @ 60 % effective = 9.32
% EFFECTIVE IMP. = 33.99

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
100F	0.468	1.160	0.043	315.00	0.111	0.263	4.74	0.253	33.99

LOSS PARAMETERS FOR SUBBASIN: 101 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.488	76.34	0.06	-0.933	0.00	0.00
Ro	0.092	14.36	0.25	-0.086	65.00	9.33
109	0.057	8.85	0.35	-0.040	35.00	3.10
LaB	0.003	0.45	0.25	-0.003	0.00	0.00
TOTAL =	0.639 SQ.MI.		XKSAT =	0.09	%ROCK=	12.43

DTHETA

Dry = 0.33
Normal = 0.15
Wet = 0

PSIF

= 7.78

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.020	VACANT	3.19	DRY	25.00	0.00	0.00	0.15	0.005
0.476	V.L.D.R	74.37	NORMAL	25.00	15.00	0.07	0.15	0.112
0.015	M.F.R.	2.39	NORMAL	25.00	65.00	0.01	0.10	0.002
0.128	GC	20.04	NORMAL	90.00	0.00	0.00	0.20	0.040
0.639	=TOTAL AREA	OK	AVERAGE =	38.03	TOTAL =	0.08	AVG. =	0.159
					% =	12.71		

PERCENT OF SUBBASIN
DRY = 3.19 %
NORMAL = 96.81 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.156

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.118

IMPERVIOUS AREA:
URBAN @ 100 % effective = 12.71
ROCK OUTCROP @ 60 % effective = 7.46
% EFFECTIVE IMP. = 20.17

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
101F	0.639	1.730	0.041	287.00	0.159	0.156	7.78	0.118	20.17

LOSS PARAMETERS FOR SUBBASIN: 102 (FUTURE)

Soil Survey Used EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
Ro	0.224	24.71	0.25	-0.149	65.00	16.06
Ru	0.197	21.71	0.4	-0.086	20.00	4.34
PvC	0.129	14.24	0.4	-0.057	0.00	0.00
CeC	0.113	12.43	0.06	-0.152	0.00	0.00
LaB	0.100	11.07	0.25	-0.067	0.00	0.00
AoB	0.080	8.83	0.4	-0.035	0.00	0.00
Va	0.064	7.01	0.4	-0.028	0.00	0.00

TOTAL = 0.907 SQ.MI. XKSAT = 0.27 %ROCK= 20.40

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.61

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.195	VACANT	21.52	DRY	25.00	0.00	0.00	0.15	0.032
0.496	V.L.D.R	54.73	NORMAL	25.00	15.00	0.07	0.15	0.082
0.020	L.D.R.	2.24	NORMAL	25.00	25.00	0.01	0.10	0.002
0.135	M.F.R.	14.90	NORMAL	25.00	65.00	0.09	0.10	0.015
0.060	GC	6.61	NORMAL	90.00	0.00	0.00	0.20	0.013
0.907	=TOTAL AREA	OK	AVERAGE =	29.30	TOTAL =	0.17	AVG. =	0.145
					% =	18.45		

PERCENT OF SUBBASIN DRY = 21.52 %
NORMAL = 78.48 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.272

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.327

IMPERVIOUS AREA: URBAN @ 100 % effective = 18.45
ROCK OUTCROP @ 60 % effective = 12.24

% EFFECTIVE IMP. = 30.70

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
102F	0.907	1.490	0.046	315.00	0.145	0.272	3.61	0.327	30.70

LOSS PARAMETERS FOR SUBBASIN: 103 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.396	49.81	0.35	-0.227	35.00	17.43
CeC	0.226	28.41	0.06	-0.347	0.00	0.00
PvC	0.126	15.88	0.4	-0.063	0.00	0.00
Ru	0.044	5.57	0.4	-0.022	20.00	1.11
LaB	0.003	0.33	0.25	-0.002	0.00	0.00

TOTAL = 0.795 SQ.MI. XKSAT = 0.22 %ROCK= 18.55

DTHETA

Dry = 0.37
Normal = 0.25
Wet = 0

PSIF

= 4.43

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.096	VACANT	12.14	DRY	25.00	0.00	0.00	0.15	0.018
0.699	V.L.D.R	87.86	NORMAL	25.00	15.00	0.10	0.15	0.132
0.795	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.10	AVG. =	0.150
					% =	13.18		

PERCENT OF SUBBASIN DRY = 12.14 %
NORMAL = 87.86 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.265

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.256

IMPERVIOUS AREA: URBAN @ 100 % effective = 13.18
ROCK OUTCROP @ 60 % effective = 11.13
% EFFECTIVE IMP. = 24.31

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
103F	0.795	2.450	0.048	300.00	0.150	0.265	4.43	0.256	24.31

LOSS PARAMETERS FOR SUBBASIN: 104 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.279	53.85	0.06	-0.658	0.00	0.00
109	0.110	21.23	0.35	-0.097	35.00	7.43
Ru	0.071	13.63	0.4	-0.054	20.00	2.73
PvC	0.058	11.29	0.4	-0.045	0.00	0.00

TOTAL = 0.518 SQ.MI. XKSAT = 0.14 %ROCK= 10.16

DTHETA

Dry = 0.39
Normal = 0.23
Wet = 0

PSIF

= 6.78

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.498	V.L.D.R	96.16	NORMAL	25.00	15.00	0.07	0.10	0.096
0.020	M.D.R.	3.84	NORMAL	25.00	45.00	0.01	0.10	0.004
0.518	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.08	AVG. =	0.100
					% =	16.15		

PERCENT OF SUBBASIN
DRY = 0.00 %
NORMAL = 100.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.230

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.163

IMPERVIOUS AREA:
URBAN @ 100 % effective = 16.15
ROCK OUTCROP @ 60 % effective = 6.09
% EFFECTIVE IMP. = 22.24

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
104F	0.518	1.410	0.045	290.00	0.100	0.230	6.78	0.163	22.24

LOSS PARAMETERS FOR SUBBASIN: 105 (FUTURE)

Soil Survey Used CENTRAL & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
Ru	0.156	38.78	0.4	-0.154	20.00	7.76
Ro	0.109	27.17	0.25	-0.164	65.00	17.66
CeC	0.068	16.87	0.06	-0.206	0.00	0.00
PvC	0.057	14.15	0.4	-0.056	0.00	0.00
LaB	0.008	1.95	0.25	-0.012	0.00	0.00
TrB	0.004	1.08	0.1	-0.011	0.00	0.00

TOTAL = 0.402 SQ.MI. XKSAT = 0.25 %ROCK= 25.42

DTHETA		PSIF	
Dry =	0.35	=	3.5
Normal =	0.25		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.104	VACANT	25.84	DRY	25.00	0.00	0.00	0.15	0.039
0.091	V.L.D.R	22.68	NORMAL	25.00	15.00	0.01	0.10	0.023
0.135	L.D.R.	33.58	NORMAL	25.00	25.00	0.03	0.10	0.034
0.072	M.D.R.	17.90	NORMAL	25.00	45.00	0.03	0.10	0.018
0.402	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.08	AVG. =	0.113
					% =	19.85		

PERCENT OF SUBBASIN DRY = 25.84 %
NORMAL = 74.16 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.276

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.291

IMPERVIOUS AREA: URBAN @ 100 % effective = 19.85
ROCK OUTCROP @ 60 % effective = 15.25
% EFFECTIVE IMP. = 35.10

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
105F	0.402	1.100	0.047	315.00	0.113	0.276	3.50	0.291	35.10

LOSS PARAMETERS FOR SUBBASIN: 106 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.316	71.42	0.35	-0.326	35.00	25.00
CeC	0.117	26.34	0.06	-0.322	0.00	0.00
Ru	0.010	2.24	0.4	-0.009	20.00	0.45

TOTAL = 0.443 SQ.MI. XKSAT = 0.22 %ROCK= 25.44

DTHETA

Dry = 0.37
Normal = 0.25
Wet = 0

PSIF

= 4.43

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.126	VACANT	28.45	DRY	25.00	0.00	0.00	0.15	0.043
0.284	V.L.D.R	64.02	NORMAL	25.00	15.00	0.04	0.10	0.064
0.033	M.D.R.	7.53	NORMAL	25.00	45.00	0.02	0.10	0.008
0.443	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.06	AVG. =	0.114
					% =	12.99		

PERCENT OF SUBBASIN DRY = 28.45 %
NORMAL = 71.55 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.284

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.256

IMPERVIOUS AREA: URBAN @ 100 % effective = 12.99
ROCK OUTCROP @ 60 % effective = 15.27

% EFFECTIVE IMP. = 28.26

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
106F	0.443	1.720	0.057	310.00	0.114	0.284	4.43	0.256	28.26

LOSS PARAMETERS FOR SUBBASIN: 107 (FUTURE)

Soil Survey Used EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.246	38.18	0.06	-0.467	0.00	0.00
Ru	0.142	22.03	0.4	-0.088	20.00	4.41
TrB	0.128	19.94	0.1	-0.199	0.00	0.00
AoB	0.107	16.65	0.4	-0.066	0.00	0.00
PvC	0.021	3.20	0.4	-0.013	0.00	0.00

TOTAL = 0.643 SQ.MI. XKSAT = 0.15 %ROCK= 4.41

DTHETA

Dry = 0.4
Normal = 0.25
Wet = 0

PSIF

= 6.6

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.026	VACANT	3.98	DRY	25.00	0.00	0.00	0.15	0.006
0.327	V.L.D.R	50.84	NORMAL	25.00	15.00	0.05	0.10	0.051
0.281	L.D.R.	43.62	NORMAL	25.00	25.00	0.07	0.10	0.044
0.006	COMM	0.87	NORMAL	20.00	90.00	0.01	0.10	0.001
0.004	DRNWAY	0.68	NORMAL	0.00	100.00	0.00	0.10	0.001
0.643	=TOTAL AREA	OK	AVERAGE =	24.79	TOTAL = % =	0.13 20.00	AVG. =	0.102

PERCENT OF SUBBASIN
DRY = 3.98 %
NORMAL = 96.02 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.256

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.174

IMPERVIOUS AREA:
URBAN @ 100 % effective = 20.00
ROCK OUTCROP @ 60 % effective = 2.64
% EFFECTIVE IMP. = 22.64

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
107F	0.643	1.320	0.035	139.00	0.102	0.256	6.60	0.174	22.64

LOSS PARAMETERS FOR SUBBASIN: 110 (FUTURE)

Soil Survey Used EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.123	44.23	0.06	-0.540	0.00	0.00
TrB	0.111	39.86	0.1	-0.399	0.00	0.00
PvC	0.038	13.84	0.4	-0.055	0.00	0.00
AoB	0.006	2.06	0.4	-0.008	0.00	0.00

TOTAL = 0.278 SQ.MI. XKSAT = 0.10 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.15
Wet = 0

PSIF

= 7.5

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.269	V.L.D.R	96.85	NORMAL	25.00	15.00	0.04	0.10	0.097
0.009	DRNWAY	3.15	NORMAL	0.00	100.00	0.01	0.10	0.003
0.278	=TOTAL AREA	OK	AVERAGE =	24.21	TOTAL =	0.05	AVG. =	0.100
					% =	17.68		

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 100.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.150

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.116

IMPERVIOUS AREA: URBAN @ 100 % effective = 17.68
ROCK OUTCROP @ 60 % effective = 0.00

% EFFECTIVE IMP. = 17.68

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
110F	0.278	1.340	0.048	95.00	0.100	0.150	7.50	0.116	17.68

LOSS PARAMETERS FOR SUBBASIN: 111 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.196	36.85	0.06	-0.450	0.00	0.00
109	0.163	30.57	0.35	-0.139	35.00	10.70
PvC	0.067	12.54	0.4	-0.050	0.00	0.00
Ru	0.066	12.43	0.4	-0.049	20.00	2.49
TrB	0.041	7.61	0.1	-0.076	0.00	0.00

TOTAL = 0.533 SQ.MI. XKSAT = 0.17 %ROCK= 13.19

DTHETA

Dry = 0.39
Normal = 0.25
Wet = 0

PSIF

= 5.98

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.078	VACANT	14.59	DRY	25.00	0.00	0.00	0.15	0.022
0.378	V.L.D.R	71.01	NORMAL	25.00	15.00	0.06	0.10	0.071
0.074	M.D.R.	13.82	NORMAL	25.00	45.00	0.03	0.10	0.014
0.003	DRNWAY	0.58	NORMAL	0.00	100.00	0.00	0.10	0.001
0.533	=TOTAL AREA	OK	AVERAGE =	24.86	TOTAL = % =	0.09 17.45	AVG. =	0.107

PERCENT OF SUBBASIN DRY = 14.59 %
NORMAL = 85.41 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.270

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.198

IMPERVIOUS AREA: URBAN @ 100 % effective = 17.45
ROCK OUTCROP @ 60 % effective = 7.91

% EFFECTIVE IMP. = 25.36

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
111F	0.533	1.940	0.048	296.00	0.107	0.270	5.98	0.198	25.36

LOSS PARAMETERS FOR SUBBASIN: 112 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.315	49.57	0.35	-0.226	35.00	17.35
PvC	0.133	20.95	0.4	-0.083	0.00	0.00
Ru	0.132	20.82	0.4	-0.083	20.00	4.16
CeC	0.028	4.44	0.06	-0.054	0.00	0.00
TrB	0.027	4.22	0.1	-0.042	0.00	0.00

TOTAL = 0.636 SQ.MI. XKSAT = 0.32 %ROCK= 21.51

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.87

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.327	VACANT	51.38	DRY	25.00	0.00	0.00	0.15	0.077
0.252	V.L.D.R	39.67	NORMAL	25.00	15.00	0.04	0.10	0.040
0.053	L.D.R.	8.37	NORMAL	25.00	25.00	0.01	0.10	0.008
0.004	DRNWAY	0.59	NORMAL	0.00	100.00	0.00	0.10	0.001
0.636	=TOTAL AREA	OK	AVERAGE =	24.85	TOTAL = % =	0.05 8.63	AVG. =	0.126

PERCENT OF SUBBASIN DRY = 51.38 %
NORMAL = 48.62 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.301

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.372

IMPERVIOUS AREA:

URBAN @	100 %	effective =	8.63
ROCK OUTCROP @	60 %	effective =	12.91
% EFFECTIVE IMP. =			21.54

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
112F	0.636	2.360	0.063	283.00	0.126	0.301	3.87	0.372	21.54

LOSS PARAMETERS FOR SUBBASIN: 113 (FUTURE)

Soil Survey Used EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.266	71.64	0.06	-0.875	0.00	0.00
Ru	0.071	19.03	0.4	-0.076	20.00	3.81
PvC	0.029	7.95	0.4	-0.032	0.00	0.00
TrB	0.005	1.38	0.1	-0.014	0.00	0.00

TOTAL = 0.371 SQ.MI. XKSAT = 0.10 %ROCK= 3.81

DTHETA

Dry = 0.35
Normal = 0.15
Wet = 0

PSIF

= 7.5

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.006	VACANT	1.56	DRY	25.00	0.00	0.00	0.15	0.002
0.129	V.L.D.R	34.79	NORMAL	25.00	15.00	0.02	0.10	0.035
0.015	M.F.R.	4.02	NORMAL	25.00	65.00	0.01	0.10	0.004
0.113	M.D.R.	30.54	NORMAL	25.00	45.00	0.05	0.10	0.031
0.042	COMM	11.30	NORMAL	20.00	90.00	0.04	0.10	0.011
0.008	DRNWAY	2.06	NORMAL	0.00	100.00	0.01	0.10	0.002
0.058	GC	15.73	NORMAL	90.00	0.00	0.00	0.20	0.031
0.371	=TOTAL AREA	OK	AVERAGE =	34.14	TOTAL =	0.13	AVG. =	0.117
					% =	33.80		

PERCENT OF SUBBASIN
DRY = 1.56 %
NORMAL = 98.44 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.153

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.127

IMPERVIOUS AREA:
URBAN @ 100 % effective = 33.80
ROCK OUTCROP @ 60 % effective = 2.28
% EFFECTIVE IMP. = 36.09

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
113F	0.371	1.280	0.034	140.00	0.117	0.153	7.50	0.127	36.09

LOSS PARAMETERS FOR SUBBASIN: 114 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.175	67.70	0.35	-0.309	35.00	23.70
Ru	0.069	26.93	0.4	-0.107	20.00	5.39
CeC	0.009	3.39	0.06	-0.041	0.00	0.00
Ro	0.005	1.98	0.25	-0.012	65.00	1.29

TOTAL = 0.258 SQ.MI. XKSAT = 0.34 %ROCK= 30.37

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.98

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.134	VACANT	51.86	DRY	25.00	0.00	0.00	0.15	0.078
0.017	L.D.R.	6.43	NORMAL	25.00	25.00	0.00	0.10	0.006
0.108	M.D.R.	41.72	NORMAL	25.00	45.00	0.05	0.10	0.042
0.258	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.05	AVG. =	0.126
					% =	20.38		

PERCENT OF SUBBASIN DRY = 51.86 %
NORMAL = 48.14 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.302

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.396

IMPERVIOUS AREA: URBAN @ 100 % effective = 20.38
ROCK OUTCROP @ 60 % effective = 18.22
% EFFECTIVE IMP. = 38.60

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
114F	0.258	0.690	0.061	301.00	0.126	0.302	3.98	0.396	38.60

LOSS PARAMETERS FOR SUBBASIN: 115 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.141	52.88	0.06	-0.646	0.00	0.00
109	0.078	29.41	0.35	-0.134	35.00	10.29
Ru	0.047	17.71	0.4	-0.070	20.00	3.54
TOTAL =	0.267 SQ.MI.		XKSAT =	0.14	%ROCK=	13.84

DTHETA

Dry = 0.39
Normal = 0.23
Wet = 0

PSIF

= 6.78

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.054	VACANT	20.12	DRY	25.00	0.00	0.00	0.15	0.030
0.066	L.D.R.	24.69	NORMAL	25.00	25.00	0.02	0.10	0.025
0.015	M.F.R.	5.80	NORMAL	25.00	65.00	0.01	0.10	0.006
0.067	M.D.R.	25.08	NORMAL	25.00	45.00	0.03	0.10	0.025
0.033	COMM	12.25	NORMAL	20.00	90.00	0.03	0.10	0.012
0.004	DRNWAY	1.35	NORMAL	0.00	100.00	0.00	0.10	0.001
0.029	GC	10.71	NORMAL	90.00	0.00	0.00	0.20	0.021
0.267	=TOTAL AREA	OK	AVERAGE =	31.01	TOTAL =	0.09	AVG. =	0.121
					% =	33.60		

PERCENT OF SUBBASIN DRY = 20.12 %
NORMAL = 79.88 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.262

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.172

IMPERVIOUS AREA: URBAN @ 100 % effective = 33.60
ROCK OUTCROP @ 60 % effective = 8.30
% EFFECTIVE IMP. = 41.90

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
115F	0.267	1.340	0.040	288.00	0.121	0.262	6.78	0.172	41.90

LOSS PARAMETERS FOR SUBBASIN: 116 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.201	80.88	0.06	-0.988	0.00	0.00
109	0.032	12.90	0.35	-0.059	35.00	4.52
Ru	0.014	5.42	0.4	-0.022	20.00	1.08
PvC	0.002	0.80	0.4	-0.003	0.00	0.00

TOTAL = 0.249 SQ.MI. XKSAT = 0.08 %ROCK= 5.60

DTHETA

Dry = 0.3
Normal = 0.15
Wet = 0

PSIF

= 8.05

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.043	VACANT	17.20	DRY	25.00	0.00	0.00	0.15	0.026
0.011	L.D.R.	4.56	NORMAL	25.00	25.00	0.00	0.10	0.005
0.003	M.F.R.	1.15	NORMAL	25.00	65.00	0.00	0.10	0.001
0.006	M.D.R.	2.56	NORMAL	25.00	45.00	0.00	0.10	0.003
0.045	IND	18.03	NORMAL	20.00	75.00	0.03	0.10	0.018
0.117	COMM	47.02	NORMAL	20.00	90.00	0.11	0.10	0.047
0.006	DRNWAY	2.45	NORMAL	0.00	100.00	0.01	0.10	0.002
0.018	GC	7.04	NORMAL	90.00	0.00	0.00	0.20	0.014
0.249	=TOTAL AREA	OK	AVERAGE =	25.71	TOTAL =	0.15	AVG. =	0.116
					% =	61.32		

PERCENT OF SUBBASIN DRY = 17.20 %
NORMAL = 82.80 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.176

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.094

IMPERVIOUS AREA: URBAN @ 100 % effective = 61.32
ROCK OUTCROP @ 60 % effective = 3.36
% EFFECTIVE IMP. = 64.68

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
116F	0.249	0.720	0.038	250.00	0.116	0.176	8.05	0.094	64.68

LOSS PARAMETERS FOR SUBBASIN: 117 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PvC	0.205	79.97	0.4	-0.318	0.00	0.00
CeC	0.026	10.28	0.06	-0.126	0.00	0.00
TrB	0.022	8.40	0.1	-0.084	0.00	0.00
109	0.003	1.35	0.35	-0.006	35.00	0.47
TOTAL =	0.256 SQ.MI.		XKSAT =	0.29	%ROCK=	0.47

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.71

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.019	VACANT	7.46	DRY	25.00	0.00	0.00	0.15	0.011
0.026	M.F.R.	10.01	NORMAL	25.00	65.00	0.02	0.10	0.010
0.070	M.D.R.	27.49	NORMAL	25.00	45.00	0.03	0.10	0.027
0.050	IND	19.45	NORMAL	20.00	75.00	0.04	0.10	0.019
0.009	DRNWAY	3.34	NORMAL	0.00	100.00	0.01	0.10	0.003
0.083	PARK	32.26	NORMAL	90.00	0.00	0.00	0.20	0.065
0.256	=TOTAL AREA	OK	AVERAGE =	44.16	TOTAL =	0.09	AVG. =	0.136
					% =	36.80		

PERCENT OF SUBBASIN
DRY = 7.46 %
NORMAL = 92.54 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.257

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.399

IMPERVIOUS AREA:
URBAN @ 100 % effective = 36.80
ROCK OUTCROP @ 60 % effective = 0.28
% EFFECTIVE IMP. = 37.08

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
117F	0.256	1.000	0.031	156.00	0.136	0.257	3.71	0.399	37.08

LOSS PARAMETERS FOR SUBBASIN: 118 (FUTURE)

Soil Survey Used AGUILA

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.299	100.00	0.35	-0.456	35.00	35.00
TOTAL =	0.299 SQ.MI.		XKSAT =	0.35	%ROCK=	35.00

DTHETA

Dry =	0.35
Normal =	0.25
Wet =	0

PSIF

=	4.03

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.299	VACANT	100.00	DRY	25.00	0.00	0.00	0.15	0.150
0.299	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.00	AVG. =	0.150
					% =	0.00		

PERCENT OF SUBBASIN

DRY =	100.00 %
NORMAL =	0.00 %
WET =	0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.408

IMPERVIOUS AREA:

URBAN @	100 %	effective =	0.00
ROCK OUTCROP @	60 %	effective =	21.00
	% EFFECTIVE IMP. =		21.00

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
118F	0.299	0.600	0.093	298.00	0.150	0.350	4.03	0.408	21.00

LOSS PARAMETERS FOR SUBBASIN: 119 (FUTURE)

Soil Survey Used AGUILA

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.143	100.00	0.35	-0.456	35.00	35.00
TOTAL =	0.143 SQ.MI.		XKSAT =	0.35	%ROCK=	35.00

DTHETA		PSIF	
Dry =	0.35	=	4.03
Normal =	0.25		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.143	VACANT	100.00	DRY	25.00	0.00	0.00	0.15	0.150
0.143	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.00	AVG. =	0.150
					% =	0.00		

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.408

IMPERVIOUS AREA: URBAN @ 100 % effective = 0.00
ROCK OUTCROP @ 60 % effective = 21.00
% EFFECTIVE IMP. = 21.00

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
119F	0.143	0.570	0.101	320.00	0.150	0.350	4.03	0.408	21.00

LOSS PARAMETERS FOR SUBBASIN: 120 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.153	58.66	0.35	-0.267	35.00	20.53
CeC	0.064	24.54	0.06	-0.300	0.00	0.00
PvC	0.044	16.80	0.4	-0.067	0.00	0.00
TOTAL =	0.260 SQ.MI.		XKSAT =	0.23	%ROCK=	20.53

DTHETA		PSIF	
Dry =	0.36	=	4.12
Normal =	0.25		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.146	VACANT	56.12	DRY	25.00	0.00	0.00	0.15	0.084
0.114	M.D.R.	43.88	NORMAL	25.00	45.00	0.05	0.10	0.044
0.260	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL = % =	0.05 19.75	AVG. =	0.128

PERCENT OF SUBBASIN DRY = 56.12 %
NORMAL = 43.88 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.312

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.268

IMPERVIOUS AREA:
URBAN @ 100 % effective = 19.75
ROCK OUTCROP @ 60 % effective = 12.32
% EFFECTIVE IMP. = 32.06

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
120F	0.260	0.890	0.064	320.00	0.128	0.312	4.12	0.268	32.06

LOSS PARAMETERS FOR SUBBASIN: 121 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PvC	0.230	67.37	0.4	-0.268	0.00	0.00
109	0.052	15.10	0.35	-0.069	35.00	5.28
CeC	0.029	8.48	0.06	-0.104	0.00	0.00
TrB	0.015	4.52	0.1	-0.045	0.00	0.00
AoB	0.011	3.14	0.4	-0.012	0.00	0.00
Ro	0.005	1.39	0.25	-0.008	65.00	0.90

TOTAL = 0.341 SQ.MI. XKSAT = 0.31 %ROCK= 6.19

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.82

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.060	VACANT	17.69	DRY	25.00	0.00	0.00	0.15	0.027
0.020	M.F.R.	5.91	NORMAL	25.00	65.00	0.01	0.10	0.006
0.226	M.D.R.	66.10	NORMAL	25.00	45.00	0.10	0.10	0.066
0.031	R.O.W.	9.16	NORMAL	5.00	90.00	0.03	0.10	0.009
0.004	DRNWAY	1.12	NORMAL	0.00	100.00	0.00	0.10	0.001
0.341	=TOTAL AREA	OK	AVERAGE =	22.89	TOTAL =	0.15	AVG. =	0.109
					% =	42.96		

PERCENT OF SUBBASIN DRY = 17.69 %
NORMAL = 82.31 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.268

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.354

IMPERVIOUS AREA: URBAN @ 100 % effective = 42.96
ROCK OUTCROP @ 60 % effective = 3.71
% EFFECTIVE IMP. = 46.68

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
121F	0.341	1.750	0.037	289.00	0.109	0.268	3.82	0.354	46.68

LOSS PARAMETERS FOR SUBBASIN: 122 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.477	70.23	0.35	-0.320	35.00	24.58
CeC	0.149	22.00	0.06	-0.269	0.00	0.00
AoB	0.031	4.57	0.4	-0.018	0.00	0.00
Ro	0.020	2.97	0.25	-0.018	65.00	1.93
PvC	0.002	0.23	0.4	-0.001	0.00	0.00

TOTAL = 0.679 SQ.MI. XKSAT = 0.24 %ROCK= 26.51

DTHETA

Dry = 0.36
Normal = 0.25
Wet = 0

PSIF

= 3.81

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.506	VACANT	74.42	DRY	25.00	0.00	0.00	0.15	0.112
0.174	M.D.R.	25.58	NORMAL	25.00	45.00	0.08	0.10	0.026
0.679	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.08	AVG. =	0.137
					% =	11.51		

PERCENT OF SUBBASIN
DRY = 74.42 %
NORMAL = 25.58 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.332

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.280

IMPERVIOUS AREA:
URBAN @ 100 % effective = 11.51
ROCK OUTCROP @ 60 % effective = 15.91
% EFFECTIVE IMP. = 27.42

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
122F	0.679	1.900	0.069	306.00	0.137	0.332	3.81	0.280	27.42

LOSS PARAMETERS FOR SUBBASIN: 123 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.014	40.87	0.06	-0.499	0.00	0.00
AoB	0.013	36.27	0.4	-0.144	0.00	0.00
109	0.008	22.85	0.35	-0.104	35.00	8.00

TOTAL = 0.035 SQ.MI. XKSAT = 0.18 %ROCK= 8.00

DTHETA

Dry = 0.39
Normal = 0.25
Wet = 0

PSIF

= 5.67

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.002	M.F.R.	5.64	NORMAL	25.00	65.00	0.00	0.10	0.006
0.012	M.D.R.	33.55	NORMAL	25.00	45.00	0.01	0.10	0.034
0.021	R.O.W.	60.81	NORMAL	5.00	90.00	0.02	0.10	0.061
0.035	=TOTAL AREA	OK	AVERAGE =	12.84	TOTAL = % =	0.03 73.49	AVG. =	0.100

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 100.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.250

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.186

IMPERVIOUS AREA: URBAN @ 100 % effective = 73.49
ROCK OUTCROP @ 60 % effective = 4.80
% EFFECTIVE IMP. = 78.29

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
123F	0.035	0.710	0.032	76.00	0.100	0.250	5.67	0.186	78.29

LOSS PARAMETERS FOR SUBBASIN: 124 (FUTURE)

Soil Survey Used EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PvC	0.062	73.92	0.4	-0.294	0.00	0.00
AoB	0.022	26.08	0.4	-0.104	0.00	0.00
TOTAL =	0.083 SQ.MI.		XKSAT =	0.40	%ROCK=	0.00

DTHETA

Dry =	0.35
Normal =	0.25
Wet =	0

PSIF

= 4.3

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.020	M.F.R.	24.57	NORMAL	25.00	65.00	0.01	0.10	0.025
0.057	M.D.R.	68.48	NORMAL	25.00	45.00	0.03	0.10	0.068
0.002	COMM	2.65	NORMAL	20.00	90.00	0.00	0.10	0.003
0.004	DRNWAY	4.29	NORMAL	0.00	100.00	0.00	0.10	0.004
0.083	=TOTAL AREA	OK	AVERAGE =	23.79	TOTAL =	0.04	AVG. =	0.100
					% =	53.47		

PERCENT OF SUBBASIN

DRY =	0.00 %
NORMAL =	100.00 %
WET =	0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.250

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.461

IMPERVIOUS AREA:

URBAN @	100 %	effective =	53.47
ROCK OUTCROP @	60 %	effective =	0.00
% EFFECTIVE IMP. =			53.47

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
124F	0.083	0.600	0.029	67.00	0.100	0.250	4.30	0.461	53.47

LOSS PARAMETERS FOR SUBBASIN: 125 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.050	89.46	0.35	-0.408	35.00	31.31
CeC	0.006	10.54	0.06	-0.129	0.00	0.00
TOTAL =	0.056 SQ.MI.		XKSAT =	0.29	%ROCK=	31.31

DTHETA		PSIF	
Dry =	0.35	=	3.71
Normal =	0.25		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.047	VACANT	84.76	DRY	25.00	0.00	0.00	0.15	0.127
0.001	M.F.R.	2.48	NORMAL	25.00	65.00	0.00	0.10	0.002
0.007	M.D.R.	11.71	NORMAL	25.00	45.00	0.00	0.10	0.012
0.001	R.O.W.	1.05	NORMAL	5.00	90.00	0.00	0.10	0.001
0.056	=TOTAL AREA	OK	AVERAGE =	24.79	TOTAL =	0.00	AVG. =	0.142
					% =	7.83		

PERCENT OF SUBBASIN DRY = 84.76 %
NORMAL = 15.24 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.335

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.337

IMPERVIOUS AREA:

URBAN @	100 %	effective =	7.83
ROCK OUTCROP @	60 %	effective =	18.79
% EFFECTIVE IMP. =			26.62

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
125F	0.056	0.470	0.099	228.00	0.142	0.335	3.71	0.337	26.62

LOSS PARAMETERS FOR SUBBASIN: 126 (FUTURE)

Soil Survey Used AGUILA, CENTRAL & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CeC	0.263	42.34	0.06	-0.517	0.00	0.00
AoB	0.105	16.90	0.4	-0.067	0.00	0.00
109	0.085	13.73	0.35	-0.063	35.00	4.81
Ro	0.068	10.96	0.25	-0.066	65.00	7.12
TfB	0.045	7.31	0.36	-0.032	0.00	0.00
TrB	0.031	5.04	0.1	-0.050	0.00	0.00
RS	0.009	1.50	0.4	-0.006	65.00	0.97
AdA	0.007	1.12	0.4	-0.004	0.00	0.00
CrB	0.007	1.10	0.4	-0.004	0.00	0.00

TOTAL = 0.622 SQ.MI. XKSAT = 0.15 %ROCK= 12.90

DTHETA

Dry = 0.4
Normal = 0.25
Wet = 0

PSIF

= 6.6

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.097	VACANT	15.57	DRY	25.00	0.00	0.00	0.15	0.023
0.150	M.F.R.	24.12	NORMAL	25.00	65.00	0.10	0.10	0.024
0.220	M.D.R.	35.39	NORMAL	25.00	45.00	0.10	0.10	0.035
0.006	DRNWAY	0.92	NORMAL	0.00	100.00	0.01	0.10	0.001
0.130	COMM	20.90	NORMAL	20.00	90.00	0.12	0.10	0.021
0.010	R.O.W.	1.63	NORMAL	5.00	90.00	0.01	0.10	0.002
0.009	PARK	1.48	NORMAL	90.00	0.00	0.00	0.20	0.003
0.622	=TOTAL AREA	OK	AVERAGE =	24.36	TOTAL =	0.33	AVG. =	0.109
					% =	52.79		

PERCENT OF SUBBASIN DRY = 15.57 %
NORMAL = 84.43 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.273

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.174

IMPERVIOUS AREA: URBAN @ 100 % effective = 52.79
ROCK OUTCROP @ 60 % effective = 7.74

% EFFECTIVE IMP. = 60.54

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
126F	0.622	1.990	0.033	258.00	0.109	0.273	6.60	0.174	60.54

LOSS PARAMETERS FOR SUBBASIN: 127 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	1.044	74.64	0.35	-0.340	35.00	26.12
68	0.255	18.25	0.63	-0.037	0.00	0.00
Ru	0.083	5.96	0.4	-0.024	20.00	1.19
21	0.012	0.85	0.38	-0.004	0.00	0.00
98	0.004	0.30	0.37	-0.001	0.00	0.00

TOTAL = 1.398 SQ.MI. XKSAT = 0.39 %ROCK= 27.32

DTHETA		PSIF	
Dry =	0.35	=	4.24
Normal =	0.25		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
1.073	VACANT	76.75	DRY	25.00	0.00	0.00	0.15	0.115
0.017	M.F.R.	1.23	NORMAL	25.00	65.00	0.01	0.10	0.001
0.261	M.D.R.	18.70	NORMAL	25.00	45.00	0.12	0.10	0.019
0.046	R.O.W.	3.31	NORMAL	5.00	90.00	0.04	0.10	0.003
1.398	=TOTAL AREA	OK	AVERAGE =	24.34	TOTAL =	0.17	AVG. =	0.138
					% =	12.20		

PERCENT OF SUBBASIN DRY = 76.75 %
NORMAL = 23.25 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.327

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.452

IMPERVIOUS AREA: URBAN @ 100 % effective = 12.20
ROCK OUTCROP @ 60 % effective = 16.39
% EFFECTIVE IMP. = 28.59

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
127F	1.398	2.390	0.063	263.00	0.138	0.327	4.24	0.452	28.59

LOSS PARAMETERS FOR SUBBASIN: 128 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.295	92.49	0.35	-0.422	35.00	32.37
CeC	0.012	3.81	0.06	-0.047	0.00	0.00
AoB	0.012	3.70	0.4	-0.015	0.00	0.00

TOTAL = 0.319 SQ.MI. XKSAT = 0.33 %ROCK= 32.37

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.92

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.307	VACANT	96.11	DRY	25.00	0.00	0.00	0.15	0.144
0.012	R.O.W.	3.89	NORMAL	5.00	90.00	0.01	0.10	0.004
0.319	=TOTAL AREA	OK	AVERAGE =	24.22	TOTAL =	0.01	AVG. =	0.148
					% =	3.50		

PERCENT OF SUBBASIN
DRY = 96.11 %
NORMAL = 3.89 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.346

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.382

IMPERVIOUS AREA:
URBAN @ 100 % effective = 3.50
ROCK OUTCROP @ 60 % effective = 19.42
% EFFECTIVE IMP. = 22.92

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
128F	0.319	0.940	0.090	290.00	0.148	0.346	3.92	0.382	22.92

LOSS PARAMETERS FOR SUBBASIN: 129 (FUTURE)

Soil Survey Used AGUILA, CENTRAL & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
AoB	0.202	56.50	0.4	-0.225	0.00	0.00
TrB	0.111	31.05	0.1	-0.311	0.00	0.00
AdA	0.027	7.67	0.4	-0.031	0.00	0.00
Ro	0.008	2.35	0.25	-0.014	65.00	1.53
CeC	0.007	1.99	0.06	-0.024	0.00	0.00
RS	0.002	0.44	0.4	-0.002	65.00	0.28
TOTAL =	0.357 SQ.MI.		XKSAT =	0.25	%ROCK=	1.81

DTHETA		PSIF	
Dry =	0.35	=	3.5
Normal =	0.25		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.004	VACANT	1.20	DRY	25.00	0.00	0.00	0.15	0.002
0.080	M.F.R.	22.42	NORMAL	25.00	65.00	0.05	0.10	0.022
0.142	M.D.R.	39.80	NORMAL	25.00	45.00	0.06	0.10	0.040
0.111	COMM	31.10	NORMAL	20.00	90.00	0.10	0.10	0.031
0.011	R.O.W.	2.97	NORMAL	5.00	90.00	0.01	0.10	0.003
0.009	DRNWAY	2.50	NORMAL	0.00	100.00	0.01	0.10	0.002
0.357	=TOTAL AREA	OK	AVERAGE =	22.23	TOTAL =	0.23	AVG. =	0.101
					% =	65.65		

PERCENT OF SUBBASIN

DRY =	1.20	%
NORMAL =	98.80	%
WET =	0.00	%

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.251

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.284

IMPERVIOUS AREA:

URBAN @	100 %	effective =	65.65
ROCK OUTCROP @	60 %	effective =	1.09
	% EFFECTIVE IMP. =		66.74

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
129F	0.357	1.610	0.026	72.00	0.101	0.251	3.50	0.284	66.74

LOSS PARAMETERS FOR SUBBASIN: 130 (FUTURE)

Soil Survey Used AGUILA & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
109	0.189	43.40	0.35	-0.198	35.00	15.19
CeC	0.138	31.61	0.06	-0.386	0.00	0.00
18	0.099	22.70	0.33	-0.109	15.00	3.40
AoB	0.006	1.48	0.4	-0.006	0.00	0.00
TrB	0.004	0.82	0.1	-0.008	0.00	0.00

TOTAL = 0.436 SQ.MI. XKSAT = 0.20 %ROCK= 18.59

DTHETA

Dry = 0.38
Normal = 0.25
Wet = 0

PSIF

= 5.05

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.408	VACANT	93.51	DRY	25.00	0.00	0.00	0.15	0.140
0.028	R.O.W.	6.49	NORMAL	5.00	90.00	0.03	0.10	0.006
0.436	=TOTAL AREA	OK	AVERAGE =	23.70	TOTAL =	0.03	AVG. =	0.147
					% =	5.84		

PERCENT OF SUBBASIN DRY = 93.51 %
NORMAL = 6.49 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.372

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.230

IMPERVIOUS AREA: URBAN @ 100 % effective = 5.84
ROCK OUTCROP @ 60 % effective = 11.16
% EFFECTIVE IMP. = 17.00

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
130F	0.436	1.250	0.082	308.00	0.147	0.372	5.05	0.230	17.00

LOSS PARAMETERS FOR SUBBASIN: 131 (FUTURE)

Soil Survey Used AGUILA, CENTRAL & EAST

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
TrB	0.221	40.31	0.1	-0.403	0.00	0.00
18	0.192	35.01	0.33	-0.169	15.00	5.25
AdA	0.040	7.33	0.4	-0.029	0.00	0.00
CeC	0.037	6.76	0.06	-0.083	0.00	0.00
AoB	0.027	4.99	0.4	-0.020	0.00	0.00
PvC	0.019	3.52	0.4	-0.014	0.00	0.00
RS	0.010	1.87	0.4	-0.007	65.00	1.21
CO	0.001	0.22	0.29	-0.001	20.00	0.04

TOTAL = 0.548 SQ.MI. XKSAT = 0.19 %ROCK= 6.51

DTHETA		PSIF	
Dry =	0.38	=	5.36
Normal =	0.25		
Wet =	0		

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.142	VACANT	25.86	DRY	25.00	0.00	0.00	0.15	0.039
0.077	M.F.R.	14.05	NORMAL	25.00	65.00	0.05	0.10	0.014
0.278	M.D.R.	50.68	NORMAL	25.00	45.00	0.13	0.10	0.051
0.044	COMM	7.99	NORMAL	20.00	90.00	0.04	0.10	0.008
0.008	DRNWAY	1.42	NORMAL	0.00	100.00	0.01	0.10	0.001
0.548	=TOTAL AREA	OK	AVERAGE =	24.24	TOTAL =	0.22	AVG. =	0.113
					% =	40.55		

PERCENT OF SUBBASIN DRY = 25.86 %
NORMAL = 74.14 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.284

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.220

IMPERVIOUS AREA: URBAN @ 100 % effective = 40.55
ROCK OUTCROP @ 60 % effective = 3.90
% EFFECTIVE IMP. = 44.46

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
131F	0.548	2.060	0.038	257.00	0.113	0.284	5.36	0.220	44.46

SECTION III

Hydrologic Sub-Basin Characteristics

Hydrologic Sub-Basin Characteristics
(Existing Condition)

TABLE 13

Existing Hydrologic Sub-Basin Characteristics
2-Year Storm

Sub-Basin I.D.	Area (Sq. Mile)	Flow Path Length (Miles)	Adjusted Slope (Ft./Mile)	Kb	6-Hr. Time of Concentration (Hours)	24-Hr. Time of Concentration (Hours)
100	0.387	1.16	315	0.052	0.458	0.483
101	0.506	1.73	287	0.047	0.571	0.558
102	0.810	1.49	315	0.046	0.550	0.529
103	0.795	2.45	300	0.056	1.000	1.000
104	0.507	1.41	290	0.053	0.571	0.583
105	0.372	1.10	315	0.050	0.417	0.450
106	0.443	1.72	310	0.073	0.867	0.929
107	0.643	1.32	139	0.040	0.642	0.633
110	0.278	1.34	95	0.051	0.821	0.804
111	0.518	1.94	296	0.062	0.867	0.917
112	0.636	2.36	283	0.066	1.208	1.237
113	0.238	1.28	140	0.038	0.500	0.496
114	0.245	0.69	301	0.089	0.592	0.592
115	0.193	1.34	288	0.061	0.600	0.629
116	0.215	0.72	250	0.041	0.258	0.308
117	0.122	1.00	156	0.031	0.417	0.458
118	0.299	0.60	298	0.093	0.579	0.558
119	0.143	0.57	320	0.101	0.571	0.554
120	0.197	0.89	320	0.065	0.442	0.471
121	0.195	1.75	289	0.041	0.521	0.521
122	0.584	1.90	306	0.069	0.879	0.921
123	0.030	0.71	76	0.062	0.608	0.633
124	0.047	0.60	67	0.038	0.450	0.467
125	0.052	0.47	228	0.097	0.475	0.500
126	0.400	1.99	258	0.041	0.546	0.567
127	1.211	2.39	263	0.069	1.283	1.283
128	0.311	0.94	290	0.093	0.813	0.813
129	0.231	1.61	72	0.042	0.854	0.904
130	0.438	1.25	308	0.089	0.929	0.996
131	0.356	2.06	257	0.043	0.617	0.646

TABLE 14

Existing Hydrologic Sub-Basin Characteristics
10-Year Storm

Sub-Basin I.D.	Area (Sq. Mile)	Flow Path Length (Miles)	Adjusted Slope (Ft./Mile)	Kb	6-Hr. Time of Concentration (Hours)	24-Hr. Time of Concentration (Hours)
100	0.468	1.16	315	0.052	0.304	0.371
101	0.639	1.73	287	0.047	0.387	0.425
102	0.907	1.49	315	0.046	0.367	0.396
103	0.795	2.45	300	0.056	0.613	0.629
104	0.518	1.41	290	0.053	0.367	0.421
105	0.402	1.10	315	0.050	0.283	0.350
106	0.443	1.72	310	0.073	0.542	0.592
107	0.643	1.32	139	0.040	0.404	0.442
110	0.278	1.34	95	0.051	0.525	0.571
111	0.533	1.94	296	0.062	0.538	0.575
112	0.636	2.36	283	0.066	0.725	0.775
113	0.371	1.28	140	0.038	0.350	0.404
114	0.258	0.69	301	0.089	0.346	0.417
115	0.267	1.34	288	0.061	0.392	0.442
116	0.249	0.72	250	0.041	0.208	0.258
117	0.256	1.00	156	0.031	0.262	0.338
118	0.299	0.60	298	0.093	0.329	0.404
119	0.143	0.57	320	0.101	0.325	0.400
120	0.260	0.89	320	0.065	0.292	0.363
121	0.341	1.75	289	0.041	0.354	0.412
122	0.679	1.90	306	0.069	0.575	0.600
123	0.035	0.71	76	0.062	0.429	0.475
124	0.083	0.60	67	0.038	0.300	0.371
125	0.056	0.47	228	0.097	0.300	0.371
126	0.622	1.99	258	0.041	0.400	0.438
127	1.302	2.39	263	0.069	0.904	0.892
128	0.311	0.94	290	0.093	0.463	0.517
129	0.359	1.61	72	0.042	0.596	0.654
130	0.438	1.25	308	0.089	0.529	0.579
131	0.548	2.06	257	0.043	0.425	0.467

TABLE 15

Existing Hydrologic Sub-Basin Characteristics
100-Year Storm

Sub-Basin I.D.	Area (Sq. Mile)	Flow Path Length (Miles)	Adjusted Slope (Ft./Mile)	Kb	6-Hr. Time of Concentration (Hours)	24-Hr. Time of Concentration (Hours)
100	0.468	1.16	315	0.052	0.242	0.296
101	0.639	1.73	287	0.047	0.304	0.346
102	0.907	1.49	315	0.046	0.283	0.317
103	0.795	2.45	300	0.056	0.450	0.458
104	0.518	1.41	290	0.053	0.283	0.338
105	0.402	1.10	315	0.050	0.229	0.283
106	0.443	1.72	310	0.073	0.400	0.438
107	0.643	1.32	139	0.040	0.313	0.354
110	0.278	1.34	95	0.051	0.412	0.450
111	0.533	1.94	296	0.062	0.396	0.433
112	0.636	2.36	283	0.066	0.636	0.517
113	0.371	1.28	140	0.038	0.279	0.333
114	0.258	0.69	301	0.089	0.254	0.321
115	0.267	1.34	288	0.061	0.300	0.354
116	0.249	0.72	250	0.041	0.175	0.213
117	0.256	1.00	156	0.031	0.217	0.267
118	0.299	0.60	298	0.093	0.246	0.308
119	0.143	0.57	320	0.101	0.242	0.304
120	0.260	0.89	320	0.065	0.237	0.292
121	0.341	1.75	289	0.041	0.275	0.333
122	0.679	1.90	306	0.069	0.425	0.450
123	0.035	0.71	76	0.062	0.338	0.387
124	0.083	0.60	67	0.038	0.237	0.296
125	0.056	0.47	228	0.097	0.237	0.296
126	0.622	1.99	258	0.041	0.317	0.358
127	1.302	2.39	263	0.069	0.608	0.579
128	0.311	0.94	290	0.093	0.333	0.387
129	0.359	1.61	72	0.042	0.458	0.488
130	0.438	1.25	308	0.089	0.375	0.421
131	0.548	2.06	257	0.043	0.333	0.379

TABLE 16

Summary Of Sub-Basin Peak Discharges (CFS)
(Existing Conditions)

Sub-Basin I.D.	2-Year		10-Year		100-Year	
	6 Hr.	24 Hr.	6 Hr.	24 Hr.	6 Hr.	24 Hr.
100	73	75	314	301	605	652
101	101	111	430	418	791	843
102	148	156	586	587	1,139	1,275
103	65	63	314	302	709	792
104	78	87	321	311	631	681
105	83	85	282	272	529	568
106	38	35	179	168	409	440
107	98	110	400	396	792	875
110	73	48	233	140	453	304
111	76	43	313	219	697	556
112	58	30	245	168	641	532
113	105	64	480	264	853	516
114	74	26	296	125	594	328
115	53	26	251	139	500	308
116	205	106	478	241	757	430
117	40	14	324	144	622	337
118	62	33	278	146	586	386
119	26	14	118	62	255	173
120	68	38	280	168	525	364
121	47	29	280	176	558	396
122	126	64	493	309	1,034	752
123	7	4	22	14	42	30
124	14	8	82	44	158	103
125	15	6	55	28	108	67
126	153	92	663	406	1,229	820
127	107	84	429	351	1,215	1,192
128	31	23	162	121	395	349
129	43	32	210	160	414	365
130	59	22	285	176	662	480
131	93	58	457	303	895	653

Existing Conditions

SubBasin No.	Type D Max. Roughness %	Type C Mod. High Roughness %	Type B Mod. Low Roughness %	Type A Min. Roughness %	Weighted m %	Weighted b %	Area Acres	Kb
100	0.0%	33.0%	32.2%	34.8%	-0.01485	0.08918	299.52	0.0524
101	0.0%	19.1%	58.1%	22.8%	-0.01419	0.08425	408.96	0.0472
102	0.0%	21.9%	54.6%	23.5%	-0.01445	0.08593	580.48	0.0460
103	0.0%	34.1%	65.9%	0.0%	-0.01759	0.10387	508.80	0.0563
104	0.0%	20.7%	73.4%	5.9%	-0.01564	0.09213	331.52	0.0527
105	0.0%	32.6%	19.4%	48.0%	-0.01382	0.08362	257.28	0.0503
106	0.0%	64.8%	33.3%	1.9%	-0.02090	0.12460	283.52	0.0733
107	0.0%	11.9%	43.3%	44.8%	-0.01173	0.07041	411.52	0.0397
110	0.0%	4.9%	93.6%	1.5%	-0.01419	0.08283	177.92	0.0509
111	0.0%	43.0%	51.9%	5.1%	-0.01821	0.10806	341.12	0.0619
112	0.0%	59.0%	32.6%	8.4%	-0.01976	0.11794	407.04	0.0664
113	0.0%	9.2%	30.4%	60.4%	-0.01026	0.06228	237.44	0.0379
114	0.0%	91.1%	0.0%	8.9%	-0.02333	0.14021	165.12	0.0885
115	0.0%	50.5%	0.0%	49.5%	-0.01572	0.09555	170.88	0.0605
116	0.0%	21.8%	0.0%	78.2%	-0.01034	0.06398	159.36	0.0412
117	0.0%	7.5%	0.0%	92.5%	-0.00766	0.04825	163.84	0.0313
118	0.0%	100.0%	0.0%	0.0%	-0.02500	0.15000	191.36	0.0930
119	0.0%	100.0%	0.0%	0.0%	-0.02500	0.15000	91.52	0.1010
120	0.0%	56.1%	0.0%	43.9%	-0.01677	0.10171	166.40	0.0645
121	0.0%	23.3%	0.0%	76.7%	-0.01062	0.06563	218.24	0.0408
122	0.0%	74.6%	0.0%	25.4%	-0.02024	0.12206	434.56	0.0687
123	0.0%	35.9%	0.0%	64.1%	-0.01298	0.07949	22.40	0.0620
124	0.0%	11.3%	0.0%	88.7%	-0.00837	0.05243	53.12	0.0380
125	0.0%	82.6%	0.0%	17.4%	-0.02174	0.13086	35.84	0.0971
126	0.0%	25.6%	6.0%	68.4%	-0.01150	0.07056	398.08	0.0407
127	0.0%	85.8%	0.0%	14.2%	-0.02234	0.13438	833.28	0.0691
128	0.0%	100.0%	0.0%	0.0%	-0.02500	0.15000	199.04	0.0925
129	0.0%	25.0%	1.2%	73.8%	-0.01103	0.06798	229.76	0.0419
130	0.0%	100.0%	0.0%	0.0%	-0.02500	0.15000	280.32	0.0888
131	0.0%	30.1%	0.0%	69.9%	-0.01189	0.07311	350.72	0.0428

Hydrologic Sub-Basin Characteristics
(Future Condition)

TABLE 17

Future Hydrologic Sub-Basin Characteristics
2-Year Storm

Sub-Basin I.D.	Area (Sq. Mile)	Flow Path Length (Miles)	Adjusted Slope (Ft./Mile)	Kb	6-Hr. Time of Concentration (Hours)	24-Hr. Time of Concentration (Hours)
100	0.387	1.16	315	0.043	0.387	0.425
101	0.506	1.73	287	0.041	0.517	0.492
102	0.810	1.49	315	0.046	0.567	0.533
103	0.795	2.45	300	0.048	0.850	0.837
104	0.507	1.41	290	0.045	0.483	0.488
105	0.372	1.10	315	0.047	0.392	0.429
106	0.443	1.72	310	0.057	0.663	0.700
107	0.643	1.32	139	0.035	0.567	0.554
110	0.278	1.34	95	0.048	0.762	0.754
111	0.518	1.94	296	0.048	0.658	0.679
112	0.636	2.36	283	0.063	1.129	1.167
113	0.238	1.28	140	0.034	0.450	0.463
114	0.245	0.69	301	0.061	0.375	0.417
115	0.193	1.34	288	0.040	0.404	0.433
116	0.215	0.72	250	0.038	0.246	0.292
117	0.122	1.00	156	0.031	0.387	0.429
118	0.299	0.60	298	0.093	0.579	0.558
119	0.143	0.57	320	0.101	0.571	0.554
120	0.197	0.89	320	0.064	0.438	0.467
121	0.195	1.75	289	0.037	0.463	0.488
122	0.584	1.90	306	0.069	0.896	0.917
123	0.030	0.71	76	0.032	0.346	0.383
124	0.047	0.60	67	0.029	0.354	0.392
125	0.052	0.47	228	0.099	0.483	0.512
126	0.400	1.99	258	0.033	0.463	0.471
127	1.211	2.39	263	0.063	1.375	1.146
128	0.311	0.94	290	0.090	0.742	0.762
129	0.231	1.61	72	0.026	0.550	0.567
130	0.438	1.25	308	0.082	0.808	0.863
131	0.356	2.06	257	0.038	0.558	0.575

TABLE 18

Future Hydrologic Sub-Basin Characteristics
10-Year Storm

Sub-Basin I.D.	Area (Sq. Mile)	Flow Path Length (Miles)	Adjusted Slope (Ft./Mile)	Kb	6-Hr. Time of Concentration (Hours)	24-Hr. Time of Concentration (Hours)
100	0.468	1.16	315	0.043	0.262	0.329
101	0.639	1.73	287	0.041	0.350	0.392
102	0.907	1.49	315	0.046	0.367	0.396
103	0.795	2.45	300	0.048	0.533	0.542
104	0.518	1.41	290	0.045	0.321	0.379
105	0.402	1.10	315	0.047	0.271	0.338
106	0.443	1.72	310	0.057	0.433	0.475
107	0.643	1.32	139	0.035	0.367	0.408
110	0.278	1.34	95	0.048	0.500	0.538
111	0.533	1.94	296	0.048	0.425	0.467
112	0.636	2.36	283	0.063	0.692	0.738
113	0.371	1.28	140	0.034	0.321	0.379
114	0.258	0.69	301	0.061	0.250	0.321
115	0.267	1.34	288	0.040	0.279	0.346
116	0.249	0.72	250	0.038	0.196	0.246
117	0.256	1.00	156	0.031	0.258	0.329
118	0.299	0.60	298	0.093	0.329	0.404
119	0.143	0.57	320	0.101	0.325	0.400
120	0.260	0.89	320	0.064	0.292	0.358
121	0.341	1.75	289	0.037	0.321	0.383
122	0.679	1.90	306	0.069	0.575	0.600
123	0.035	0.71	76	0.032	0.262	0.321
124	0.083	0.60	67	0.029	0.246	0.317
125	0.056	0.47	228	0.099	0.304	0.375
126	0.622	1.99	258	0.033	0.338	0.383
127	1.302	2.39	263	0.063	0.833	0.813
128	0.311	0.94	290	0.090	0.442	0.496
129	0.359	1.61	72	0.026	0.404	0.450
130	0.438	1.25	308	0.082	0.483	0.483
131	0.548	2.06	257	0.038	0.387	0.433

TABLE 19

Future Hydrologic Sub-Basin Characteristics
100-Year Storm

Sub-Basin I.D.	Area (Sq. Mile)	Flow Path Length (Miles)	Adjusted Slope (Ft./Mile)	Kb	6-Hr. Time of Concentration (Hours)	24-Hr. Time of Concentration (Hours)
100	0.468	1.16	315	0.043	0.217	0.267
101	0.639	1.73	287	0.041	0.279	0.321
102	0.907	1.49	315	0.046	0.283	0.317
103	0.795	2.45	300	0.048	0.400	0.421
104	0.518	1.41	290	0.045	0.254	0.308
105	0.402	1.10	315	0.047	0.221	0.275
106	0.443	1.72	310	0.057	0.329	0.383
107	0.643	1.32	139	0.035	0.283	0.329
110	0.278	1.34	95	0.048	0.396	0.433
111	0.533	1.94	296	0.048	0.325	0.375
112	0.636	2.36	283	0.063	0.488	0.500
113	0.371	1.28	140	0.034	0.258	0.313
114	0.258	0.69	301	0.061	0.204	0.254
115	0.267	1.34	288	0.040	0.229	0.283
116	0.249	0.72	250	0.038	0.167	0.204
117	0.256	1.00	156	0.031	0.213	0.262
118	0.299	0.60	298	0.093	0.246	0.308
119	0.143	0.57	320	0.101	0.242	0.304
120	0.260	0.89	320	0.064	0.233	0.287
121	0.341	1.75	289	0.037	0.254	0.313
122	0.679	1.90	306	0.069	0.425	0.450
123	0.035	0.71	76	0.032	0.221	0.271
124	0.083	0.60	67	0.029	0.204	0.254
125	0.056	0.47	228	0.099	0.237	0.296
126	0.622	1.99	258	0.033	0.271	0.317
127	1.398	2.39	263	0.063	0.533	0.533
128	0.319	0.94	290	0.090	0.321	0.379
129	0.357	1.61	72	0.026	0.325	0.375
130	0.436	1.25	308	0.082	0.354	0.400
131	0.548	2.06	257	0.038	0.304	0.354

TABLE 20

Summary Of Sub-Basin Peak Discharges (CFS)
(Future Conditions)

Sub-Basin I.D.	2-Year		10-Year		100-Year	
	6 Hr.	24 Hr.	6 Hr.	24 Hr.	6 Hr.	24 Hr.
100	93	95	364	332	630	688
101	126	141	489	448	842	917
102	143	152	616	582	1,143	1,277
103	85	86	386	357	792	868
104	103	115	379	343	676	731
105	89	91	310	282	539	580
106	59	56	243	218	478	499
107	115	131	452	419	823	914
110	82	53	249	149	483	320
111	113	72	405	279	834	630
112	65	34	263	181	676	557
113	137	82	517	279	914	551
114	108	44	388	172	693	378
115	97	50	343	179	623	371
116	214	110	493	250	781	440
117	56	23	348	162	645	355
118	62	33	278	146	586	386
119	26	14	118	62	255	173
120	73	41	280	169	529	368
121	71	43	312	195	593	424
122	131	67	493	310	1,067	761
123	13	9	36	22	61	41
124	20	11	97	53	177	113
125	15	6	54	27	108	67
126	183	113	729	431	1,357	901
127	126	113	520	437	1,438	1,381
128	38	29	176	137	410	368
129	61	49	256	202	515	447
130	79	35	321	210	716	516
131	121	77	500	326	958	689

Future Conditions

SubBasin No.	Type D Max. Roughness %	Type C Mod. High Roughness %	Type B Mod. Low Roughness %	Type A Min. Roughness %	Weighted m %	Weighted b %	Area Acres	Kb
100	0.0%	10.7%	55.8%	33.5%	-0.01244	0.07409	299.52	0.0433
101	0.0%	3.2%	74.4%	22.4%	-0.01243	0.07328	408.96	0.0408
102	0.0%	21.5%	54.7%	23.8%	-0.01438	0.08553	580.48	0.0458
103	0.0%	12.1%	87.9%	0.0%	-0.01511	0.08847	508.80	0.0476
104	0.0%	0.0%	96.2%	3.8%	-0.01347	0.07848	331.52	0.0445
105	0.0%	25.8%	22.7%	51.5%	-0.01279	0.07746	257.28	0.0466
106	0.0%	28.5%	64.0%	7.5%	-0.01639	0.09695	283.52	0.0567
107	0.0%	0.0%	54.8%	45.2%	-0.01036	0.06192	411.52	0.0348
110	0.0%	0.0%	96.9%	3.1%	-0.01352	0.07876	177.92	0.0483
111	0.0%	14.6%	71.0%	14.4%	-0.01431	0.08446	341.12	0.0482
112	0.0%	51.4%	39.7%	8.9%	-0.01887	0.11242	407.04	0.0632
113	0.0%	1.6%	34.8%	63.6%	-0.00916	0.05568	237.44	0.0339
114	0.0%	50.8%	1.1%	48.1%	-0.01586	0.09632	165.12	0.0612
115	0.0%	20.0%	0.0%	80.0%	-0.01000	0.06200	170.88	0.0397
116	0.0%	17.2%	0.0%	82.8%	-0.00948	0.05892	159.36	0.0381
117	0.0%	7.5%	0.0%	92.5%	-0.00766	0.04825	163.84	0.0313
118	0.0%	100.0%	0.0%	0.0%	-0.02500	0.15000	191.36	0.0930
119	0.0%	100.0%	0.0%	0.0%	-0.02500	0.15000	91.52	0.1010
120	0.0%	56.1%	0.0%	43.9%	-0.01677	0.10171	166.40	0.0645
121	0.0%	17.7%	0.0%	82.3%	-0.00957	0.05947	218.24	0.0371
122	0.0%	74.4%	0.0%	25.6%	-0.02020	0.12184	434.56	0.0686
123	0.0%	0.0%	0.0%	100.0%	-0.00625	0.04000	22.40	0.0316
124	0.0%	0.0%	0.0%	100.0%	-0.00625	0.04000	53.12	0.0292
125	0.0%	84.7%	0.0%	15.3%	-0.02213	0.13317	35.84	0.0988
126	0.0%	15.6%	0.0%	84.4%	-0.00918	0.05716	398.08	0.0333
127	0.0%	76.0%	0.0%	24.0%	-0.02050	0.12360	894.72	0.0631
128	0.0%	96.1%	0.0%	3.9%	-0.02427	0.14571	204.16	0.0896
129	0.0%	1.0%	0.2%	98.8%	-0.00645	0.04118	228.48	0.0260
130	0.0%	86.8%	6.7%	6.5%	-0.02303	0.13816	279.04	0.0818
131	0.0%	21.5%	4.3%	74.2%	-0.01060	0.06537	350.72	0.0384

SECTION IV

Hydrograph Routing Parameters

KAMINSKI HUBBARD engineering inc. • Surveying • Civil • Hydrology	Made by DLB	Date 5-29-92	Job No. 0146
	Checked by	Date	Sheet No.
	For HEC-1 I.D. 114RR		

STAGE-STORAGE PARAMETERS FOR BILTMORE MOUNTAIN ESTATES DETENTION BASIN

Stage (Ft.)	Planimeter Reading (in^2)			Average Reading (in^2)	Area (Ac.)	Volume (Ac.-Ft.)	Storage Volume (Ac.-Ft.)
	Basin No. 1	Basin No. 2	Total				
1292.5					0		0
						0.32	
1296	0.05 0.10 0.15	- - -	0.15	0.050	0.184		0.32
						0.50	
1298	0.08 0.16 0.23	0.01 0.02 0.03	0.26	0.087	0.318		0.82
						0.80	
1300	0.11 0.21 0.31	0.03 0.05 0.08	0.39	0.130	0.478		1.62
						1.10	
1302	0.14 0.28 0.41	0.035 0.07 0.10	0.51	0.170	0.624		2.72
						1.52	
1304	0.20 0.40 0.60	0.05 0.09 0.13	0.73	0.243	0.894		4.24
						1.15	
1305.2					1.026		5.39
						0.86	
1306	0.25 0.50 0.74	0.07 0.12 0.17	0.91	0.303	1.114		6.25
						1.21	
1307	0.37 0.71 1.07		1.07	0.357	1.311		7.46
						1.37	
1308	0.40 0.78 1.16		1.16	0.387	1.421		8.83

KAMINSKI HUBBARD engineering inc. • Surveying • Civil • Hydrology	Made by DLB	Date 2-30-92	Job No. 0146
	Checked by	Date	Sheet No.
	For Biltmore Mt. Estates Detention Basin Rating Curve #114RR		

Stage (Ft.)	Storage Volume (Ac-Ft)	Culvert Discharge (cfs)	Weir Discharge (cfs)	Total Discharge (cfs)
1292.5	0	0	–	0
1296	0.32	18	–	18
1298	0.82	25	–	25
1300	1.62	28	–	28
1302	2.72	31	–	31
1304	4.24	34	–	34
1305.2	5.39	36	–	36
1306	6.25	37	46	83
1307	7.46	38	361	399
1308	8.83	39	1352	1391
1307.5	8.15	38	771	809

PROJECT: Biltmore Mt. Estates Detention Basin

STATION: 114RR

SHEET ____ **OF** ____

CULVERT DESIGN FORM

DESIGNER / DATE: DLB / 9-30-92

REVIEWER / DATE: ____ / ____

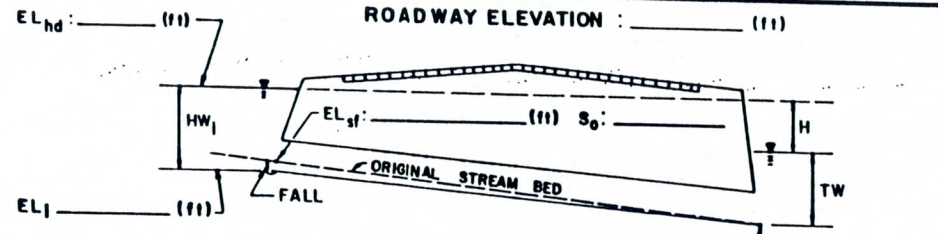
HYDROLOGICAL DATA

SEE ADD'L. SHTS.

- ☐ METHOD: ____
- ☐ DRAINAGE AREA: ____ ☐ STREAM SLOPE: ____
- ☐ CHANNEL SHAPE: ____
- ☐ ROUTING: ____ ☐ OTHER: ____

DESIGN FLOWS/TAILWATER

R.I. (YEARS)	FLOW (cfs)	TW (ft)



$S \approx S_o - FALL / L_a$

$S =$ 0.027 '/ft

$L_a =$ 115' ±

CULVERT DESCRIPTION: MATERIAL - SHAPE - SIZE - ENTRANCE	TOTAL FLOW Q (cfs)	FLOW PER BARREL Q/N (1)	HEADWATER CALCULATIONS: INLET CONTROL HW_i/D (2)	HW_i	FALL (3)	EL_{hi} (4)	OUTLET CONTROL TW (5)	d_c	$\frac{d_c+D}{2}$	h_o (6)	k_e	H (7)	~~EL_{ho}~~ LS_o (8)	CONTROL HEADWATER ELEVATION (HW)	OUTLET VELOCITY	COMMENTS
24" CMP - Mitered to	21						–	1.5	1.75	1.75	0.5	4.9	3.1	3.5		EL = 1296
Conform to Slope	25						–	1.8	1.9	1.9		6.7	3.1	5.5		" = 1298
	28						–	1.9	1.95	1.95		8.7	3.1	7.5		" = 1300
	31						–	2.0	2.0	2.0		10.6	3.1	9.5		" = 1302
	34						–	2.0	2.0	2.0		12.6	3.1	11.5		EL. = 1304

TECHNICAL FOOTNOTES:

(1) USE Q/NB FOR BOX CULVERTS

(2) $HW_i/D = HW/D$ OR HW_i/D FROM DESIGN CHARTS

(3) $FALL = HW_i - (EL_{hd} - EL_{sf})$; FALL IS ZERO FOR CULVERTS ON GRADE

(4) $EL_{hi} = HW_i + EL_i$ (INVERT OF INLET CONTROL SECTION)

(5) TW BASED ON DOWN STREAM CONTROL OR FLOW DEPTH IN CHANNEL.

(6) h_o = TW or $(d_c + D/2)$ (WHICHEVER IS GREATER)

(7) $H = \left[1 + k_e + (29 n^2 L)/R^{1.33}\right] V^2/2g$

(8) $EL_{ho} = EL_o + H + h_o$

$H = HW - h_o + LS_o$

SUBSCRIPT DEFINITIONS:

a. APPROXIMATE
f. CULVERT FACE
hd. DESIGN HEADWATER
hi. HEADWATER IN INLET CONTROL
ho. HEADWATER IN OUTLET CONTROL
i. INLET CONTROL SECTION
o. OUTLET
sf. STREAMBED AT CULVERT FACE
tw. TAILWATER

COMMENTS / DISCUSSION:

OUTLET CONTROL

CULVERT BARREL SELECTED:

SIZE: ____

SHAPE: ____

MATERIAL: ____ n ____

ENTRANCE: ____

PROJECT: Biltmore Mt. Estates Detention Basin

STATION: 114RR

SHEET ____ OF ____

CULVERT DESIGN FORM

DESIGNER / DATE: DLB / 9-30-92

REVIEWER / DATE: ____ / ____

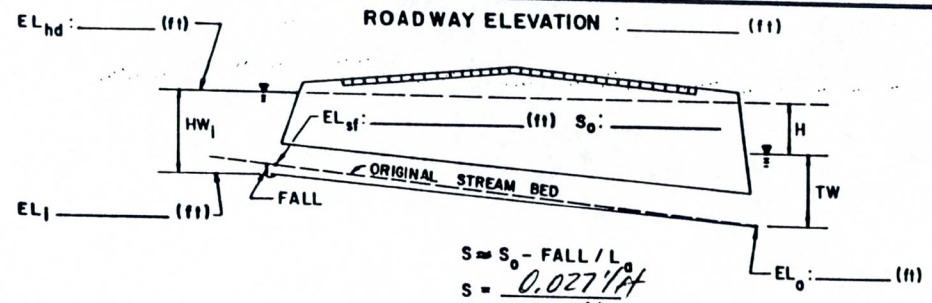
HYDROLOGICAL DATA

SEE ADD'L. SHTS.

- ☐ METHOD: ____
- ☐ DRAINAGE AREA: ____ ☐ STREAM SLOPE: ____
- ☐ CHANNEL SHAPE: ____
- ☐ ROUTING: ____ ☐ OTHER: ____

DESIGN FLOWS/TAILWATER

R.I. (YEARS)	FLOW (cfs)	TW (ft)



$S \approx S_o - FALL / L_a$

$S = 0.027'/ft$

$L_a = 115'\pm$

CULVERT DESCRIPTION: MATERIAL - SHAPE - SIZE - ENTRANCE	TOTAL FLOW Q (cfs)	FLOW PER BARREL Q/N (1)	HEADWATER CALCULATIONS: INLET CONTROL HW_i/D (2)	HW_i	FALL (3)	EL_{hi} (4)	OUTLET CONTROL TW (5)	d_c	$\frac{d_c+D}{2}$	h_o (6)	k_e	H (7)	~~EL_{ho}~~ LS_o (8)	~~CONTROL HEADWATER ELEVATION~~ HW	OUTLET VELOCITY	COMMENTS
	36							2.0	2.0	2.0	0.5	13.8	3.1	12.7		EL. = 1305.2
	37							"	"	"	"	14.6	"	13.5		" = 1306
	38							"	"	"	"	15.6	"	14.5		" = 1307
	39							2.0	2.0	2.0	0.5	16.6	3.1	15.5		EL. = 1308

TECHNICAL FOOTNOTES:

(1) USE Q/NB FOR BOX CULVERTS

(2) $HW_i/D = HW/D$ OR HW_i/D FROM DESIGN CHARTS

(3) $FALL = HW_i - (EL_{hd} - EL_{sf})$; FALL IS ZERO FOR CULVERTS ON GRADE

(4) $EL_{hi} = HW_i + EL_i$ (INVERT OF INLET CONTROL SECTION)

(5) TW BASED ON DOWN STREAM CONTROL OR FLOW DEPTH IN CHANNEL.

(6) h_o = TW or $(d_c + D/2)$ (WHICHEVER IS GREATER)

(7) $H = \left[1 + k_e + (29 n^2 L)/R^{1.33}\right] V^2/2g$

(8) $EL_{ho} = EL_o + H + h_o$

$H = HW - h_o + LS_o$

SUBSCRIPT DEFINITIONS:

a. APPROXIMATE
f. CULVERT FACE
hd. DESIGN HEADWATER
hi. HEADWATER IN INLET CONTROL
ho. HEADWATER IN OUTLET CONTROL
i. INLET CONTROL SECTION
o. OUTLET
sf. STREAMBED AT CULVERT FACE
tw. TAILWATER

COMMENTS / DISCUSSION:

Outlet Control

CULVERT BARREL SELECTED:

SIZE: ____

SHAPE: ____

MATERIAL: ____ n ____

ENTRANCE: ____

PROJECT: Biltmore Mt. Estates Detention Basin

STATION: 114RR

SHEET ____ OF ____

CULVERT DESIGN FORM

DESIGNER / DATE: DLB / 9-30-92

REVIEWER / DATE: ____ / ____

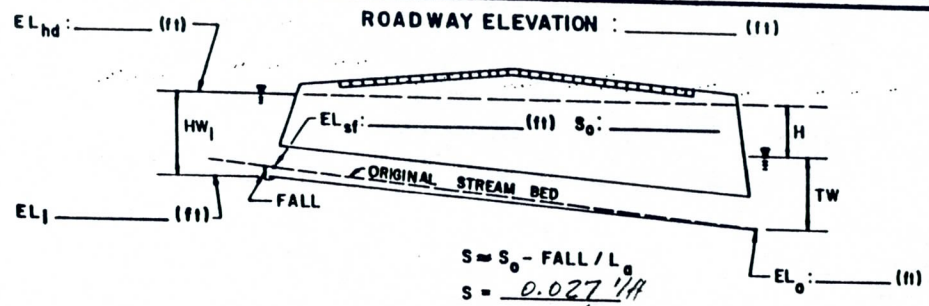
HYDROLOGICAL DATA

SEE ADD'L. SHTS.

- ☐ METHOD: ____
- ☐ DRAINAGE AREA: ____ ☐ STREAM SLOPE: ____
- ☐ CHANNEL SHAPE: ____
- ☐ ROUTING: ____ ☐ OTHER: ____

DESIGN FLOWS/TAILWATER

R.I. (YEARS)	FLOW (cfs)	TW (ft)



$S = S_o - FALL / L_a$

$S = 0.027$ '/'

$L_a = 115' \pm$

CULVERT DESCRIPTION: MATERIAL - SHAPE - SIZE - ENTRANCE

	TOTAL FLOW Q (cfs)	FLOW PER BARREL Q/N (1)	HEADWATER CALCULATIONS: INLET CONTROL HW I/D (2)	HW I	FALL (3)	EL hi (4)	OUTLET CONTROL TW (5)	d_c	$\frac{d_c+D}{2}$	h_o (6)	k_e	H (7)	EL ho (8)	CONTROL HEADWATER ELEVATION	OUTLET VELOCITY	COMMENTS
24" CMP (Mitered to	18	18	1.75	3.5												
Conform to Slope)		25	2.75	5.5												
		30	3.75	7.5												
		34	4.75	9.5												
		37	5.75	11.5												
		40	6.75	13.5												

TECHNICAL FOOTNOTES:

(1) USE Q/NB FOR BOX CULVERTS

(2) $HW_I/D = HW/D$ OR HW_I/D FROM DESIGN CHARTS

(3) $FALL = HW_I - (EL_{hd} - EL_{sf})$; FALL IS ZERO FOR CULVERTS ON GRADE

(4) $EL_{hi} = HW_I + EL_I$ (INVERT OF INLET CONTROL SECTION)

(5) TW BASED ON DOWN STREAM CONTROL OR FLOW DEPTH IN CHANNEL.

(6) $h_o = TW$ or $(d_c + D/2)$ (WHICHEVER IS GREATER)

(7) $H = \left[1 + k_e + (29 n^2 L)/R^{1.33}\right] V^2/2g$

(8) $EL_{ho} = EL_o + H + h_o$

SUBSCRIPT DEFINITIONS:

a. APPROXIMATE
f. CULVERT FACE
hd. DESIGN HEADWATER
hi. HEADWATER IN INLET CONTROL
ho. HEADWATER IN OUTLET CONTROL
I. INLET CONTROL SECTION
o. OUTLET
sf. STREAMBED AT CULVERT FACE
tw. TAILWATER

COMMENTS / DISCUSSION:

INLET CONTROL

CULVERT BARREL SELECTED:

SIZE: ____

SHAPE: ____

MATERIAL: ____ n ____

ENTRANCE: ____

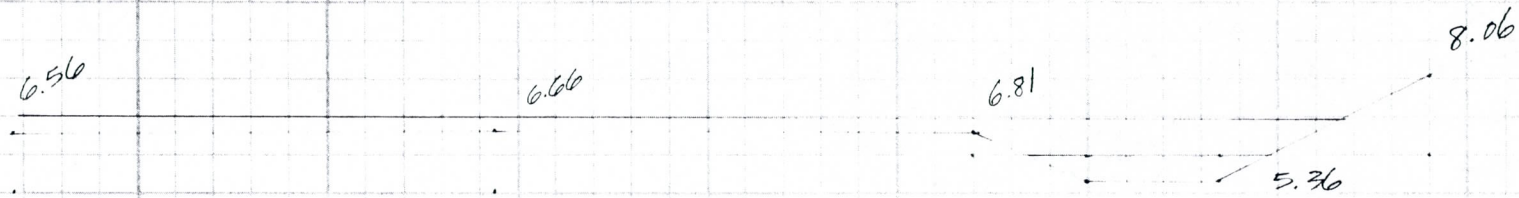
KAMINSKI HUBBARD engineering inc. • Surveying • Civil • Hydrology	Made by DLB	Date 3/19/93	Job No. 146
	Checked by	Date	Sheet No. 1
	For #114 RR (Dutton Basin)		

Assumed from 400 scale map

EL. = 1308: $Q = (2.70)\Big[(50)\left(\frac{1.44+1.19}{2}\right)^{1.5} + (6)\left(\frac{1.19+2.64}{2}\right)^{1.5} + (7)(2.64)^{1.5} + (11)\left(\frac{2.64}{2}\right)^{1.5} + (100)\left(\frac{1.0}{2}\right)^{1.5}$

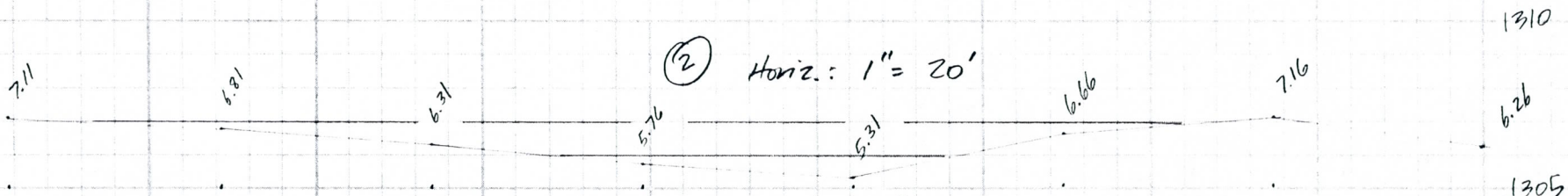
$+ (42)\left(\frac{1.0+1.69}{2}\right)^{1.5} + (50)\left(\frac{1.69+2.69}{2}\right)^{1.5} + (25)\left(\frac{2.69+1.34}{2}\right)^{1.5} + (25)\left(\frac{1.34+0.84}{2}\right)^{1.5}\Big]$

$= 1352$ CFS



Horiz: 1" = 10' (1)

(2) Horiz.: 1" = 20'



EL = 1306: $Q = (2.70)\Big[\underbrace{(9.5)\left(\frac{0.24}{2}\right)^{1.5} + (25)\left(\frac{0.24+0.69}{2}\right)^{1.5} + (11)\left(\frac{0.69}{2}\right)^{1.5}}_{(2)} + \underbrace{(2)(3)(0.64)^{1.5} + (7)(0.64)^{1.5}}_{(1)}\Big]$

$= 46$ CFS

EL = 1307: $Q = (2.70)\Big[\underbrace{(50)\left(\frac{0.44+0.19}{2}\right)^{1.5} + (6)\left(\frac{0.19+1.64}{2}\right)^{1.5} + (7)(1.64)^{1.5} + (6.5)\left(\frac{1.64}{2}\right)^{1.5}}_{(1)} + (42)\left(\frac{0.69}{2}\right)^{1.5} + (50)\left(\frac{0.69+1.69}{2}\right)^{1.5}$

$+ (25)\left(\frac{1.69+0.34}{2}\right)^{1.5} + (14)\left(\frac{0.34}{2}\right)^{1.5}\Big]$

$= 360.7$ CFS

KAMINSKI HUBBARD engineering inc.

• Surveying
• Civil
• Hydrology

Made by DLB | Date 3/19/93 | Job No. 146

Checked by | Date | Sheet No. 2

For #14RR (Detention Basin)

EL. = 1307.5

$$Q = (2.70)\left[(50)\left(\frac{0.94+0.69}{2}\right)^{1.5} + (6)\left(\frac{0.69+2.14}{2}\right)^{1.5} + (7)(2.14)^{1.5} + (9)\left(\frac{2.14}{2}\right)^{1.5}\right.$$

$$\left. + (50)\left(\frac{0.5}{2}\right)^{1.5} + (42)\left(\frac{0.5+1.19}{2}\right)^{1.5} + (50)\left(\frac{1.19+2.19}{2}\right)^{1.5} + (25)\left(\frac{2.19+0.84}{2}\right)^{1.5} + (25)\left(\frac{0.84+0.34}{2}\right)^{1.5}\right]$$

$$= 771 \text{ CFS}$$

KAMINSKI HUBBARD engineering inc. • Surveying • Civil • Hydrology	Made by DLB	Date 5-29-92	Job No. 0146
	Checked by	Date	Sheet No.
	For HEC-1 I.D. 118RR		

STAGE-STORAGE-DISCHARGE PARAMETERS FOR SQUAW PEAK PARK DETENTION BASIN NO. 1

Stage (Ft.)	Planimeter Reading (in^2)	Average Reading (in^2)	Area (Ac.)	Volume (Ac.-Ft.)	Storage Volume (Ac.-Ft.)	Q (cfs)
1461			0	0.94	0	0
1470	0.06 0.11 0.17	0.057	0.208	5.08	0.94	42
1480	0.22 0.44 0.66	0.22	0.808	1.82	6.02	64
1482	0.29 0.56 0.83	0.277	1.016	2.25	7.84	68
1484	0.34 0.68 1.01	0.337	1.237	2.72	10.09	71
1486	0.41 0.82 1.21	0.403	1.481	3.08	12.81	74 + 143 = 217
1488			1.600		15.89	77 + 744 = 821

$Q = CA\sqrt{2gH}$ (Orifice Eq.)

$C = 0.60$

$A = \pi(2)^2/4 = 3.14\ ft^2$ (24" ϕ RCP)

$\therefore Q = 15.119\ H^{1/2}$

$Q = C L H^{3/2}$ (Weir Eq.)

Use $C = 2.70$

$L = 150'$

For Elev. 1486.0 → $H = 0.5'$ $Q = (2.70)(150)(0.5)^{1.5} = 143$ cfs

For Elev. 1488.0 → $H = 1.5'$ $Q = (2.70)(150)(1.5)^{1.5} = 744$ cfs

PROJECT: Squaw Peak Park Detention Basin No. 1

STATION: 118RR

SHEET _____ **OF** _____

CULVERT DESIGN FORM

DESIGNER / DATE: DLB / 9-30-92

REVIEWER / DATE: _____ / _____

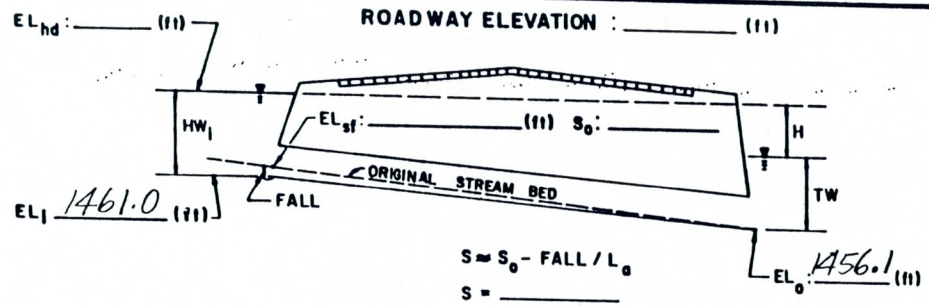
HYDROLOGICAL DATA

SEE ADD'L. SHTS.

- ☐ METHOD: _____
- ☐ DRAINAGE AREA: _____ ☐ STREAM SLOPE: _____
- ☐ CHANNEL SHAPE: _____
- ☐ ROUTING: _____ ☐ OTHER: _____

DESIGN FLOWS / TAILWATER

R.I. (YEARS)	FLOW (cfs)	TW (ft)



$S \approx S_o - FALL / L_a$

$S =$ _____

$L_a =$ 150' ±

CULVERT DESCRIPTION: MATERIAL - SHAPE - SIZE - ENTRANCE	TOTAL FLOW Q (cfs)	FLOW PER BARREL Q/N (1)	HEADWATER CALCULATIONS: INLET CONTROL HW_i/D (2)	HW_i	FALL (3)	EL_hi (4)	OUTLET CONTROL TW (5)	d_c	(d_c+D)/2	h_o (6)	k_e	H (7)	~~EL_hwi~~ LS_o (8)	~~CONTROL HEADWATER ELEVATION~~ HW	OUTLET VELOCITY	COMMENTS
24" ϕ RCP - Square	42		4.5	9			–	2	2	2	0.5	11.9	4.9	9		IC
Edge W/ Headwall			9.5	19			–	2	2	2		21.9	4.9	19		OC
				21			–	2	2	2		23.9	4.9	21		
				23			–	2	2	2		25.9	4.9	23		
				25			–	2	2	2	0.5	27.9	4.9	25		OC

TECHNICAL FOOTNOTES:

(1) USE Q/NB FOR BOX CULVERTS

(2) $HW_i/D = HW/D$ OR HW_i/D FROM DESIGN CHARTS

(3) $FALL = HW_i - (EL_{hd} - EL_{sf})$; FALL IS ZERO FOR CULVERTS ON GRADE

(4) $EL_{hi} = HW_i + EL_i$ (INVERT OF INLET CONTROL SECTION)

(5) TW BASED ON DOWN STREAM CONTROL OR FLOW DEPTH IN CHANNEL.

(6) $h_o = TW$ or $(d_c + D/2)$ (WHICHEVER IS GREATER)

(7) $H = \left[1 + k_e + (29 n^2 L)/R^{1.33}\right] V^2/2g$

(8) $EL_{ho} = EL_o + H + h_o$

$H = HW - h_o + LS_o$ (Outlet Control)

SUBSCRIPT DEFINITIONS:

- a. APPROXIMATE
- f. CULVERT FACE
- hd. DESIGN HEADWATER
- hi. HEADWATER IN INLET CONTROL
- ho. HEADWATER IN OUTLET CONTROL
- i. INLET CONTROL SECTION
- o. OUTLET
- sf. STREAMBED AT CULVERT FACE
- tw. TAILWATER

COMMENTS / DISCUSSION:

CULVERT BARREL SELECTED:

SIZE: _____

SHAPE: _____

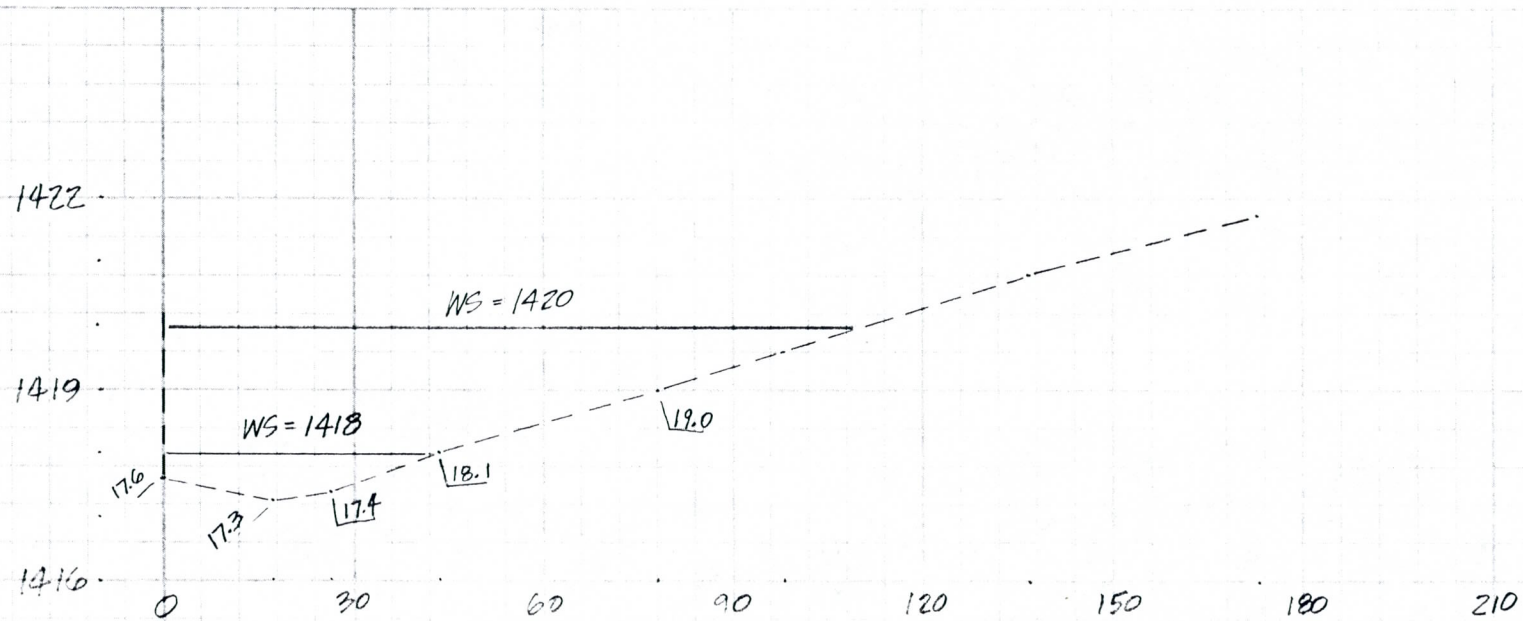
MATERIAL: _____

ENTRANCE: _____

KAMINSKI HUBBARD engineering inc. • Surveying • Civil • Hydrology	Made by DLB	Date 5-29-92	Job No. 0146
	Checked by	Date	Sheet No.
	For HEC-1 I.D. 119RR		

STAGE-STORAGE-DISCHARGE PARAMETERS FOR SQUAW PEAK PARK DETENTION BASIN NO. 2

Stage (Ft.)	Planimeter Reading (in^2)	Average Reading (in^2)	Area (Ac.)	Volume (Ac.-Ft.)	Storage Volume (Ac.-Ft.)	Q (CFS)
1402			0	0.15	0	0
1406	0.02 0.04 0.06	0.020	0.073	0.66	0.15	25
1410	0.07 0.14 0.21	0.070	0.257	1.74	0.81	40
1414	0.18 0.34 0.50	0.167	0.612	1.59	2.55	50
1416	0.28 0.53 0.80	0.267	0.979	2.24	4.14	57
1418	0.36 0.69 1.03	0.343	1.261		6.38	60+39 = 99
1420			1.543	2.80	9.18	63+622 = 685



$Q = CLH^{3/2}$ $\quad C = 2.70$

(1) Elev. = 1418 $\rightarrow$ $Q = (2.70)\left[(17)\left(\frac{0.4+0.7}{2}\right)^{1.5} + (9)\left(\frac{0.7+0.6}{2}\right)^{1.5} + (17)\left(\frac{0.6}{2}\right)^{1.5}\right] = 39$ CFS

(2) Elev. = 1420 $\rightarrow$ $Q = (2.70)\left[(17)\left(\frac{2.4+2.7}{2}\right)^{1.5} + (26)\left(\frac{2.7+1.9}{2}\right)^{1.5} + (34)\left(\frac{1.9+1.0}{2}\right)^{1.5} + (31)\left(\frac{1.0+0}{2}\right)^{1.5}\right] = 622$ CFS

KAMINSKI HUBBARD engineering inc.
• Surveying
• Civil
• Hydrology

Made by DLB		Date 2-15-93	Job No. 0146
Checked by		Date	Sheet No.
For Squaw Peak Park Det. Basin No 2			

PROJECT: Squaw Peak Park Detention Basin No. 2

STATION: 119RR

SHEET ____ OF ____

CULVERT DESIGN FORM

DESIGNER / DATE: DLB / 9-30-92

REVIEWER / DATE: ____ / ____

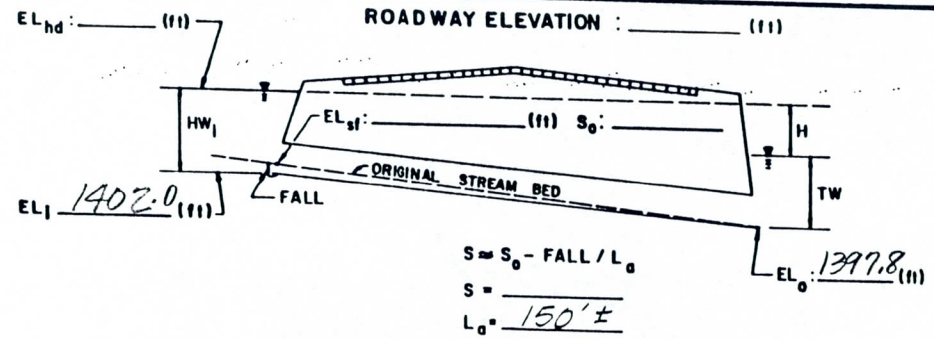
HYDROLOGICAL DATA

SEE ADD'L SHTS.

- ☐ METHOD: ____
- ☐ DRAINAGE AREA: ____ ☐ STREAM SLOPE: ____
- ☐ CHANNEL SHAPE: ____
- ☐ ROUTING: ____ ☐ OTHER: ____

DESIGN FLOWS/TAILWATER

R.I. (YEARS)	FLOW (cfs)	TW (ft)



CULVERT DESCRIPTION: MATERIAL - SHAPE - SIZE - ENTRANCE

HEADWATER CALCULATIONS

CULVERT DESCRIPTION	TOTAL FLOW Q (cfs)	FLOW PER BARREL Q/N (1)	INLET CONTROL HW_i/D (2)	INLET CONTROL HW_i	INLET CONTROL FALL (3)	INLET CONTROL EL_hi (4)	OUTLET CONTROL TW (5)	OUTLET CONTROL d_c	OUTLET CONTROL (d_c+D)/2	OUTLET CONTROL h_o (6)	OUTLET CONTROL k_e	OUTLET CONTROL H (7)	OUTLET CONTROL EL_ho (8)	CONTROL HEADWATER ELEVATION	OUTLET VELOCITY	COMMENTS
24" ϕ RCP - Square	25		2	4												
Edge w/ Headwall	40		4	8												
	50		6	12												
			7	14												
			8	16												

TECHNICAL FOOTNOTES:

(1) USE Q/NB FOR BOX CULVERTS

(2) $HW_i/D = HW/D$ OR HW_i/D FROM DESIGN CHARTS

(3) $FALL = HW_i - (EL_{hd} - EL_{sf})$; FALL IS ZERO FOR CULVERTS ON GRADE

(4) $EL_{hi} = HW_i + EL_i$ (INVERT OF INLET CONTROL SECTION)

(5) TW BASED ON DOWN STREAM CONTROL OR FLOW DEPTH IN CHANNEL.

(6) h_o = TW or $(d_c + D/2)$ (WHICHEVER IS GREATER)

(7) $H = \left[1 + k_e + (29 n^2 L)/R^{1.33}\right] V^2/2g$

(8) $EL_{ho} = EL_o + H + h_o$

SUBSCRIPT DEFINITIONS:

a. APPROXIMATE
f. CULVERT FACE
hd. DESIGN HEADWATER
hi. HEADWATER IN INLET CONTROL
ho. HEADWATER IN OUTLET CONTROL
i. INLET CONTROL SECTION
o. OUTLET
sf. STREAMBED AT CULVERT FACE
tw. TAILWATER

COMMENTS / DISCUSSION:

INLET CONTROL

CULVERT BARREL SELECTED:

SIZE: ____

SHAPE: ____

MATERIAL: ____ n ____

ENTRANCE: ____

PROJECT: Squaw Peak Park Detention Basin No.2

STATION: 119RR

SHEET ____ OF ____

CULVERT DESIGN FORM

DESIGNER / DATE: DLB / 9-30-92

REVIEWER / DATE: ____ / ____

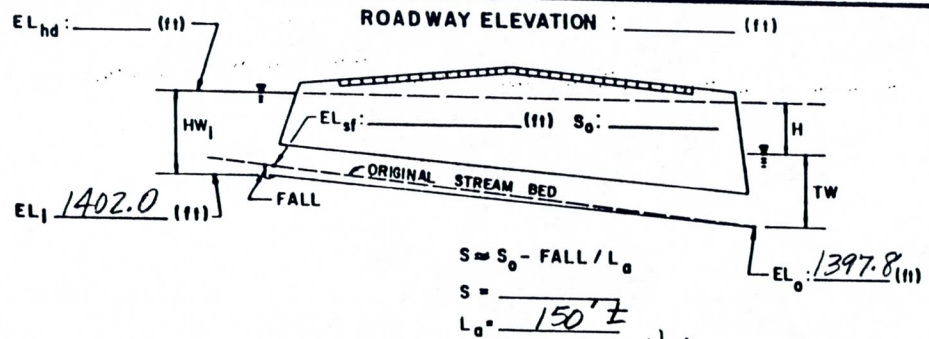
HYDROLOGICAL DATA

SEE ADD'L SHTS.

- ☐ METHOD: ____
- ☐ DRAINAGE AREA: ____ ☐ STREAM SLOPE: ____
- ☐ CHANNEL SHAPE: ____
- ☐ ROUTING: ____ ☐ OTHER: ____

DESIGN FLOWS/TAILWATER

R.I. (YEARS)	FLOW (cfs)	TW (ft)



$S \approx S_o - FALL / L_a$

$S =$ ____

$L_a =$ 150' ±

CULVERT DESCRIPTION: MATERIAL - SHAPE - SIZE - ENTRANCE	TOTAL FLOW Q (cfs)	FLOW PER BARREL Q/N (1)	HEADWATER CALCULATIONS: INLET CONTROL HW_i/D (2)	HW_i	FALL (3)	EL_{hi} (4)	OUTLET CONTROL TW (5)	d_c	$\frac{d_c+D}{2}$	h_o (6)	k_e	H (7)	~~EL_{ho}~~ LS_o (8)	HW ~~CONTROL HEADWATER ELEVATION~~	OUTLET VELOCITY	COMMENTS
24"φ RCP - Square Edge	35						–	1.8	1.9	1.9	0.5	6.3	4.2	4		
w/ Headwall	45						–	2.0	2.0	2.0		10.2	4.2	8		
	53						–	2.0	2.0	2.0		14.2	4.2	12		
	57						–	2.0	2.0	2.0		16.2	4.2	14		
	60						–	2.0	2.0	2.0	0.5	18.2	4.2	16		
	63							2.0	2.0	2.0	0.5	20.2	4.2	18		

TECHNICAL FOOTNOTES:

(1) USE Q/NB FOR BOX CULVERTS

(2) HW_i/D = HW/D OR HW_i/D FROM DESIGN CHARTS

(3) FALL = $HW_i - (EL_{hd} - EL_{sf})$; FALL IS ZERO FOR CULVERTS ON GRADE

(4) $EL_{hi} = HW_i + EL_i$ (INVERT OF INLET CONTROL SECTION)

(5) TW BASED ON DOWN STREAM CONTROL OR FLOW DEPTH IN CHANNEL.

(6) h_o = TW or $(d_c + D/2)$ (WHICHEVER IS GREATER)

(7) $H = \left[1 + k_e + (29 n^2 L)/R^{1.33}\right] V^2/2g$

(8) $EL_{ho} = EL_o + H + h_o$

$H = HW - h_o + LS_o$

SUBSCRIPT DEFINITIONS:

a. APPROXIMATE
f. CULVERT FACE
hd. DESIGN HEADWATER
hi. HEADWATER IN INLET CONTROL
ho. HEADWATER IN OUTLET CONTROL
i. INLET CONTROL SECTION
o. OUTLET
sf. STREAMBED AT CULVERT FACE
tw. TAILWATER

COMMENTS / DISCUSSION:

OUTLET CONTROL

CULVERT BARREL SELECTED:

SIZE: ____

SHAPE: ____

MATERIAL: ____

ENTRANCE: ____

KAMINSKI HUBBARD engineering inc. • Surveying • Civil • Hydrology	Made by DLB	Date 6-1-92	Job No. 0146
	Checked by	Date	Sheet No.
	For HEC-1 I.D. 125RR		

STAGE-STORAGE-DISCHARGE PARAMETERS FOR DETENTION BASIN AT DREAMY DRAW CONDOMINIUMS

Stage (Ft.)	Planimeter Reading (in^2)	Average Reading (in^2)	Area (Ac.)	Volume (Ac.-Ft.)	Storage Volume (Ac.-Ft.)	Discharge (CFS)
1285.5	0	0	0		0	0
				0.36		
1290	0.05 0.09 0.13	0.043	0.159		0.36	5.5
				0.58		
1292	0.11 0.23 0.34	0.113	0.416		0.94	6.5
				1.27		
1294	0.23 0.46 0.70	0.233	0.857		2.21	7.3
				2.07		
1296	0.34 0.67 0.99	0.330	1.212		4.28	8.0
				2.83		
1298	0.44 0.89 1.32	0.440	1.616		7.11	9.0

PROJECT: ACDC ADMS Phase I

STATION: _____

SHEET _____ OF _____

CULVERT DESIGN FORM

DESIGNER / DATE: DLB / 6-1-92

REVIEWER / DATE: _____ / _____

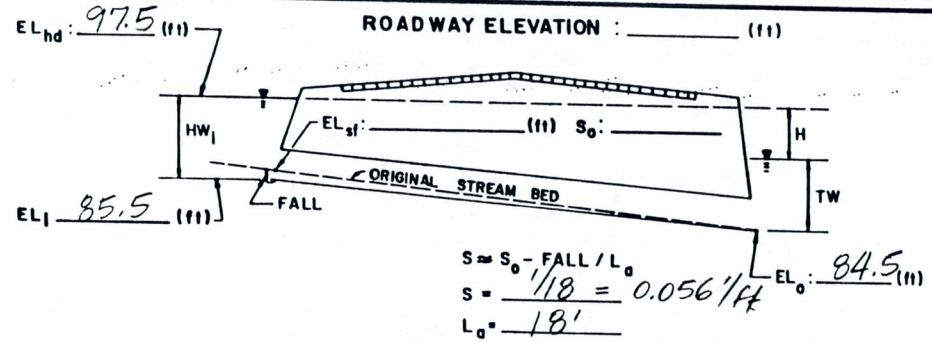
HYDROLOGICAL DATA

SEE ADD'L. SHTS.

- ☐ METHOD: _____
- ☐ DRAINAGE AREA: _____ ☐ STREAM SLOPE: _____
- ☐ CHANNEL SHAPE: _____
- ☐ ROUTING: _____ ☐ OTHER: _____

DESIGN FLOWS/TAILWATER

R.I. (YEARS)	FLOW (cfs)	TW (ft)



CULVERT DESCRIPTION: MATERIAL - SHAPE - SIZE - ENTRANCE	TOTAL FLOW Q (cfs)	FLOW PER BARREL Q/N (1)	HEADWATER CALCULATIONS: INLET CONTROL HW_i/D (2)	HW_i	FALL (3)	EL_hi (4)	OUTLET CONTROL TW (5)	d_c	(d_c+D)/2	h_o (6)	k_e	H (7)	EL_ho (8)	CONTROL HEADWATER ELEVATION	OUTLET VELOCITY	COMMENTS
CMP - CIRC. - 12IN. - PROJ.	6.5	5.5	4.5													
		6.5	6.5								0.9					
		7.3	8.5													
		8.0	10.5													
		9.0	12.5													

TECHNICAL FOOTNOTES:

(1) USE Q/NB FOR BOX CULVERTS

(2) $HW_i/D = HW/D$ OR HW_i/D FROM DESIGN CHARTS

(3) $FALL = HW_i - (EL_{hd} - EL_{sf})$; FALL IS ZERO FOR CULVERTS ON GRADE

(4) $EL_{hi} = HW_i + EL_i$ (INVERT OF INLET CONTROL SECTION)

(5) TW BASED ON DOWN STREAM CONTROL OR FLOW DEPTH IN CHANNEL.

(6) h_o = TW or $(d_c + D/2)$ (WHICHEVER IS GREATER)

(7) $H = \left[1 + k_e + (29 n^2 L)/R^{1.33}\right] V^2/2g$

(8) $EL_{ho} = EL_o + H + h_o$

SUBSCRIPT DEFINITIONS:

a. APPROXIMATE
f. CULVERT FACE
hd. DESIGN HEADWATER
hi. HEADWATER IN INLET CONTROL
ho. HEADWATER IN OUTLET CONTROL
i. INLET CONTROL SECTION
o. OUTLET
sf. STREAMBED AT CULVERT FACE
tw. TAILWATER

COMMENTS / DISCUSSION:

CULVERT BARREL SELECTED:

SIZE: _____

SHAPE: _____

MATERIAL: _____ n: _____

ENTRANCE: _____

KAMINSKI HUBBARD engineering inc. • Surveying • Civil • Hydrology	Made by DLB	Date 5-22-92	Job No. 0146
	Checked by	Date	Sheet No.
	For HEC-1 I.D. 127 RR		

STAGE - STORAGE - DISCHARGE PARAMETERS FOR THE DREAMY DRAW DAM

The following parameters were obtained from the U.S. Army Corps of Engineers report "Gila River Basin, New River and Phoenix City Streams, Arizona, Design Memorandum No. 1, Feature Design for Dreamy Draw Dam," January 1972.

Stage (Ft.)	Storage Volume (Ac.-Ft.)	Principal Spillway (CFS)	Emergency Spillway (CFS)	Total Discharge (CFS)
1370	0	0	0	0
1375	0	82	0	82
1380	5	116	0	116
1385	17	136	0	136
1390	50	154	0	154
1395	112	170	0	170
1400	200	184	0	184
1405	254	198	0	198
1407	370	203	550	753
1410	465	210	2300	2510
1415	650	222	7050	7272
1419	830	231	12150	12381

KAMINSKI HUBBARD engineering inc. • Surveying • Civil • Hydrology	Made by DLB	Date 5-21-92	Job No. 0146
	Checked by	Date	Sheet No. 1
	For HEC-1 I.D. 130 RR		

STAGE - STORAGE PARAMETERS FOR NORTH MT. DETENTION BASIN NO. 4

Stage (Ft.)	Planimeter Reading (in^2)	Average Reading (in^2)	Area (Ac.)	Volume (Ac.-Ft.)	Storage Volume (Ac.-Ft.)
1317	ϕ	ϕ	ϕ		0
				0.11	
1320	0.025 0.04 0.06	0.02	0.07		0.11
				0.36	
1322	0.08 0.16 0.24	0.08	0.29		0.47
				0.99	
1324	0.20 0.39 0.57	0.19	0.70		1.46
				2.07	
1326	0.38 0.75 1.12	0.373	1.37		3.53
				4.01	
1328	0.71 1.43 2.16	0.72	2.64		7.54
				7.40	
1330	1.30 2.59 3.89	1.297	4.76		14.94
				12.13	
1332	2.01 4.01 6.02	2.007	7.37		27.07
				17.53	
1334	2.76 5.53 8.30	2.767	10.16		44.60
				23.38	
1336	3.59 7.19 10.80	3.60	13.22		67.98
				28.93	
1338	4.29 8.55 12.83	4.277	15.71		96.91

KAMINSKI HUBBARD engineering inc. • Surveying • Civil • Hydrology	Made by DLB	Date 5-22-92	Job No. 0146
	Checked by	Date	Sheet No. 2
	For HEC-1 I.D. 130RR		

STAGE-STORAGE PARAMETERS FOR NORTH MT. DETENTION BASIN NO. 4 (CONT'D.)

Low Level Outlet or Principal Spillway

Diameter, D = 27" RCP
However, low level outlet is a 16" x 12" orifice.

$A = \frac{16'' \times 12''}{144} = 1.33 \text{ ft}^2$

Centerline Elevation = 17.67
Coefficient of Discharge = 0.6
Exponent of Head = 0.5

Emergency Spillway

Crest Elevation = 1332.8

Length = 80 ft.

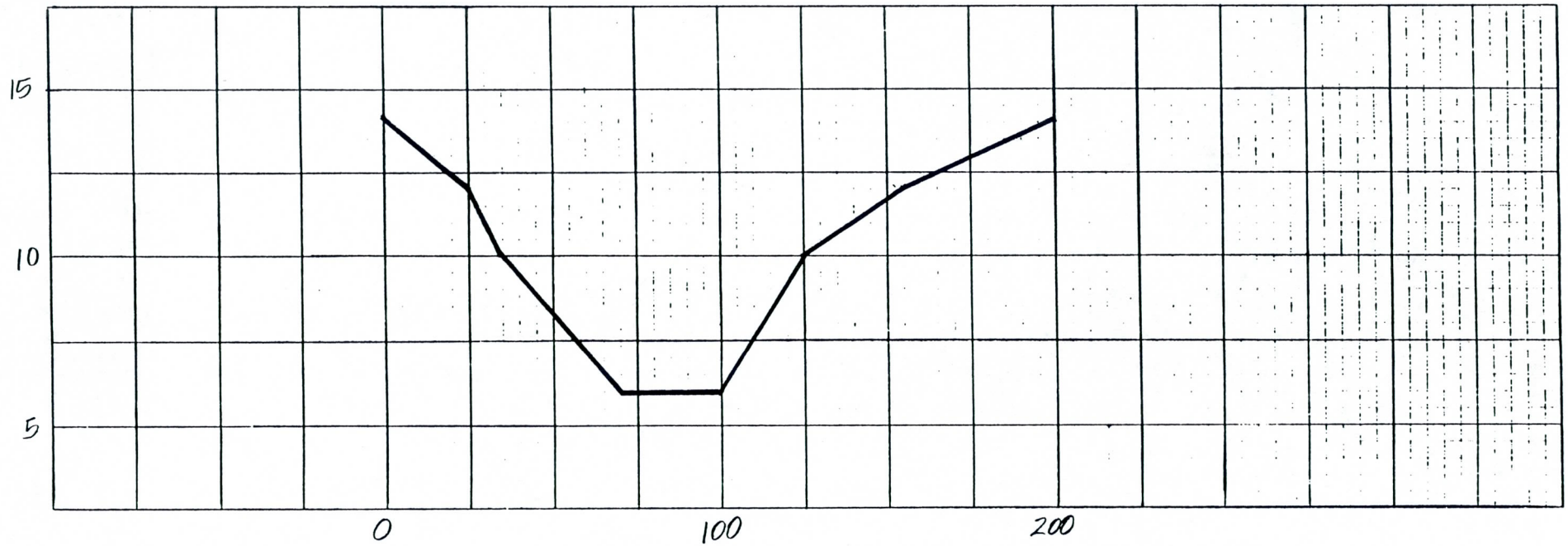
Side Slope = 3 to 1

Weir Coefficient = 2.7

Exponent of Head = 1.5

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM102

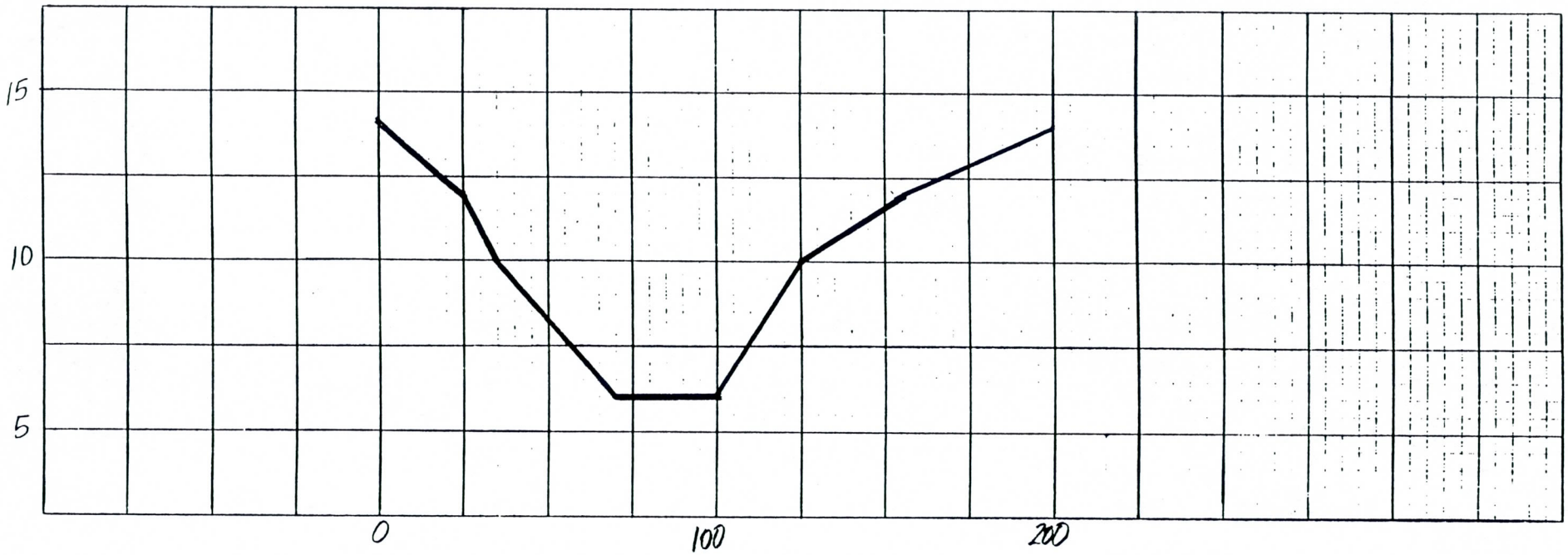


RD								
RC	0.045	0.035	0.045	720	0.0110			
RX	0	25	35	70	100	125	155	200
RY	14	12	10	6	6	10	12	14

CALCULATED BY: DLB 5/15/92

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM103

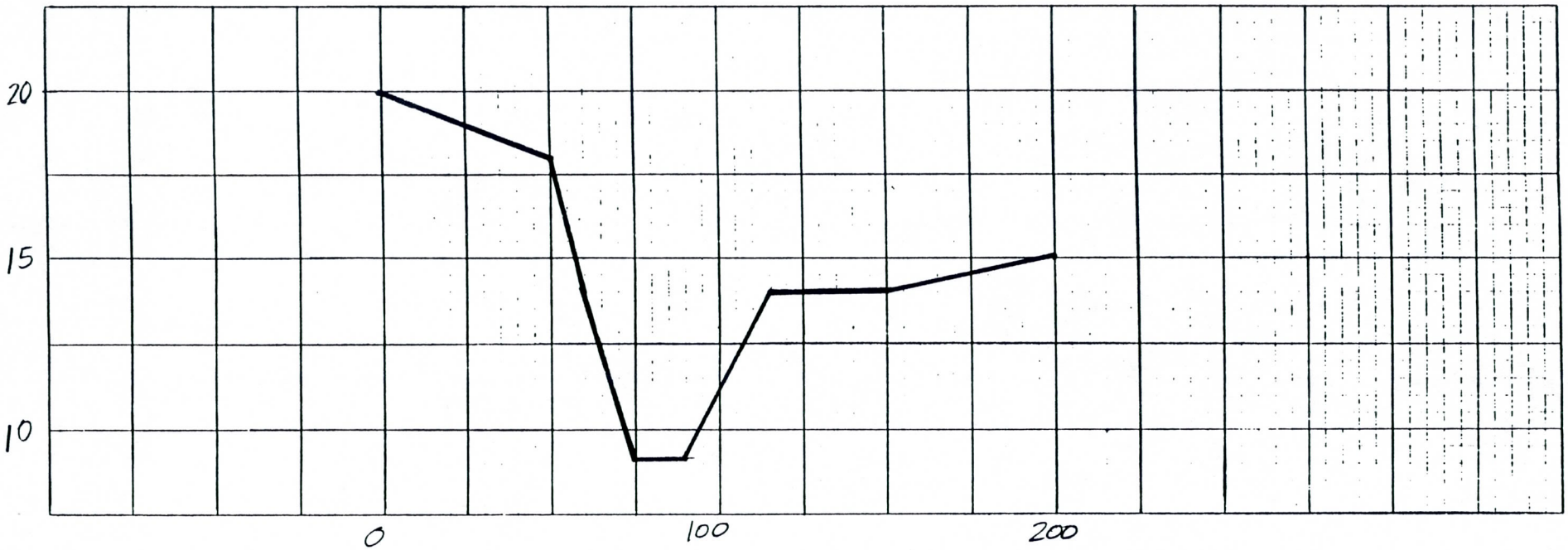


RD								
RC	0.045	0.035	0.045	1125	0.0080			
RX	0	25	35	70	100	125	155	200
RY	14	12	10	6	6	10	12	14

CALCULATED BY: DLB 5/15/92

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM104

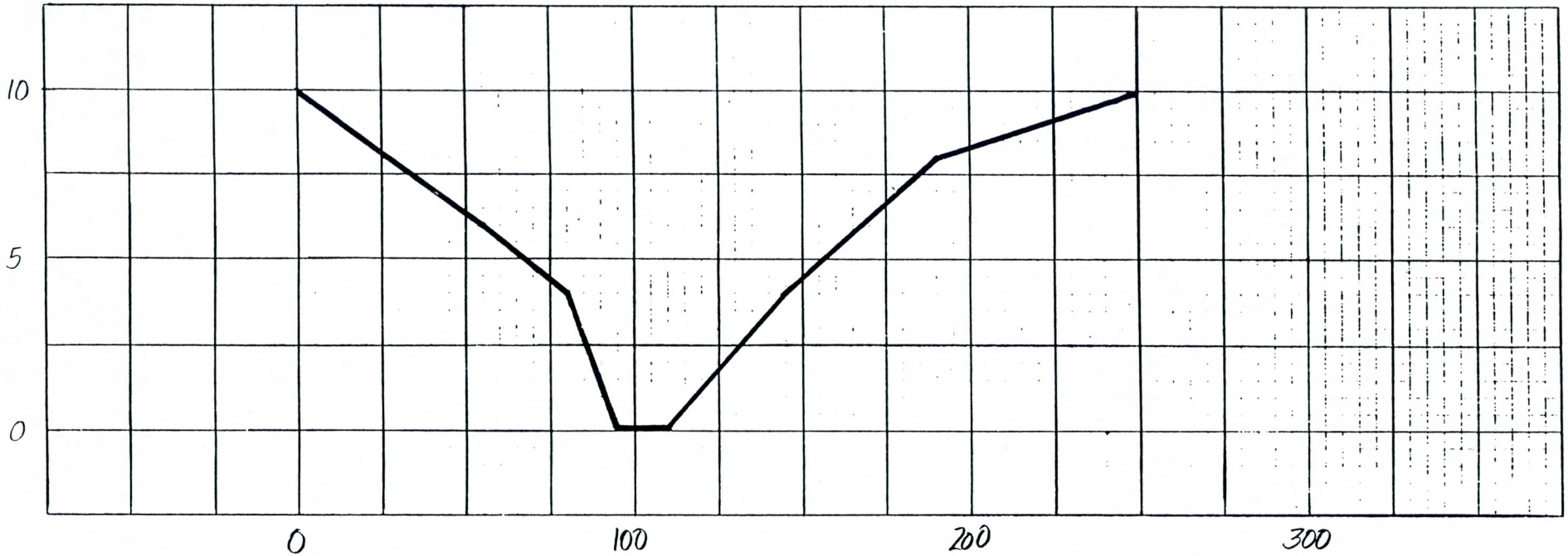


RD								
RC	0.045	0.035	0.045	2631	0.0068			
RX	0	50	60	75	90	115	150	200
RY	20	18	14	9	9	14	14	15

CALCULATED BY: DLB 5/15/92

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM105

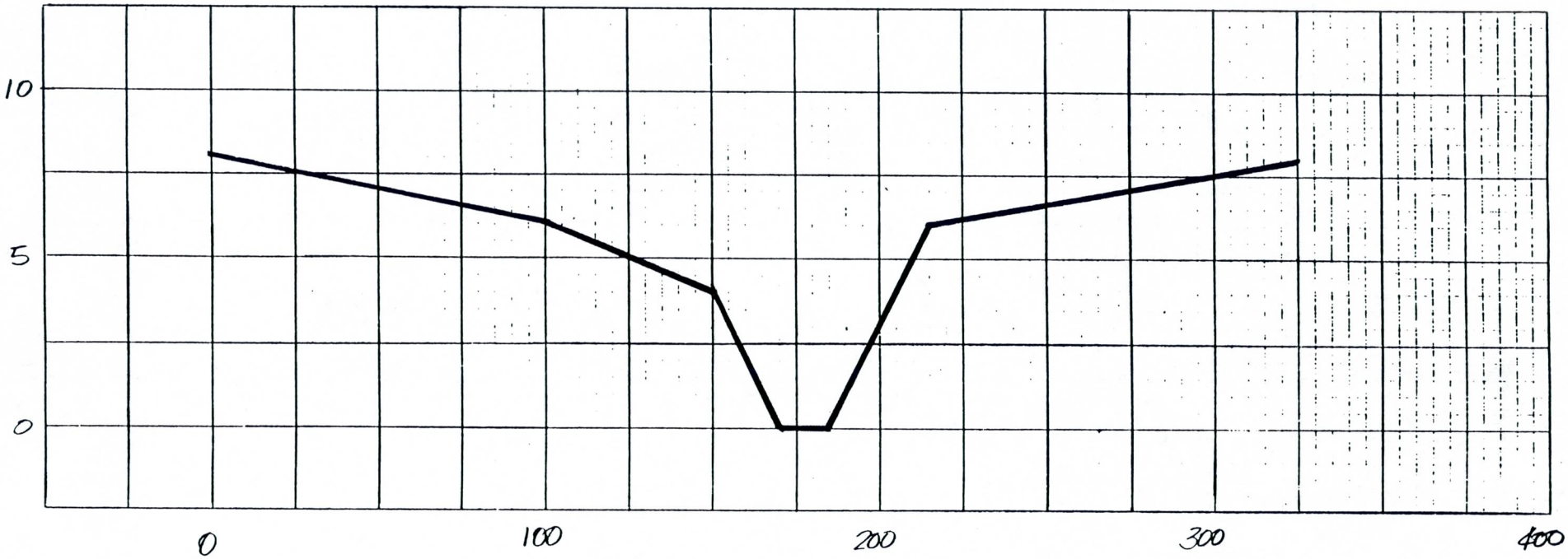


RD								
RC	0.045	0.035	0.045	5463	0.0066			
RX	0	55	80	95	110	145	190	250
RY	10	6	4	0	0	4	8	10

CALCULATED BY: DLB 5/15/92

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM106

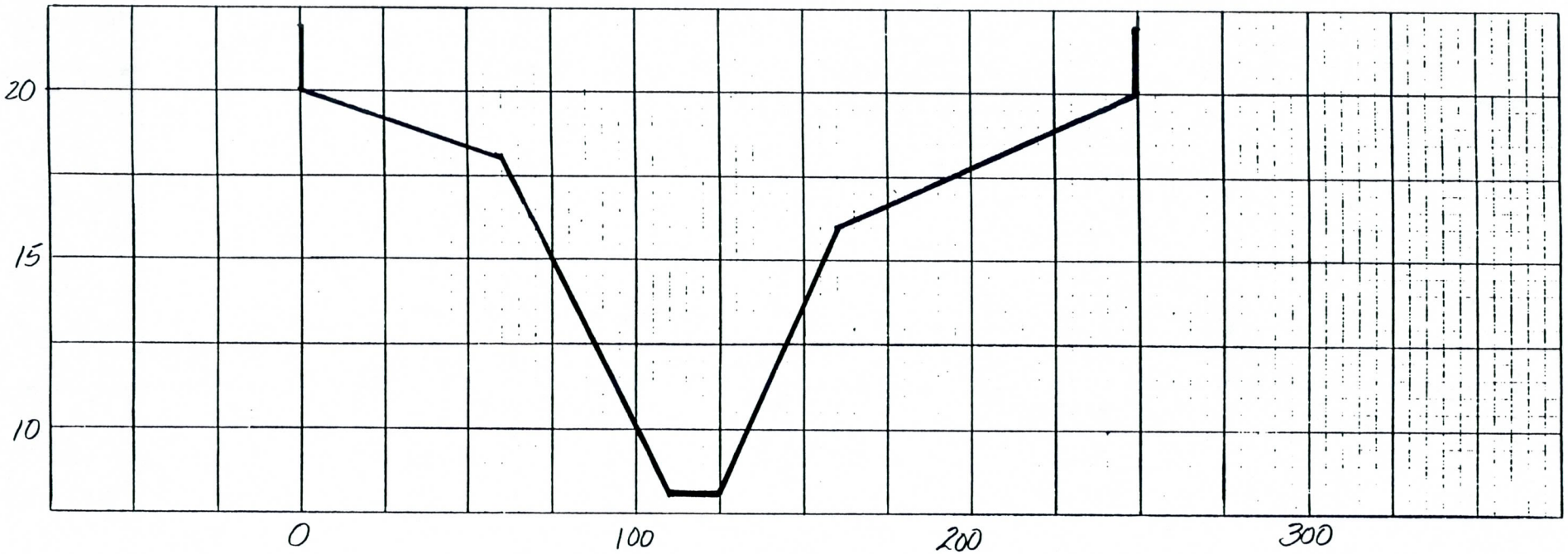


RD								
RC	0.045	0.035	0.045	5946	0.0145			
RX	0	100	150	170	185	205	215	325
RY	8	6	4	0	0	4	6	8

CALCULATED BY: DLB 5/15/92

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM114

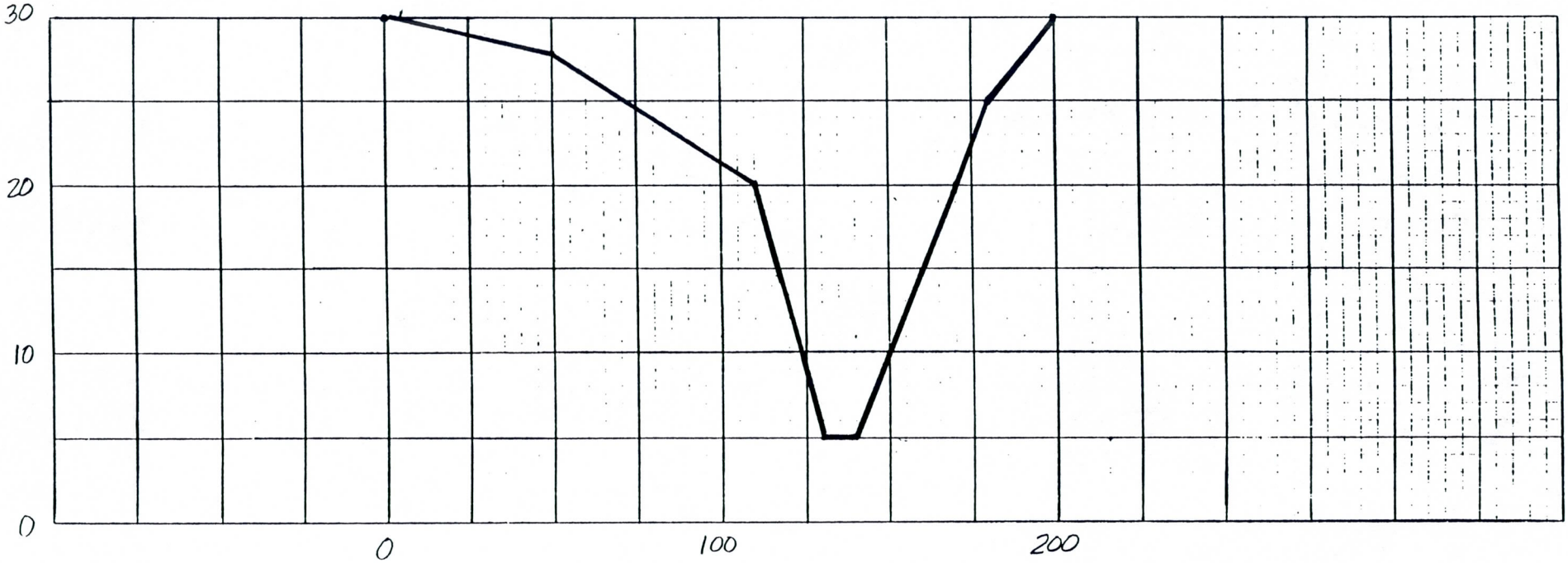


R								
RC	0.055	0.045	0.055					
RX	0	0	60	110	125	160	250	250
RY	22	20	18	8	8	16	20	22

CALCULATED BY: DLB 6/1/92

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM118

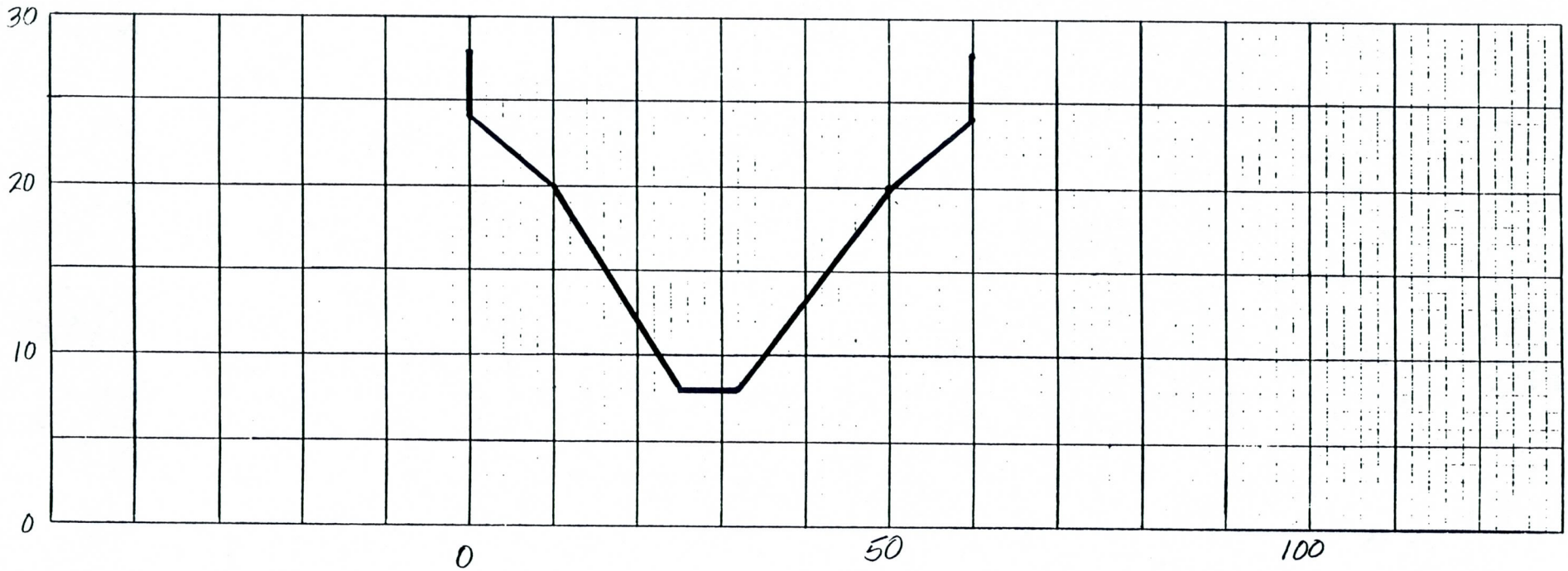


R								
RC	0.045	0.045	0.045					
RX	0	50	110	130	140	170	180	200
RY	30	28	20	5	5	20	25	30

CALCULATED BY: DLB 6/1/92

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM 119

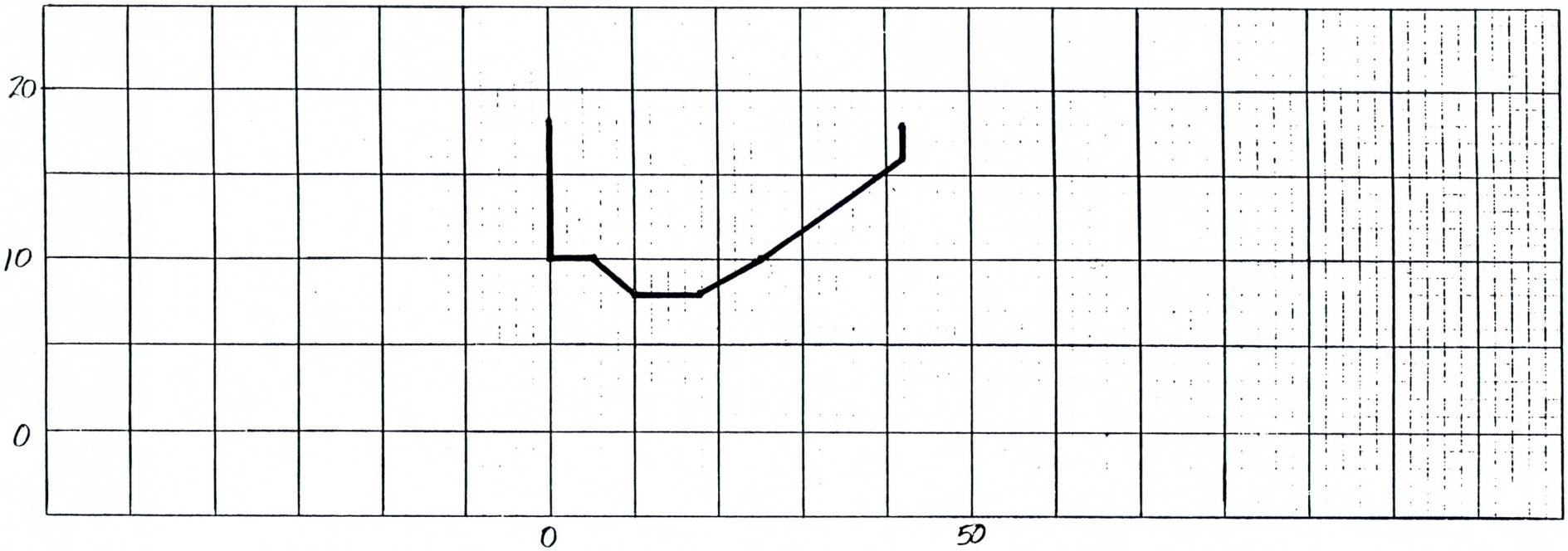


R								
RC	0.050	0.045	0.050					
RX	0	0	10	25	32	50	60	60
RY	28	24	20	8	8	20	24	28

CALCULATED BY: DLB 6/1/92

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM120

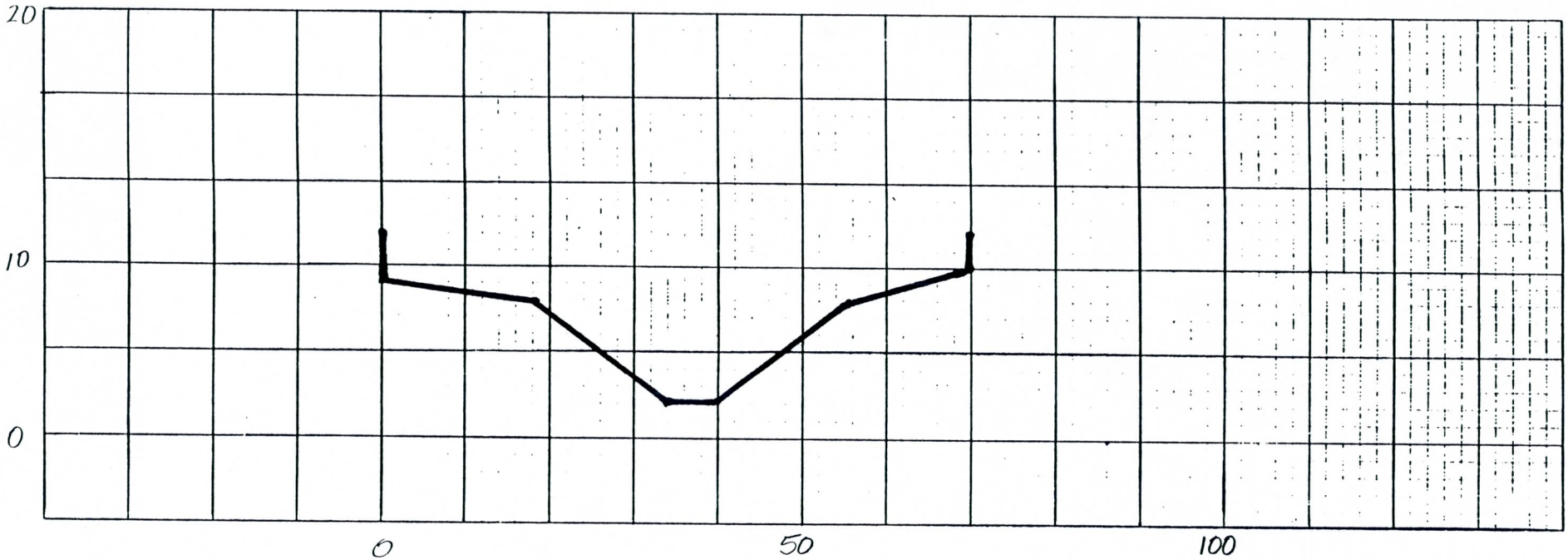


R								
RC	0.040	0.040	0.045					
RX	0	0	5	10	18	25	42	42
RY	18	10	10	8	8	10	16	18

CALCULATED BY: DLB 6/1/92

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM122

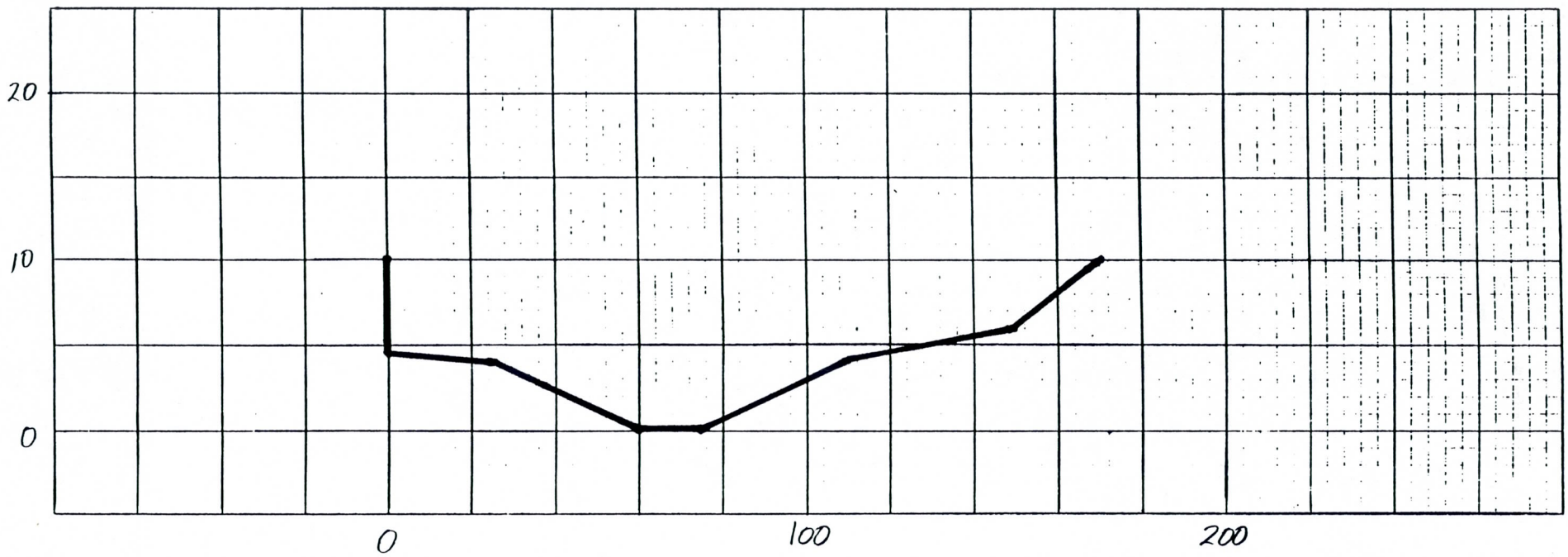


R								
RC	0.045	0.035	0.045					
RX	0	0	18	34	40	55	70	70
RY	12	9	8	2	2	8	10	12

CALCULATED BY: DLB 6/2/92

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM125

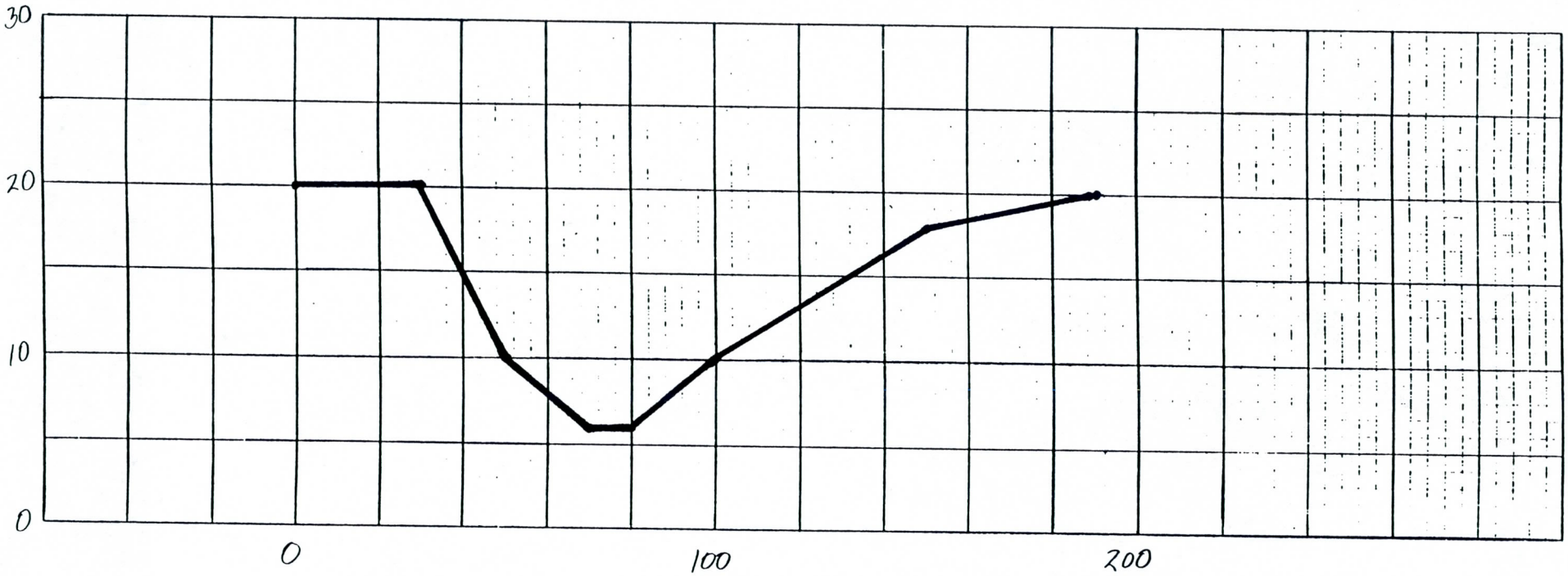


R								
RC	0.050	0.040	0.050					
RX	0	0	25	60	75	110	150	170
RY	10	4.5	4	0	0	4	6	10

CALCULATED BY: DLB 6/2/92

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM 127

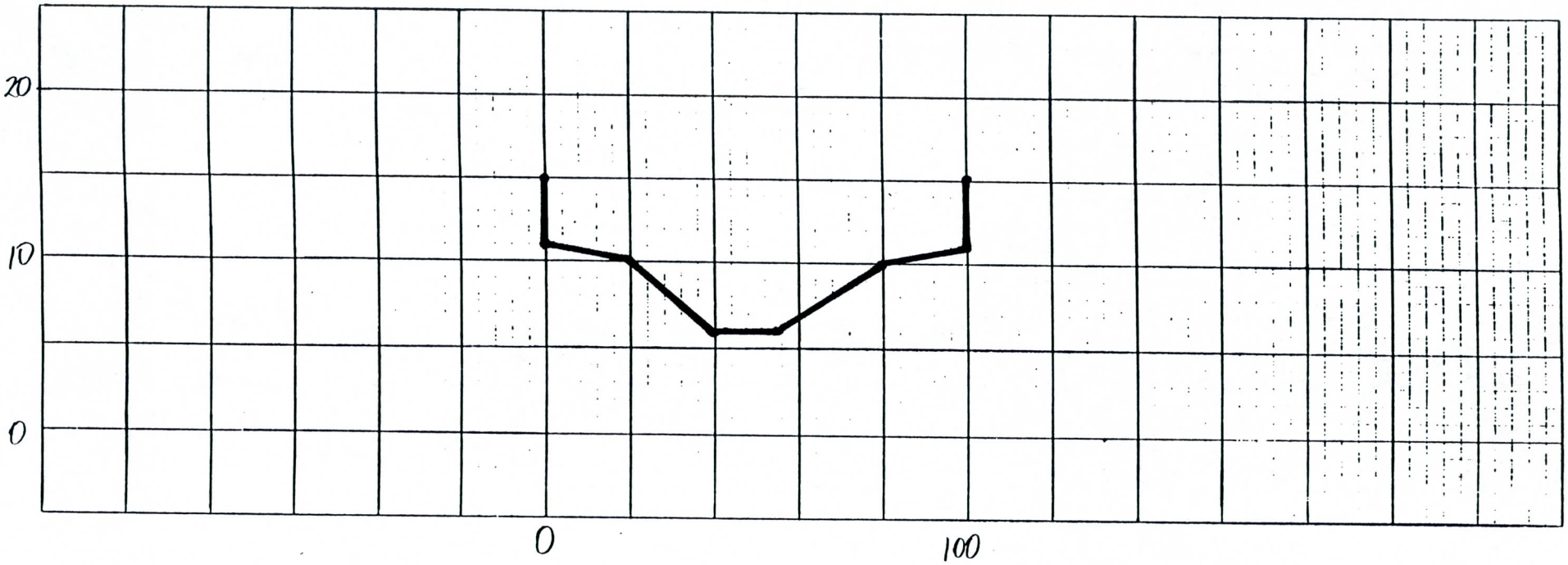


R								
RC	0.050	0.040	0.050					
RX	0	30	50	70	80	100	150	190
RY	20	20	10	6	6	10	18	20

CALCULATED BY: DLB 6/2/92

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM128

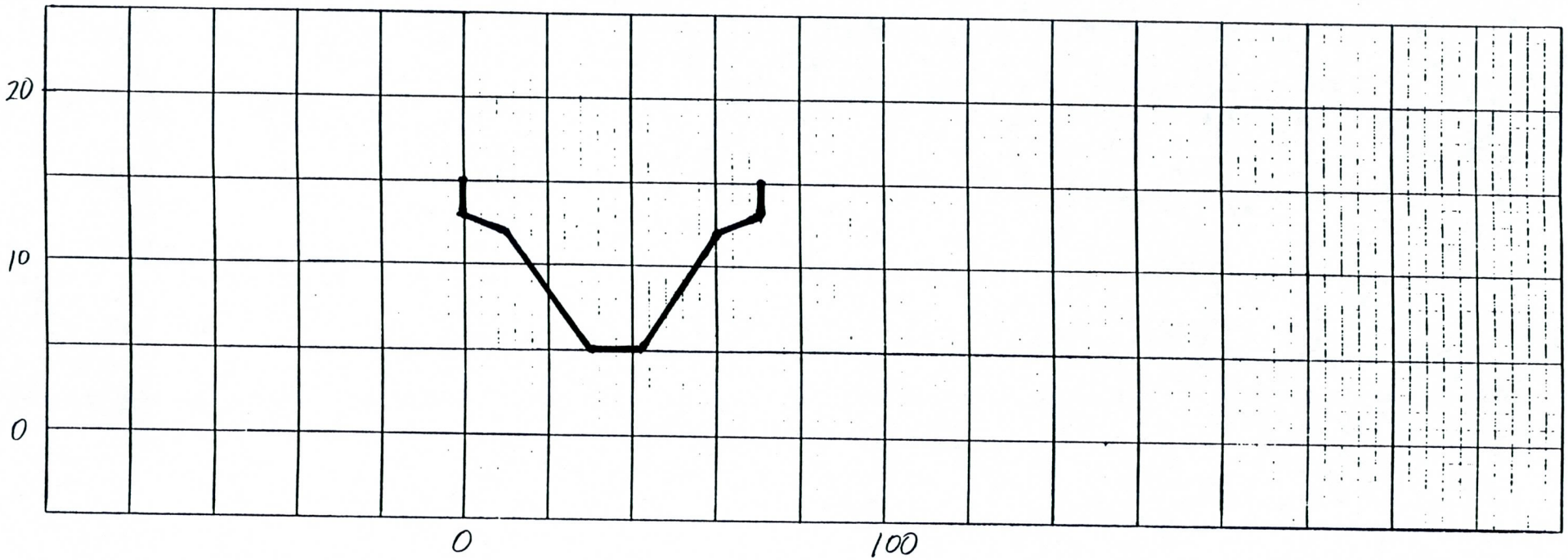


R								
RC	0.050	0.040	0.050					
RX	0	0	20	40	55	80	100	100
RY	15	11	10	6	6	10	11	15

CALCULATED BY: DLB 6/2/92

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM130



R								
RC	0.050	0.040	0.050					
RX	0	0	10	30	42	60	70	70
RY	15	13	12	5	5	12	13	15

CALCULATED BY: DLB 6/2/92

SECTION V

Divert & Onsite Retention Parameters

KAMINSKI HUBBARD engineering inc. • Surveying • Civil • Hydrology	Made by DLB	Date 5-27-93	Job No. 146
	Checked by	Date	Sheet No. 1
	For Onsite Retention Calculations		

CUDIA CITY WASH TO 10TH STREET WASH

ONSITE RETENTION CALCULATIONS - EXISTING CONDITIONS

X_1 = 2-Yr, 6-Hr. Precip. Value = 1.20"
X_2 = 2-Yr, 24-Hr. " " = 1.40"
X_3 = 100-Yr, 6-Hr. " " = 3.10"
X_4 = 100-Yr, 24-Hr. Precip. Value = 3.80"

Location - NE Corner T2N R3E

Y_2 = 2-Yr, 1-Hr Est. Precip. Value $= -0.011 + 0.942(X_1)(X_1/X_2)$
$= -0.011 + 0.942(1.20)(1.20/1.40)$
$= 0.96''$

Y_{100} = 100-Yr, 1-Hr Est. Precip. Value $= 0.494 + 0.755(X_3)(X_3/X_4)$
$= 0.494 + 0.755(3.10)(3.10/3.80)$
$= 2.40''$

Therefore,

2-Yr., 2-Hr. Depth = $0.341(1.20) + 0.659(0.96) = \underline{1.04''}$

100-Yr., 2-Hr. Depth = $0.341(3.10) + 0.659(2.40) = \underline{2.64''}$

From Precip. Depth vs. Return Period,

10-Yr., 2-Hr. Depth = 1.70"

For 13.1 square mile Watershed Area, Areal Reduction = 0.95

Therefore,

$$\boxed{\text{10-Yr., 2-Hr. Depth} = 1.62''}$$

For 10-Yr., 2-Hr. Duration Storm Volume,

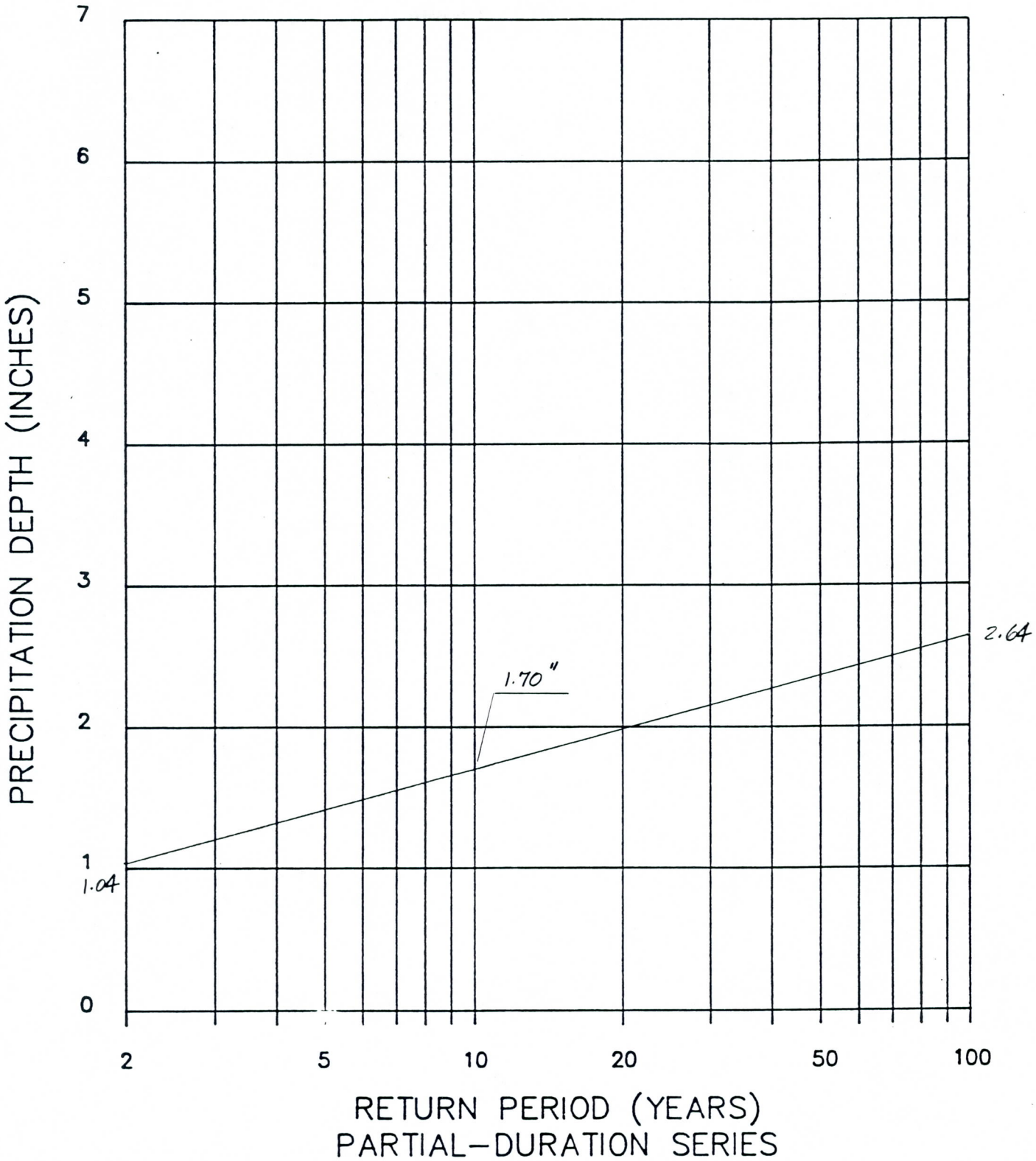
$$V_{10} = C\left(\frac{P}{12}\right)A = 0.135\ CA \quad (\text{in Ac-Ft})$$

For Future Conditions,

100-Yr, 2-Hr. Depth $= 2.64'' \times 0.95$
$= \underline{2.51''}$

100-Yr, 2-Hr. Volume $= \frac{P}{12} CA = \frac{2.51}{12} CA$

$= 0.209\ CA$



Precipitation Depth versus Return Period for Partial-Duration Series

CUDIA CITY WASH TO 10TH STREET WASH
ONSITE RETENTION CALCS.
(EXISTING CONDITION)

Sub-Basin	Planimetered Area (in^2) ①	②	③	Avg.	Area (Ac.)	Land Use	C	Vol. (Ac-Ft.)
126	2.75	5.53	8.30	2.77	10.16	COMM	0.80	1.10
	2.39	4.77	7.18	2.39	8.79	COMM	0.80	0.95
	1.43	2.85	4.28	1.43	5.24	COMM	0.80	0.57
	0.55	1.09	1.63	0.54	2.00	MF RES	0.60	0.16
	1.80	3.59	5.37	1.79	6.57	COMM	0.80	0.71
	0.99	1.95	2.92	0.97	3.58	COMM	0.80	0.39
	0.36	0.71	1.06	0.35	1.30	MF RES	0.60	0.11
	0.80	1.60	2.40	0.80	2.94	MF RES	0.60	0.24
	1.10	2.20	3.30	1.10	4.04	MF RES	0.60	0.33
	0.42	0.83	1.23	0.41	1.51	COMM	0.80	0.16
	0.53	1.08	1.61	0.54	1.97	COMM	0.80	0.21
	0.18	0.35	0.51	0.17	0.62	MF RES	0.60	0.05
							Σ =	4.98
129	1.30	2.61	3.93	1.31	4.81	MF RES	0.60	0.39
	0.68	1.35	2.00	0.67	2.45	COMM	0.80	0.26
	1.09	2.18	3.27	1.09	4.00	COMM	0.80	0.43
	2.14	4.28	6.41	2.14	7.85	COMM	0.80	0.85
	1.12	2.23	3.36	1.12	4.11	MF RES	0.60	0.33
	0.60	1.21	1.83	0.61	2.24	MF RES	0.60	0.18
							Σ =	2.44
131	0.73	1.46	2.19	0.73	2.68	MF RES	0.60	0.22
	1.16	2.30	3.44	1.15	4.21	COMM	0.80	0.45
	3.03	6.07	9.10	3.03	11.14	COMM	0.80	1.20
							Σ =	1.87

KAMINSKI HUBBARD engineering inc. • Surveying • Civil • Hydrology	Made by DLB	Date 6-1-93	Job No. 146
	Checked by	Date	Sheet No. 1
	For CONTRIBUTING AREA CALCS.		

CUDIA CITY WASH TO 10TH STREET WASH

2-YEAR CONTRIBUTING AREA - EXISTING CONDITIONS

1. Undeveloped (vacant) Areas Contribute 100%. Very Low Density and Low Density Residential Areas Contribute 100%.
2. Based on Land Use Classification, All Impervious Areas Contribute 100%. The Remaining Pervious Areas Were Treated As Non-Contributing.
3. Land Use Areas Having Onsite Retention Calculations Are Non-Contributing.
4. Parks and Golf Courses Are Non-Contributing.

Sub-Basin 100 Area = 0.468 − (0.35)(0.087) − (0.55)(0.045) − 0.026
= 0.387 mi.²

Sub-Basin 101 Area = 0.639 − (0.35)(0.015) − 0.128
= 0.506 mi.²

Sub-Basin 102 Area = 0.907 − (0.35)(0.147) − 0.046
= 0.810 mi²

Sub-Basin 103 Area = 0.795 mi.²

Sub-Basin 104 Area = 0.518 − (0.55)(0.020)
= 0.507 mi.²

Sub-Basin 105 Area = 0.402 − (0.55)(0.054)
= 0.372 mi.²

Sub-Basin 106 Area = 0.443 mi.²

Sub-Basin 107 Area = 0.643 mi.²

Sub-Basin 110 Area = 0.278 mi.²

Sub-Basin 111 Area = 0.533 − (0.55)(0.027)
= 0.518 mi.²

Sub-Basin 112 Area = 0.636 mi.²

KAMINSKI HUBBARD engineering inc. • Surveying • Civil • Hydrology	Made by DLB	Date 6-1-93	Job No. 146
	Checked by	Date	Sheet No. 2
	For CONTRIBUTING AREA CALCS.		

2-YEAR CONTRIBUTING AREA (CONT'D)

Sub-Basin 113 Area = 0.371 − (0.35)(0.042) − (0.55)(0.108) − (0.10)(0.018) − 0.057
= 0.238 mi.²

Sub-Basin 114 Area = 0.258 − (0.55)(0.023)
= 0.245 mi.²

Sub-Basin 115 Area = 0.267 − (0.35)(0.048) − (0.55)(0.052) − 0.029
= 0.193 mi.²

Sub-Basin 116 Area = 0.249 − (0.35)(0.003) − (0.55)(0.006) − (0.10)(0.119) − 0.018
= 0.215 mi.²

Sub-Basin 117 Area = 0.256 − (0.35)(0.029) − (0.55)(0.074) − 0.083
= 0.122 mi.²

Sub-Basin 118 Area = 0.299 mi.²

Sub-Basin 119 Area = 0.143 mi.²

Sub-Basin 120 Area = 0.260 − (0.55)(0.114)
= 0.197 mi.²

Sub-Basin 121 Area = 0.341 − (0.35)(0.024) − (0.55)(0.238 − 0.014) − 0.014 (SCHOOL)
= 0.195 mi.²

Sub-Basin 122 Area = 0.679 − (0.55)(0.172)
= 0.584 mi.²

Sub-Basin 123 Area = 0.035 − (0.35)(0.002) − (0.55)(0.006) − (0.10)(0.014)
= 0.030 mi.²

Sub-Basin 124 Area = 0.083 − (0.35)(0.018) − (0.55)(0.054)
= 0.047 mi.²

Sub-Basin 125 Area = 0.056 − (0.55)(0.008)
= 0.052 mi.²

Sub-Basin 126 Area = 0.622 − 0.017 − (0.35)(0.130 − 0.017) − (0.55)(0.167) − 0.059 − (0.10)(0.120 − 0.059) − 0.009
= 0.400 mi.²

KAMINSKI HUBBARD engineering inc. • Surveying • Civil • Hydrology	Made by DLB	Date 6-1-93	Job No. 146
	Checked by	Date	Sheet No. 3
	For CONTRIBUTING AREA CALCS.		

2-YEAR CONTRIBUTING AREA (CONT'D)

Sub-Basin 127 Area = 1.302 - (0.35)(0.033) - (0.55)(0.143) - (0.10)(0.009)
= 1.211 mi.²

Sub-Basin 128 Area = 0.311 mi.²

Sub-Basin 129 Area = 0.359 - 0.017 - (0.35)(0.094 - 0.017) - (0.55)(0.105)
- 0.022 - (0.10)(0.066 - 0.022)
= 0.231 mi.²

Sub-Basin 130 Area = 0.438 mi.²

Sub-Basin 131 Area = 0.548 - 0.004 - (0.35)(0.076 - 0.004) - (0.55)(0.249)
- 0.024 - (0.10)(0.042 - 0.024)
= 0.356 mi.²

CUDIA CITY WASH TO 10TH STREET WASH
ONSITE RETENTION CALCS.
(FUTURE CONDITION)

Sub-Basin	Planimetered Area (in^2) ①	②	③	Avg.	Area (Ac.)	Land Use	C	Vol. (Ac-Ft.)	
126					37.82	COMM	0.80	4.08	*
					10.90	MF RES	0.60	0.88	*
					7.59	COMM	0.80	1.27	
					12.09	MF RES	0.60	1.52	
							Σ =	7.75	
129					14.30	COMM	0.80	1.54	*
					11.16	MF RES	0.60	0.90	*
					28.42	COMM	0.80	4.75	
							Σ =	7.19	
131					15.35	COMM	0.80	1.66	*
					2.68	MF RES	0.60	0.22	*
					1.21	COMM	0.80	0.20	
					2.57	MF RES	0.60	0.32	
							Σ =	2.40	

* Based on 10-Year 2-Hour Storm Frequency

KAMINSKI HUBBARD engineering inc. • Surveying • Civil • Hydrology	Made by DLB	Date 9-23-93	Job No. 146
	Checked by	Date	Sheet No. 1
	For Contributing Area Calcs.		

CUDIA CITY WASH TO 10TH STREET WASH

2-Year Contributing Area - Future Conditions

1. Undeveloped Areas Contribute 100%. Very Low & Low Density Residential Areas Contribute 100%.
2. All Impervious Areas Contribute 100%. Pervious Areas Are Non-contributing.
3. Onsite Retention Areas are Non-contributing.
4. Parks & Golf Courses Are Non-contributing.

Sub-Basin 100 Area = 0.468 − (0.35)(0.087) − (0.55)(0.045) − 0.026
= 0.387 mi.²

Sub-Basin 101 Area = 0.639 − (0.35)(0.015) − 0.128
= 0.506 mi.²

Sub-Basin 102 Area = 0.907 − (0.35)(0.135) − 0.060 *
= 0.800 mi.²

Sub-Basin 103 Area = 0.795 mi.²

Sub-Basin 104 Area = 0.518 − (0.55)(0.020)
= 0.507 mi.²

Sub-Basin 105 Area = 0.402 − (0.55)(0.072) *
= 0.362 mi.²

Sub-Basin 106 Area = 0.443 − (0.55)(0.033)
= 0.425 mi.² *

Sub-Basin 107 Area = 0.643 mi.²

Sub-Basin 110 Area = 0.278 mi.²

Sub-Basin 111 Area = 0.533 − (0.55)(0.074)
= 0.492 mi.² *

Sub-Basin 112 Area = 0.636 mi.²

KAMINSKI HUBBARD engineering inc. • Surveying • Civil • Hydrology	Made by DLB	Date 9-23-93	Job No. 146
	Checked by	Date	Sheet No. 2
	For Contributing Area Calcs.		

2-Year Contributing Area (cont'd.)

Sub-Basin 113 Area = 0.371 − (0.35)(0.015) − (0.55)(0.113) − (0.10)(0.042) − 0.058 *
= 0.241 mi.²

Sub-Basin 114 Area = 0.258 − (0.55)(0.108) *
= 0.199 mi.²

Sub-Basin 115 Area = 0.267 − (0.35)(0.015) − (0.55)(0.067) − (0.10)(0.033) − 0.029
= 0.193 mi.²

Sub-Basin 116 Area = 0.249 − (0.35)(0.003) − (0.55)(0.006) − (0.25)(0.045) − (0.10)(0.117) − 0.018 *
= 0.204 mi.²

Sub-Basin 117 Area = 0.256 − (0.35)(0.026) − (0.55)(0.070) − (0.25)(0.050) − 0.083 *
= 0.113 mi.²

Sub-Basin 118 Area = 0.299 mi.²

Sub-Basin 119 Area = 0.143 mi.²

Sub-Basin 120 Area = 0.260 − (0.55)(0.114)
= 0.197 mi.²

Sub-Basin 121 Area = 0.341 − (0.35)(0.020) − (0.55)(0.226 − 0.014) − 0.014 *
= 0.203 mi²

Sub-Basin 122 Area = 0.679 − (0.55)(0.174)
= 0.584 mi²

Sub-Basin 123 Area = 0.035 − (0.35)(0.002) − (0.55)(0.012) *
= 0.028 mi²

Sub-Basin 124 Area = 0.083 − (0.35)(0.020) − (0.55)(0.057) − (0.10)(0.002) *
= 0.044 mi.²

Sub-Basin 125 Area = 0.056 − (0.35)(0.001) − (0.55)(0.007)
= 0.052 mi.²

Sub-Basin 126 Area = 0.622 − 0.035 − (0.35)(0.150 − 0.035) − (0.55)(0.220) − 0.071 − (0.10)(0.130 − 0.071) − 0.009 *
= 0.340 mi.²

.622 − 0.031 = .591

ME101-0324-29M

KAMINSKI HUBBARD engineering inc. • Surveying • Civil • Hydrology	Made by DLB	Date 9-23-93	Job No. 146
	Checked by	Date	Sheet No. 3
	For Contributing Area Calcs.		

2-Year Contributing Area (Cont'd)

Sub-Basin 127 Area = 1.398 − (0.35)(0.017) − (0.55)(0.261)
= 1.248 mi²

Sub-Basin 128 Area = 0.319 mi.²

Sub-Basin 129 Area = 0.357 − 0.017 − (0.35)(0.080 − 0.017) − (0.55)(0.142)
− 0.067 − (0.10)(0.111 − 0.067)
.357 − .044 = .313 = 0.168 mi²

Sub-Basin 130 Area = 0.436 mi²

Sub-Basin 131 Area = 0.548 − 0.008 − (0.35)(0.077 − 0.008) − (0.55)(0.278)
− 0.002 − (0.10)(0.044 − 0.002)
= 0.356 mi²

MF101-0374-20M

SECTION VI

HEC-1 Hydrology Results, 100-Year 24-Hour Storm (Existing Conditions)

```
****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              MAY   1991              *
*           VERSION 4.0.1E             *
*                                      *
*  RUN DATE  11/23/94  TIME  14:18:33  *
*                                      *
****************************************
```

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

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

  1           ID       ACDC AREA DRAINAGE MASTER STUDY
  2           ID       FILENAME:  CUC324.DAT        KHE JOB NO. 0146
  3           ID       WATERSHED CONTRIBUTING TO ACDC
  4           ID       CUDIA CITY WASH TO 10TH STREET WASH
  5           ID       100-YEAR 24-HOUR DURATION STORM
              *                                                        *
              *        FINAL HEC-1 RUN FOR CUDIA CITY WASH WATERSHED   *
              *                 Submitted: January 27, 1993            *
              *                 REVISED:  SEPTEMBER 15, 1993           *
              *                                                        *
              *DIAGRAM
  6           IT       4 10OCT92    1200     800
  7           IO       5
              *   *   *   *   *   *   *   *
              *                           *
              *        CUDIA CITY WASH    *
              *      SUB-BASINS 100 - 107 *
              *                           *
              *   *   *   *   *   *   *   *

  8           KK    100S
  9           KM    RUNOFF GENERATED ON SUB-BASIN 100
 10           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 11           KM    L= 1.16 mi.  S= 698 ft/mi.  Adj. S= 315 ft/mi.  Kb= .052
 12           KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 13           BA    .468
 14           IN      30
 15           KM    ****************CUDIA CITY WASH, PRECIP. BASED UPON DA = 4.815 SQ.MI.
 16           KM    RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 17           KM    AN AREAL REDUCTION COEFFICIENT OF .975 WAS USED
 18           PB   3.705
 19           PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
 20           PC    .063    .071    .080    .089    .098    .109    .120    .133    .147    .163
 21           PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
 22           PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
 23           PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
 24           LG    .122    .290    4.74    .253   30.77
 25           UC    .308    .174
 26           UA       0       5      16      30      65      77      84      90      94      97
 27           UA     100

 28           KK   RM100
 29           KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 100 THROUGH 102
 30           KM             1) Reach Length = 3025 ft.
 31           RD    3025   .0073    .040            TRAP      15       2

 32           KK    101S
 33           KM    RUNOFF GENERATED ON SUB-BASIN 101
 34           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 35           KM    L= 1.73 mi.  S= 385 ft/mi.  Adj. S= 287 ft/mi.  Kb= .047
 36           KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 37           BA    .639
 38           LG    .159    .184    7.78    .118   17.83
 39           UC    .375    .249
 40           UA       0       5      16      30      65      77      84      90      94      97
```

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

  41          UA     100

  42          KK   RM101
  43          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 101 THROUGH 102
  44          KM             1) Reach Length = 1692 ft.
  45          RD    1692   .0089    .040            TRAP       5       2

  46          KK    102S
  47          KM    RUNOFF GENERATED ON SUB-BASIN 102
  48          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
  49          KM    L= 1.49 mi.  S= 600 ft/mi.  Adj. S= 315 ft/mi.  Kb= .046
  50          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
  51          BA    .907
  52          LG    .143    .272    3.61    .324   31.54
  53          UC    .325    .155
  54          UA       0       5      16      30      65      77      84      90      94      97
  55          UA     100

  56          KK   HC102
  57          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 102 WITH ROUTED FLOW FROM 100 & 101
  58          HC       3

  59          KK   RM102
  60          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 102 TO 103
  61          KM             1) Reach Length = 720 ft.
  62          RD
  63          RC    .045    .035    .045     720   .0110
  64          RX       0      25      35      70     100     125     155     200
  65          RY      14      12      10       6       6      10      12      14

  66          KK    103S
  67          KM    RUNOFF GENERATED ON SUB-BASIN 103
  68          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
  69          KM    L= 2.45 mi.  S=456 ft/mi.  Adj. S= 300 ft/mi.  Kb= .056
  70          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
  71          BA    .795
  72          LG    .150    .291    4.43    .256   21.01
  73          UC    .475    .378
  74          UA       0       5      16      30      65      77      84      90      94      97
  75          UA     100

  76          KK   HC103
  77          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 103 WITH ROUTED FLOW FROM 102
  78          HC       2

  79          KK   RM103
  80          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 103 TO 104
  81          KM             1) Reach Length = 1125 ft.
  82          RD
  83          RC    .045    .035    .045    1125   .0080
  84          RX       0      25      35      70     100     125     155     200
  85          RY      14      12      10       6       6      10      12      14
```

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

 86           KK    104S
 87           KM    RUNOFF GENERATED ON SUB-BASIN 104
 88           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 89           KM    L= 1.41 mi.  S= 402 ft/mi.  Adj. S= 290 ft/mi.  Kb= .053
 90           KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 91           BA    .518
 92           LG    .110    .263    6.78    .163   19.35
 93           UC    .354    .224
 94           UA       0       5      16      30      65      77      84      90      94      97
 95           UA     100

 96           KK   HC104
 97           KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 104 WITH ROUTED FLOW FROM 103
 98           HC       2

 99           KK   RM104
100           KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 104 THROUGH 105
101           KM             1) Reach Length = 2631 ft.
102           RD
103           RC    .045    .035    .045    2631   .0068
104           RX       0      50      60      75      90     115     150     200
105           RY      20      18      14       9       9      14      14      15

106           KK    105S
107           KM    RUNOFF GENERATED ON SUB-BASIN 105
108           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
109           KM    L= 1.10 mi.  S= 740 ft/mi.  Adj. S= 315 ft/mi.  Kb= .050
110           KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
111           BA    .402
112           LG    .116    .283    3.50    .291   32.87
113           UC    .292    .171
114           UA       0       5      16      30      65      77      84      90      94      97
115           UA     100

116           KK   HC105
117           KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 105 WITH ROUTED FLOW FROM 104
118           HC       2

119           KK   RM105
120           KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 105 THROUGH 107
121           KM             1) Reach Length = 5463 ft.
122           RD
123           RC    .045    .035    .045    5463   .0066
124           RX       0      55      80      95     110     145     190     250
125           RY      10       6       4       0       0       4       8      10

126           KK    106S
127           KM    RUNOFF GENERATED ON SUB-BASIN 106
128           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
129           KM    L= 1.72 mi.  S= 562 ft/mi.  Adj. S= 310 ft/mi.  Kn= .073
130           KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
131           BA    .443
132           LG    .132    .328    4.43    .256   21.45
133           UC    .454    .378
```

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

 134          UA       0       5      16      30      65      77      84      90      94      97
 135          UA     100

 136          KK   RM106
 137          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 106 THROUGH 107
 138          KM             1) Reach Length = 5946 ft.
 139          RD
 140          RC    .045    .035    .045    5946   .0145
 141          RX       0     100     150     170     185     205     215     325
 142          RY       8       6       4       0       0       4       6       8

 143          KK    107S
 144          KM    RUNOFF GENERATED ON SUB-BASIN 107
 145          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 146          KM    L= 1.32 mi.  S= 139 ft/mi.  Adj. S= 139 ft/mi.  Kn= .040
 147          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 148          BA    .643
 149          LG    .106    .268    6.60    .175   20.90
 150          UC    .363    .193
 151          UA       0       5      16      30      65      77      84      90      94      97
 152          UA     100

 153          KK   HC107
 154          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 107 WITH ROUTED FLOW FROM 105 & 106
 155          HC       3

 156          KK   107RE
 157          KM    DIVERT FLOW FROM SUB-BASIN 107 INTO THE ACDC
 158          DT   107DC
 159          DI       0   10000
 160          DQ       0   10000
              *    *    *    *    *    *    *    *    *    *
              *                                            *
              *      CUDIA CITY WASH TO 10TH STREET WASH   *
              *             SUB-BASINS 110 - 131           *
              *                                            *
              *    *    *    *    *    *    *    *    *    *
 161          KM    *************JIM TAWARD'S SUBBASIN, PRECIP. BASED UPON DA = 0.278 SQ.MI.

 162          KK    110S
 163          KM    RUNOFF GENERATED ON SUB-BASIN 110
 164          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 165          KM    L= 1.34 mi.  S= 95 ft/mi.  Adj. S= 95 ft/mi.  Kb= .051
 166          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 167          BA    .278
 168          KM    RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 169          KM    AN AREAL REDUCTION COEFFICIENT OF .998 WAS USED
 170          PB   3.792
 171          LG    .102    .160    7.50    .117   14.71
 172          UC    .463    .412
 173          UA       0       5      16      30      65      77      84      90      94      97
 174          UA     100
```

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

 175          KK   110RE
 176          KM    DIVERT FLOW FROM SUB-BASIN 110 INTO THE ACDC
 177          DT   110DC
 178          DI       0   10000
 179          DQ       0   10000

 180          KK   HC110
 181          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 110 WITH REMAINING FLOW FROM 107
 182          HC       2
 183          KM    **************STANFORD WASH, PRECIP. BASED UPON DA = 1.169 SQ.MI.

 184          KK    111S
 185          KM    RUNOFF GENERATED ON SUB-BASIN 111
 186          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 187          KM    L= 1.94 mi.  S= 429 ft/mi.  Adj. S= 296 ft/mi.  Kb= .062
 188          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 189          BA    .533
 190          KM    RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 191          KM    AN AREAL REDUCTION COEFFICIENT OF .992 WAS USED
 192          PB   3.770
 193          LG    .121    .310    5.98    .198   18.00
 194          UC    .446    .367
 195          UA       0       5      16      30      65      77      84      90      94      97
 196          UA     100

 197          KK    112S
 198          KM    RUNOFF GENERATED ON SUB-BASIN 112
 199          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 200          KM    L= 2.36 mi.  S= 375 ft/mi.  Adj. S= 283 ft/mi.  Kb= .066
 201          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 202          BA    .636
 203          LG    .129    .309    3.87    .373   19.91
 204          UC    .525    .466
 205          UA       0       5      16      30      65      77      84      90      94      97
 206          UA     100

 207          KK  HC112A
 208          KM    COMBINE HYDROGRAPHS FROM SUBBASIN 111 AND 112
 209          HC       2

 210          KK   112RE
 211          KM    DIVERT FLOW FROM SUB-BASIN 112 INTO THE ACDC
 212          DT   112DC
 213          DI       0   10000
 214          DQ       0   10000

 215          KK  HC112B
 216          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 112 WITH REMAINING FLOW FROM 110
 217          HC       2
 218          KM    **************CUNNINGHAM'S SUBBASIN, PRECIP. BASED UPON DA = 0.371 SQ.MI.
```

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

 219          KK    113S
 220          KM    RUNOFF GENERATED ON SUB-BASIN 113
 221          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 222          KM    L= 1.28 mi.  S= 140 ft/mi.  Adj. S= 140 ft/mi.  Kb= .038
 223          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 224          BA    .371
 225          KM    RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 226          KM    AN AREAL REDUCTION COEFFICIENT OF .997 WAS USED
 227          PB   3.789
 228          LG    .120    .168    7.50    .127   31.53
 229          UC    .354    .251
 230          UA      0       5      16      30      65      77      84      90      94      97
 231          UA     100

 232          KK   113RE
 233          KM    DIVERT FLOW FROM SUB-BASIN 113 INTO THE ACDC
 234          DT   113DC
 235          DI      0   10000
 236          DQ      0   10000

 237          KK   HC113
 238          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 113 WITH REMAINING FLOW FROM 112
 239          HC      2
 240          KM    **************BILTMORE SUBBASIN, PRECIP. BASED UPON DA = 0.525 SQ.MI.

 241          KK    114S
 242          KM    RUNOFF GENERATED ON SUB-BASIN 114
 243          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 244          KM    L= 0.69 mi.  S= 472 ft/mi.  Adj. S= 301 ft/mi.  Kb= .089
 245          KM    CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 246          BA    .258
 247          LG    .146    .341    3.98    .396   22.21
 248          UC    .321    .169
 249          UA      0       3       5       8      12      20      43      75      90      96
 250          UA     100

 251          KK   DT114
 252          KM    THROW AWAY DETENTION BASIN VOLUME:  1) 5.4 AC-FT FROM SUB-BASIN 114
 253          KM                                           (Hydrograph identified as OR114)
 254          KM                                        2) Balance of runoff continues on.
 255          KM                                           (Hydrograph identified as DT114)
 256          DT   OR114     5.4
 257          DI      0   10000
 258          DQ      0   10000

 259          KK   RM114
 260          KM    KINEMATIC WAVE ROUTE IN CHANNEL FROM SUB-BASIN 114 THROUGH 115
 261          KM             1) Reach Length = 3143 ft.
 262          RD    3143   .0134    .045            TRAP      10       4
```

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

 263          KK    115S
 264          KM    RUNOFF GENERATED ON SUB-BASIN 115
 265          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 266          KM    L= 1.34 mi.  S= 384 ft/mi.  Adj. S= 288 ft/mi.  Kb= .061
 267          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 268          BA    .267
 269          LG    .136    .311    6.78    .174   30.04
 270          UC    .371    .330
 271          UA      0       5      16      30      65      77      84      90      94      97
 272          UA     100

 273          KK  HC115A
 274          KM    COMBINE HYDROGRAPHS FROM SUB-BASINS 114 & 115
 275          HC      2

 276          KK   115RE
 277          KM    DIVERT FLOW FROM SUB-BASIN 115 INTO THE ACDC
 278          DT   115DC
 279          DI      0   10000
 280          DQ      0   10000

 281          KK  HC115B
 282          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 115 WITH REMAINING FLOW FROM 113
 283          HC      2
 284          KM    ***************SEWAGE TRT SUBBASIN PRECIP. BASED UPON DA = 0.249 SQ.MI.

 285          KK    116S
 286          KM    RUNOFF GENERATED ON SUB-BASIN 116
 287          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 288          KM    L= 0.72 mi.  S= 263 ft/mi.  Adj. S= 250 ft/mi.  Kb= .041
 289          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 290          BA    .249
 291          LG    .118    .183    8.05    .095   53.25
 292          UC    .225    .120
 293          UA      0       5      16      30      65      77      84      90      94      97
 294          UA     100

 295          KK   116RE
 296          KM    DIVERT FLOW FROM SUB-BASIN 116 INTO THE ACDC
 297          DT   116DC
 298          DI      0   10000
 299          DQ      0   10000

 300          KK   HC116
 301          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 116 WITH REMAINING FLOW FROM 115
 302          HC      2
 303          KM    ****************UNNAMED SUBBASIN PRECIP. BASED UPON DA = 0.256 SQ.MI.

 304          KK    117S
 305          KM    RUNOFF GENERATED ON SUB-BASIN 117
 306          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 307          KM    L= 1.00 mi.  S= 156 ft/mi.  Adj. S= 156 ft/mi.  Kb= .031
 308          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 309          BA    .256
```

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

 310          LG    .136    .257    3.71    .405   25.61
 311          UC    .275    .192
 312          UA       0       5      16      30      65      77      84      90      94      97
 313          UA     100

 314          KK   117RE
 315          KM    DIVERT FLOW FROM SUB-BASIN 117 INTO THE ACDC
 316          DT   117DC
 317          DI       0   10000
 318          DQ       0   10000

 319          KK   HC117
 320          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 117 WITH REMAINING FLOW FROM 116
 321          HC       2
 322          KM    **************FLYNN LANE WASH, PRECIP. BASED UPON DA = 1.043 SQ.MI.

 323          KK    118S
 324          KM    RUNOFF GENERATED ON SUB-BASIN 118
 325          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 326          KM    L= 0.60 mi.  S= 449 ft/mi.  Adj. S= 298 ft/mi.  Kb= .093
 327          KM    CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 328          BA    .299
 329          KM    RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 330          KM    AN AREAL REDUCTION COEFFICIENT OF .993 WAS USED
 331          PB   3.773
 332          LG    .150    .350    4.03    .408   21.00
 333          UC    .308    .133
 334          UA       0       3       5       8      12      20      43      75      90      96
 335          UA     100

 336          KK   118RR
              * KO     3
 337          KM    RESERVOIR ROUTE THROUGH SQUAW PEAK PARK DETENTION BASIN NO. 1
 338          RS       1    ELEV    1461
 339          SV       0     .94    6.02    7.84   10.09   12.81   15.89
 340          SE    1461    1470    1480    1482    1484    1486    1488
 341          SQ       0      42      64      68      71     217     821

 342          KK   RM118
 343          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 118 THROUGH 119
 344          KM            1) Reach Length = 1601 ft.
 345          RD
 346          RC    .045    .045    .045    1601   .0368
 347          RX       0      50     110     130     140     170     180     200
 348          RY      30      28      20       5       5      20      25      30

 349          KK    119S
 350          KM    RUNOFF GENERATED ON SUB-BASIN 119
 351          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 352          KM    L= 0.57 mi.  S= 1849 ft/mi.  Adj. S= 320 ft/mi.  Kb= .101
 353          KM    CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 354          BA    .143
 355          LG    .150    .350    4.03    .408   21.00
 356          UC    .304    .191
 357          UA       0       3       5       8      12      20      43      75      90      96
```

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

 358          UA     100

 359          KK   HC119
 360          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 119 WITH ROUTED FLOW FROM 118
 361          HC       2

 362          KK   119RR
              * KO     3
 363          KM    RESERVOIR ROUTE THROUGH SQUAW PEAK PARK DETENTION BASIN NO. 2
 364          RS       1    ELEV    1402
 365          SV       0     .15     .81    2.55    4.14    6.38    9.18
 366          SE    1402    1406    1410    1414    1416    1418    1420
 367          SQ       0      25      40      50      57      99     685

 368          KK   RM119
 369          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 119 THROUGH 120
 370          KM             1) Reach Length = 4438 ft.
 371          RD
 372          RC    .050    .045    .050    4438   .0257
 373          RX       0       0      10      25      32      50      60      60
 374          RY      28      24      20       8       8      20      24      28

 375          KK    120S
 376          KM    RUNOFF GENERATED ON SUB-BASIN 120
 377          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 378          KM    L= 0.89 mi.  S= 688 ft/mi.  Adj. S= 320 ft/mi.  Kb= .065
 379          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 380          BA    .260
 381          LG    .128    .312    4.12    .268   32.06
 382          UC    .300    .191
 383          UA       0       5      16      30      65      77      84      90      94      97
 384          UA     100

 385          KK   HC120
 386          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 120 WITH ROUTED FLOW FROM 119
 387          HC       2

 388          KK   RM120
 389          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 120 THROUGH 121
 390          KM             1) Reach Length = 2378 ft.
 391          RD
 392          RC    .040    .040    .045    2378   .0185
 393          RX       0       0       5      10      18      25      42      42
 394          RY      18      10      10       8       8      10      16      18

 395          KK    121S
 396          KM    RUNOFF GENERATED ON SUB-BASIN 121
 397          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 398          KM    L= 1.75 mi.  S= 386 ft/mi.  Adj. S= 289 ft/mi.  Kb= .041
 399          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 400          BA    .341
 401          LG    .112    .273    3.82    .361   39.65
 402          UC    .338    .320
 403          UA       0       5      16      30      65      77      84      90      94      97
 404          UA     100
```

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

 405          KK  HC121A
 406          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 120 & 121
 407          HC       2

 408          KK   121RE
 409          KM    DIVERT FLOW FROM SUB-BASIN 121 INTO THE ACDC
 410          DT   121DC
 411          DI       0   10000
 412          DQ       0   10000

 413          KK  HC121B
 414          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 121 WITH REMAINING FLOW FROM 117
 415          HC       2
 416          KM    ******************MYRTLE AVE. WASH, PRECIP. BASED UPON DA = 0.797 SQ.MI.

 417          KK    123S
 418          KM    RUNOFF GENERATED ON SUB-BASIN 123
 419          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 420          KM    L= 0.71 mi.  S= 76 ft/mi.  Adj. S= 76 ft/mi.  Kb= .062
 421          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 422          BA    .035
 423          KM    RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 424          KM    AN AREAL REDUCTION COEFFICIENT OF .995 WAS USED
 425          PB   3.781
 426          LG    .118    .300    5.67    .194   52.70
 427          UC    .396    .680
 428          UA       0       5      16      30      65      77      84      90      94      97
 429          UA     100

 430          KK   123RR
              * KO     3
 431          KM    ROUTE FLOW THROUGH MYRTLE WASH DETENTION BASIN
 432          KM    SOURCE:  S.R. 51 Squaw Peak Highway, Glendale Avenue to Northern Avenue,
 433          KM             Final Drainage Design Report.  Prepared for ADOT, Highway Division,
 434          KM             ADOT Proj. No. RAM-600-2-502, September 1989, by HNTB Architects,
 435          KM             Engineers & Planners.
 436          RS       1    ELEV    1280
 437          SV     .24    1.26    2.40    3.67    4.35    5.07    5.82    6.61
 438          SE    1281    1283    1285    1287    1288    1289    1290    1291
 439          SQ       0     1.8     3.1     4.1     4.8     5.4     6.0     6.5     7.0     7.5
 440          SQ     7.9     8.3
 441          SE    1280    1281    1282    1283    1284    1285    1286    1287    1288    1289
 442          SE    1290    1291

 443          KK    122S
 444          KM    RUNOFF GENERATED ON SUB-BASIN 122
 445          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 446          KM    L= 1.90 mi.  S= 504 ft/mi.  Adj. S= 306 ft/mi.  Kb= .069
 447          KM    CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 448          BA    .679
 449          LG    .137    .332    3.81    .280   27.31
 450          UC    .463    .328
 451          UA       0       3       5       8      12      20      43      75      90      96
 452          UA     100
```

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

 453          KK   HC122
 454          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 122 WITH DETENTION BASIN OUTFLOW
 455          HC       2

 456          KK   RM122
 457          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 122 THROUGH 124
 458          KM             1) Reach Length = 2580 ft.
 459          RD
 460          RC    .045    .035    .045    2580   .0120
 461          RX       0       0      18      34      40      55      70      70
 462          RY      12       9       8       2       2       8      10      12

 463          KK    124S
 464          KM    RUNOFF GENERATED ON SUB-BASIN 124
 465          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 466          KM    L= 0.60 mi.  S= 67 ft/mi.  Adj. S= 67 ft/mi.  Kb= .038
 467          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 468          BA    .083
 469          LG    .106    .261    4.30    .465   45.39
 470          UC    .296    .263
 471          UA       0       5      16      30      65      77      84      90      94      97
 472          UA     100

 473          KK  HC124A
 474          KM    COMBINE HYDROGRAPH FROM SUB-BASIN 122 & 124
 475          HC       2

 476          KK   124RE
 477          KM    DIVERT FLOW FROM SUB-BASIN 124 INTO THE ACDC
 478          DT   124DC
 479          DI       0   10000
 480          DQ       0   10000

 481          KK  HC124B
 482          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 124 WITH REMAINING FLOW FROM 121
 483          HC       2
 484          KM    **********DREAMY DRAW EAST SUBBASIN, PRECIP. BASED UPON DA = 0.678 SQ.MI.

 485          KK    125S
 486          KM    RUNOFF GENERATED ON SUB-BASIN 125
 487          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 488          KM    L= 0.47 mi.  S= 232 ft/mi.  Adj. S= 228 ft/mi.  Kb= .097
 489          KM    CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 490          BA    .056
 491          LG    .141    .333    3.71    .338   27.11
 492          UC    .300    .275
 493          UA       0       3       5       8      12      20      43      75      90      96
 494          UA     100
```

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

495           KK   125RR
              * KO     3
496           KM    ROUTE FLOW THROUGH DETENTION BASIN AT DREAMY DRAW CONDOMINIUMS
497           RS       1    ELEV    85.5
498           SV       0     .36     .94    2.21    4.28    7.11
499           SE    85.5      90      92      94      96      98
500           SQ       0     5.5     6.5     7.3     8.0     9.0

501           KK   RM125
502           KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 125 THROUGH 126
503           KM             1) Reach Length = 3868 ft.
504           RD
505           RC    .050    .040    .050    3868   .0124
506           RX       0       0      25      60      75     110     150     170
507           RY      10     4.5       4       0       0       4       6      10

508           KK    126S
509           KM    RUNOFF GENERATED ON SUB-BASIN 126
510           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
511           KM    L= 1.99 mi.  S= 281 ft/mi.  Adj. S= 258 ft/mi.  Kb= .041
512           KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
513           BA    .622
514           LG    .114    .288    6.60    .175   51.59
515           UC    .367    .276
516           UA       0       5      16      30      65      77      84      90      94      97
517           UA     100

518           KK   DT126
519           KM    THROW AWAY 10-YR 2-HR RETENTION VOLUME:  1) 5.0 AC-FT FROM SUB-BASIN 126
520           KM                                               (Hydrograph identified as OR126)
521           KM                                             2) Balance of runoff continues on.
522           KM                                               (Hydrograph identified as DT126)
523           DT   OR126     5.0
524           DI       0   10000
525           DQ       0   10000

526           KK  HC126A
527           KM    COMBINE HYDROGRAPH FROM SUB-BASIN 125 & 126
528           HC       2

529           KK   126RE
530           KM    DIVERT FLOW FROM SUB-BASIN 126 INTO THE ACDC
531           DT   126DC
532           DI       0   10000
533           DQ       0   10000

534           KK  HC126B
535           KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 126 WITH REMAINING FLOW FROM 124
536           HC       2
537           KM    *************DREAMY DRAW SUBBASIN, PRECIP. BASED UPON DA = 1.972 SQ.MI.
```

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

 538          KK    127S
 539          KM    RUNOFF GENERATED ON SUB-BASIN 127
 540          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 541          KM    L= 2.39 mi.  S= 293 ft/mi.  Adj. S= 263 ft/mi.  Kb= .069
 542          KM    CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 543          BA   1.302
 544          KM    RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 545          KM    AN AREAL REDUCTION COEFFICIENT OF .987 WAS USED
 546          PB   3.751
 547          LG    .143    .336    4.19    .443   24.67
 548          UC    .579    .349
 549          UA       0       3       5       8      12      20      43      75      90      96
 550          UA     100

 551          KK   127RR
              * KO     3
 552          KM    ROUTE FLOW THROUGH DREAMY DRAW DAM
 553          KM    SOURCE:  Gila River Basin, New River and Phoenix City Streams, Arizona,
 554          KM             Design Memorandum No. 1, Feature Design for Dreamy Draw Dam,
 555          KM             January 1972, by U.S. Army Corps of Engineers.
 556          RS       1    ELEV    1370
 557          SV       0       0       5      17      50     112     200     254     370     465
 558          SV     650     830
 559          SE    1370    1375    1380    1385    1390    1395    1400    1405    1407    1410
 560          SE    1415    1419
 561          SQ       0      82     116     136     154     170     184     198     753    2510
 562          SQ    7272   12381

 563          KK   RM127
 564          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 127 THROUGH 128
 565          KM             1) Reach Length = 2612 ft.
 566          RD
 567          RC    .050    .040    .050    2612   .0142
 568          RX       0      30      50      70      80     100     150     190
 569          RY      20      20      10       6       6      10      18      20

 570          KK    128S
 571          KM    RUNOFF GENERATED ON SUB-BASIN 128
 572          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 573          KM    L= 0.94 mi.  S= 399 ft/mi.  Adj. S= 290 ft/mi.  Kb= .093
 574          KM    CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 575          BA    .311
 576          LG    .150    .350    3.92    .384   19.38
 577          UC    .387    .239
 578          UA       0       3       5       8      12      20      43      75      90      96
 579          UA     100

 580          KK   HC128
 581          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 128 WITH ROUTED FLOW FROM 127
 582          HC       2
```

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

 583          KK   RM128
 584          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 128 THROUGH 129
 585          KM             1) Reach Length = 7766 ft.
 586          RD
 587          RC    .050    .040    .050    7766   .0121
 588          RX       0       0      20      40      55      80     100     100
 589          RY      15      11      10       6       6      10      11      15

 590          KK    129S
 591          KM    RUNOFF GENERATED ON SUB-BASIN 129
 592          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 593          KM    L= 1.61 mi.  S= 72 ft/mi.  Adj. S= 72 ft/mi.  Kb= .042
 594          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 595          BA    .359
 596          LG    .112    .275    3.50    .289   48.02
 597          UC    .492    .442
 598          UA       0       5      16      30      65      77      84      90      94      97
 599          UA     100

 600          KK   DT129
 601          KM    THROW AWAY 10-YR 2-HR RETENTION VOLUME:  1) 2.4 AC-FT FROM SUB-BASIN 129
 602          KM                                               (Hydrograph identified as OR129)
 603          KM                                             2) Balance of runoff continues on.
 604          KM                                               (Hydrograph identified as DT129)
 605          DT   OR129     2.4
 606          DI       0   10000
 607          DQ       0   10000

 608          KK  HC129A
 609          KM    COMBINE HYDROGRAPH FROM SUB-BASIN 128 & 129
 610          HC       2

 611          KK   129RE
 612          KM    DIVERT FLOW FROM SUB-BASIN 129 INTO THE ACDC
 613          DT   129DC
 614          DI       0   10000
 615          DQ       0   10000

 616          KK  HC129B
 617          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 129 WITH REMAINING FLOW FROM 126
 618          HC       2
 619          KM    ************NORTHERN AVE. WASH, PRECIP. BASED UPON DA = 0.986 SQ.MI.

 620          KK    130S
 621          KM    RUNOFF GENERATED ON SUB-BASIN 130
 622          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 623          KM    L= 1.25 mi.  S= 519 ft/mi.  Adj. S= 308 ft/mi.  Kb= .089
 624          KM    CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 625          BA    .438
 626          KM    RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 627          KM    AN AREAL REDUCTION COEFFICIENT OF .993 WAS USED
 628          PB   3.773
 629          LG    .150    .380    5.05    .233   11.27
 630          UC    .438    .283
```

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

 631          UA       0       3       5       8      12      20      43      75      90      96
 632          UA     100

 633          KK   130RR
              * KO     3
 634          KM    ROUTE FLOW THROUGH NORTH MOUNTAIN DETENTION BASIN NO. 4
 635          RS       1    ELEV    1317
 636          SV       0      .1      .5     1.5     3.5     7.5    14.9    27.1    44.6    68.0
 637          SV    96.9
 638          SE    1317    1320    1322    1324    1326    1328    1330    1332    1334    1336
 639          SE    1338
 640          SL  1317.7    1.33      .6      .5
 641          SS    1332      80     2.7     1.5

 642          KK   RM130
 643          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 130 THROUGH 131
 644          KM            1) Reach Length = 6520 ft.
 645          RD
 646          RC    .050    .040    .050    6520   .0126
 647          RX       0       0      10      30      42      60      70      70
 648          RY      15      13      12       5       5      12      13      15

 649          KK    131S
 650          KM    RUNOFF GENERATED ON SUB-BASIN 131
 651          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 652          KM    L= 2.06 mi.  S= 278 ft/mi.  Adj. S= 257 ft/mi.  Kb= .043
 653          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 654          BA    .548
 655          LG    .115    .289    5.36    .221   41.00
 656          UC    .379    .317
 657          UA       0       5      16      30      65      77      84      90      94      97
 658          UA     100

 659          KK   DT131
 660          KM    THROW AWAY 10-YR 2-HR RETENTION VOLUME:  1) 1.9 AC-FT FROM SUB-BASIN 131
 661          KM                                               (Hydrograph identified as OR131)
 662          KM                                             2) Balance of runoff continues on.
 663          KM                                               (Hydrograph identified as DT131)
 664          DT   OR131     1.9
 665          DI       0   10000
 666          DQ       0   10000

 667          KK  HC131A
 668          KM    COMBINE HYDROGRAPH FROM SUB-BASIN 130 & 131
 669          HC       2

 670          KK   131RE
 671          KM    DIVERT FLOW FROM SUB-BASIN 131 INTO THE ACDC
 672          DT   131DC
 673          DI       0   10000
 674          DQ       0   10000
```

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

 675          KK  HC131B
 676          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 131 WITH REMAINING FLOW FROM 129
 677          HC       2
 678          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  [illegible]0.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   8         100S
                V
                V
  28        RM100
                .
                .
  32            .        101S
                .           V
                .           V
  42            .       RM101
                .           .
                .           .
  46            .           .        102S
                .           .           .
                .           .           .
  56        HC102.......................
                V
                V
  59        RM102
                .
                .
  66            .        103S
                .           .
                .           .
  76        HC103............
                V
                V
  79        RM103
                .
                .
  86            .        104S
                .           .
                .           .
  96        HC104............
                V
                V
  99        RM104
                .
                .
 106            .        105S
                .           .
                .           .
 116        HC105............
                V
                V
 119        RM105
                .
                .
 126            .        106S
                .           V
                .           V
 136            .       RM106
                .           .
                .           .
  [illegible]3  .           .        107S
                .           .           .
                .           .           .
 153        HC107.......................
                .
```

```
            .
158         .-------->   107DC
156      107RE
            .
            .
162         .        110S
            .           .
            .           .
177         .           .-------->   110DC
175         .       110RE
            .           .
            .           .
180      HC110............
            .
            .
184         .        111S
            .           .
            .           .
197         .           .        112S
            .           .           .
            .           .           .
207         .      HC112A............
            .           .
            .           .
212         .           .-------->   112DC
210         .       112RE
            .           .
            .           .
215      HC112B............
            .
            .
219         .        113S
            .           .
            .           .
234         .           .-------->   113DC
232         .       113RE
            .           .
            .           .
237      HC113............
            .
            .
241         .        114S
            .           .
            .           .
256         .           .-------->   OR114
251         .       DT114
            .           V
            .           V
259         .       RM114
            .           .
            .           .
263         .           .        115S
            .           .           .
            .           .           .
273         .      HC115A............
            .           .
            .           .
278         .           .-------->   115DC
276         .       115RE
            .           .
            .           .
281      HC115B............
            .
            .
285         .        116S
            .           .
```

```
          .          .
297       .          .-------->   116DC
295       .      116RE
          .          .
          .          .
300    HC116............
          .
          .
304       .       117S
          .          .
          .          .
316       .          .-------->   117DC
314       .      117RE
          .          .
          .          .
319    HC117............
          .
          .
323       .       118S
          .          V
          .          V
336       .      118RR
          .          V
          .          V
342       .      RM118
          .          .
          .          .
349       .          .        119S
          .          .          .
          .          .          .
359       .      HC119............
          .          V
          .          V
362       .      119RR
          .          V
          .          V
368       .      RM119
          .          .
          .          .
375       .          .        120S
          .          .          .
          .          .          .
385       .      HC120............
          .          V
          .          V
388       .      RM120
          .          .
          .          .
395       .          .        121S
          .          .          .
          .          .          .
405       .     HC121A............
          .          .
          .          .
410       .          .-------->   121DC
408       .      121RE
          .          .
          .          .
413    HC121B............
          .
          .
417       .       123S
          .          V
          .          V
430       .      123RR
          .          .
```

```
                .          .
443             .          .        122S
                .          .          .
                .          .          .
[illegible]3    .      HC122............
                .          V
                .          V
456             .      RM122
                .          .
                .          .
463             .          .        124S
                .          .          .
                .          .          .
473             .     HC124A............
                .          .
                .          .
478             .          .-------->   124DC
476             .      124RE
                .          .
                .          .
481        HC124B............
                .
                .
485             .       125S
                .          V
                .          V
495             .      125RR
                .          V
                .          V
501             .      RM125
                .          .
                .          .
[illegible]8    .          .        126S
                .          .          .
                .          .          .
523             .          .          .-------->   OR126
518             .          .      DT126
                .          .          .
                .          .          .
526             .     HC126A............
                .          .
                .          .
531             .          .-------->   126DC
529             .      126RE
                .          .
                .          .
534        HC126B............
                .
                .
538             .       127S
                .          V
                .          V
551             .      127RR
                .          V
                .          V
563             .      RM127
                .          .
                .          .
570             .          .        128S
                .          .          .
                .          .          .
[illegible]80   .      HC128............
                .          V
                .          V
583             .      RM128
                .          .
```

```
              .          .
590           .          .        129S
              .          .          .
              .          .          .
605           .          .          .-------->   OR129
600           .          .      DT129
              .          .          .
              .          .          .
608           .     HC129A............
              .          .
              .          .
613           .          .-------->   129DC
611           .      129RE
              .          .
              .          .
616      HC129B............
              .
              .
620           .       130S
              .          V
              .          V
633           .      130RR
              .          V
              .          V
642           .      RM130
              .          .
              .          .
649           .          .        131S
              .          .          .
              .          .          .
664           .          .          .-------->   OR131
659           .          .      DT131
              .          .          .
              .          .          .
667           .     HC131A............
              .          .
              .          .
672           .          .-------->   131DC
670           .      131RE
              .          .
              .          .
675      HC131B............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              MAY   1991               *
*           VERSION 4.0.1E              *
*                                       *
*  RUN DATE  11/23/94  TIME  14:18:33   *
*                                       *
*****************************************
```

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

```
                    ACDC AREA DRAINAGE MASTER STUDY
                    FILENAME:  CUC324.DAT        KHE JOB NO. 0146
                    WATERSHED CONTRIBUTING TO ACDC
                    CUDIA CITY WASH TO 10TH STREET WASH
                    100-YEAR 24-HOUR DURATION STORM

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

   IT        HYDROGRAPH TIME DATA
                   NMIN          4  MINUTES IN COMPUTATION INTERVAL
                  IDATE     10OCT92  STARTING DATE
                  ITIME       1200  STARTING TIME
                     NQ        800  NUMBER OF HYDROGRAPH ORDINATES
                 NDDATE     12OCT92  ENDING DATE
                 NDTIME       1716  ENDING TIME
                 ICENT          19  CENTURY MARK

            COMPUTATION INTERVAL    0.07 HOURS
                 TOTAL TIME BASE   53.27 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
```

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	100S	652.	12.07	79.	24.	11.	0.47		
ROUTED TO	RM100	646.	12.13	79.	24.	11.	0.47		
HYDROGRAPH AT	101S	843.	12.07	111.	31.	14.	0.64		
ROUTED TO	RM101	830.	12.13	111.	31.	14.	0.64		
HYDROGRAPH AT	102S	1275.	12.07	153.	46.	21.	0.91		
3 COMBINED AT	HC102	2713.	12.07	343.	102.	46.	2.01		
ROUTED TO	RM102	2678.	12.07	343.	102.	46.	2.01		
HYDROGRAPH AT	103S	792.	12.13	122.	35.	16.	0.80		
2 COMBINED AT	HC103	3428.	12.07	466.	137.	62.	2.81		
ROUTED TO	RM103	3420.	12.13	466.	137.	62.	2.81		
HYDROGRAPH AT	104S	681.	12.07	84.	24.	11.	0.52		
2 COMBINED AT	HC104	4069.	12.13	550.	161.	73.	3.33		
ROUTED TO	RM104	4048.	12.20	549.	161.	73.	3.33		
HYDROGRAPH AT	105S	568.	12.07	70.	21.	10.	0.40		
2 COMBINED AT	HC105	4484.	12.13	619.	182.	82.	3.73		
ROUTED TO	RM105	4432.	12.27	619.	182.	82.	3.73		
HYDROGRAPH AT	106S	440.	12.13	68.	20.	9.	0.44		
ROUTED TO	RM106	437.	12.33	68.	20.	9.	0.44		
HYDROGRAPH AT	107S	875.	12.07	104.	30.	14.	0.64		
3 COMBINED AT	HC107	5411.	12.27	791.	232.	105.	4.82		
DIVERSION TO	107DC	5411.	0.07	791.	232.	105.	4.82		
HYDROGRAPH AT	107RE	0.	0.07	0.	0.	0.	4.82		
HYDROGRAPH AT	110S	304.	12.13	51.	14.	6.	0.28		
DIVERSION TO	110DC	304.	0.07	51.	14.	6.	0.28		
HYDROGRAPH AT	110RE	0.	0.07	0.	0.	0.	0.28		
2 COMBINED AT	HC110	0.	0.07	0.	0.	0.	5.09		
HYDROGRAPH AT	111S	556.	12.13	83.	24.	11.	0.53		
HYDROGRAPH AT	112S	532.	12.20	92.	27.	12.	0.64		
2 COMBINED AT	HC112A	1083.	12.13	175.	50.	23.	1.17		

DIVERSION TO	112DC	1083.	0.07	175.	50.	23.	1.17		
HYDROGRAPH AT	112RE	0.	0.07	0.	0.	0.	1.17		
2 COMBINED AT	HC112B	0.	0.07	0.	0.	0.	6.26		
HYDROGRAPH AT	113S	516.	12.07	74.	22.	10.	0.37		
DIVERSION TO	113DC	516.	0.07	74.	22.	10.	0.37		
HYDROGRAPH AT	113RE	0.	0.07	0.	0.	0.	0.37		
2 COMBINED AT	HC113	0.	0.07	0.	0.	0.	6.63		
HYDROGRAPH AT	114S	328.	12.13	38.	11.	5.	0.26		
DIVERSION TO	OR114	153.	12.13	9.	3.	1.	0.26		
HYDROGRAPH AT	DT114	328.	12.13	32.	8.	4.	0.26		
ROUTED TO	RM114	323.	12.20	32.	8.	4.	0.26		
HYDROGRAPH AT	115S	308.	12.13	47.	14.	6.	0.27		
2 COMBINED AT	HC115A	612.	12.13	78.	23.	10.	0.52		
DIVERSION TO	115DC	612.	0.07	78.	23.	10.	0.52		
HYDROGRAPH AT	115RE	0.	0.07	0.	0.	0.	0.52		
2 COMBINED AT	HC115B	0.	0.07	0.	0.	0.	7.16		
HYDROGRAPH AT	116S	430.	12.00	58.	18.	8.	0.25		
DIVERSION TO	116DC	430.	0.07	58.	18.	8.	0.25		
HYDROGRAPH AT	116RE	0.	0.07	0.	0.	0.	0.25		
2 COMBINED AT	HC116	0.	0.07	0.	0.	0.	7.41		
HYDROGRAPH AT	117S	337.	12.07	40.	12.	5.	0.26		
DIVERSION TO	117DC	337.	0.07	40.	12.	5.	0.26		
HYDROGRAPH AT	117RE	0.	0.07	0.	0.	0.	0.26		
2 COMBINED AT	HC117	0.	0.07	0.	0.	0.	7.66		
HYDROGRAPH AT	118S	386.	12.07	42.	12.	6.	0.30		
ROUTED TO	118RR	164.	12.33	42.	12.	6.	0.30	1485.28	12.33
ROUTED TO	RM118	170.	12.40	42.	12.	6.	0.30		
HYDROGRAPH AT	119S	173.	12.13	20.	6.	3.	0.14		
2 COMBINED AT	HC119	243.	12.33	62.	18.	8.	0.44		
ROUTED TO	119RR	222.	12.47	62.	18.	8.	0.44	1418.42	12.47
ROUTED TO	RM119	237.	12.60	62.	18.	8.	0.44		
HYDROGRAPH AT	120S	364.	12.07	45.	14.	6.	0.26		
2 COMBINED AT	HC120	393.	12.07	107.	32.	15.	0.70		

ROUTED TO	RM120	391.	12.13	107.	32.	15.	0.70		
HYDROGRAPH AT	121S	396.	12.07	62.	20.	9.	0.34		
2 COMBINED AT	HC121A	778.	12.13	168.	52.	23.	1.04		
DIVERSION TO	121DC	778.	0.07	168.	52.	23.	1.04		
HYDROGRAPH AT	121RE	0.	0.07	0.	0.	0.	1.04		
2 COMBINED AT	HC121B	0.	0.07	0.	0.	0.	8.71		
HYDROGRAPH AT	123S	30.	12.13	7.	2.	1.	0.04		
ROUTED TO	123RR	5.	13.80	5.	2.	1.	0.04	1284.94	13.87
HYDROGRAPH AT	122S	752.	12.27	113.	34.	15.	0.68		
2 COMBINED AT	HC122	756.	12.27	117.	36.	16.	0.71		
ROUTED TO	RM122	752.	12.33	117.	36.	16.	0.71		
HYDROGRAPH AT	124S	103.	12.07	15.	5.	2.	0.08		
2 COMBINED AT	HC124A	811.	12.27	132.	41.	19.	0.80		
DIVERSION TO	124DC	811.	0.07	132.	41.	19.	0.80		
HYDROGRAPH AT	124RE	0.	0.07	0.	0.	0.	0.80		
2 COMBINED AT	HC124B	0.	0.07	0.	0.	0.	9.50		
HYDROGRAPH AT	125S	67.	12.13	9.	3.	1.	0.06		
ROUTED TO	125RR	8.	12.93	7.	3.	1.	0.06	94.86	12.93
ROUTED TO	RM125	8.	13.67	7.	3.	1.	0.06		
HYDROGRAPH AT	126S	820.	12.07	132.	42.	19.	0.62		
DIVERSION TO	OR126	14.	12.07	10.	3.	1.	0.62		
HYDROGRAPH AT	DT126	820.	12.07	132.	40.	18.	0.62		
2 COMBINED AT	HC126A	822.	12.07	136.	43.	19.	0.68		
DIVERSION TO	126DC	822.	0.07	136.	43.	19.	0.68		
HYDROGRAPH AT	126RE	0.	0.07	0.	0.	0.	0.68		
2 COMBINED AT	HC126B	0.	0.07	0.	0.	0.	10.18		
HYDROGRAPH AT	127S	1192.	12.33	187.	56.	25.	1.30		
ROUTED TO	127RR	156.	13.33	147.	56.	25.	1.30	1390.72	13.33
ROUTED TO	RM127	156.	13.40	147.	56.	25.	1.30		
HYDROGRAPH AT	128S	349.	12.20	43.	13.	6.	0.31		
2 COMBINED AT	HC128	470.	12.20	185.	69.	31.	1.61		
ROUTED TO	RM128	457.	12.47	185.	69.	31.	1.61		
HYDROGRAPH AT	129S	365.	12.13	72.	23.	10.	0.36		

DIVERSION TO	OR129	7.	12.13	5.	1.	1.	0.36		
HYDROGRAPH AT	DT129	365.	12.13	72.	22.	10.	0.36		
2 COMBINED AT	HC129A	719.	12.40	247.	91.	41.	1.97		
DIVERSION TO	129DC	719.	0.07	247.	91.	41.	1.97		
HYDROGRAPH AT	129RE	0.	0.07	0.	0.	0.	1.97		
2 COMBINED AT	HC129B	0.	0.07	0.	0.	0.	12.15		
HYDROGRAPH AT	130S	480.	12.20	60.	16.	7.	0.44		
ROUTED TO	130RR	24.	13.27	23.	16.	7.	0.44	1331.60	13.27
ROUTED TO	RM130	24.	14.00	23.	16.	7.	0.44		
HYDROGRAPH AT	131S	653.	12.13	105.	33.	15.	0.55		
DIVERSION TO	OR131	7.	12.13	4.	1.	0.	0.55		
HYDROGRAPH AT	DT131	653.	12.13	105.	32.	14.	0.55		
2 COMBINED AT	HC131A	659.	12.13	122.	47.	22.	0.99		
DIVERSION TO	131DC	659.	0.07	122.	47.	22.	0.99		
HYDROGRAPH AT	131RE	0.	0.07	0.	0.	0.	0.99		
2 COMBINED AT	HC131B	0.	0.07	0.	0.	0.	13.14		

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)
RM100	MANE	4.00	646.06	728.00	1.91	4.00	646.06	728.00	1.91

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4761E+02 EXCESS=0.0000E+00 OUTFLOW=0.4761E+02 BASIN STORAGE=0.4898E-02 PERCENT ERROR= 0.0

RM101	MANE	3.12	834.52	726.47	1.81	4.00	830.30	728.00	1.81

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6180E+02 EXCESS=0.0000E+00 OUTFLOW=0.6180E+02 BASIN STORAGE=0.1263E-02 PERCENT ERROR= 0.0

RM102	MANE	1.18	2696.70	724.74	1.88	4.00	2678.27	724.00	1.88

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2016E+03 EXCESS=0.0000E+00 OUTFLOW=0.2016E+03 BASIN STORAGE=0.7924E-04 PERCENT ERROR= 0.0

RM103	MANE	1.87	3430.96	727.47	1.82	4.00	3419.94	728.00	1.82

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2720E+03 EXCESS=0.0000E+00 OUTFLOW=0.2720E+03 BASIN STORAGE=0.1330E-03 PERCENT ERROR= 0.0

RM104	MANE	4.00	4047.98	732.00	1.80	4.00	4047.98	732.00	1.80

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3194E+03 EXCESS=0.0000E+00 OUTFLOW=0.3194E+03 BASIN STORAGE=0.4266E-03 PERCENT ERROR= 0.0

RM105	MANE	4.00	4431.95	736.00	1.82	4.00	4431.95	736.00	1.82

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3616E+03 EXCESS=0.0000E+00 OUTFLOW=0.3617E+03 BASIN STORAGE=0.6947E-03 PERCENT ERROR= 0.0

RM106	MANE	4.00	437.05	740.00	1.66	4.00	437.05	740.00	1.66

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3900E+02 EXCESS=0.0000E+00 OUTFLOW=0.3910E+02 BASIN STORAGE=0.5833E-03 PERCENT ERROR= -0.3

RM114	MANE	1.80	324.86	732.60	1.22	4.00	322.91	732.00	1.22

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1669E+02 EXCESS=0.0000E+00 OUTFLOW=0.1673E+02 BASIN STORAGE=0.3441E-02 PERCENT ERROR= -0.3

RM118	MANE	4.00	169.92	744.00	1.54	4.00	169.92	744.00	1.54

INUITY SUMMARY (AC-FT) - INFLOW=0.2463E+02 EXCESS=0.0000E+00 OUTFLOW=0.2463E+02 BASIN STORAGE=0.7063E-04 PERCENT ERROR= 0.0

RM119	MANE	4.00	237.45	756.00	1.54	4.00	237.45	756.00	1.54

```
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3640E+02 EXCESS=0.0000E+00 OUTFLOW=0.3642E+02 BASIN STORAGE=0.2158E-03 PERCENT ERROR=  -0.1

          RM120  MANE        4.00    391.38    728.00      1.71      4.00    391.38    728.00        1.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6386E+02 EXCESS=0.0000E+00 OUTFLOW=0.6387E+02 BASIN STORAGE=0.2213E-03 PERCENT ERROR=   0.0

          RM122  MANE        4.00    751.72    740.00      1.88      4.00    751.72    740.00        1.88

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7160E+02 EXCESS=0.0000E+00 OUTFLOW=0.7161E+02 BASIN STORAGE=0.2284E-03 PERCENT ERROR=   0.0

          RM125  MANE        4.00      7.61    820.00      1.79      4.00      7.61    820.00        1.79

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5359E+01 EXCESS=0.0000E+00 OUTFLOW=0.5358E+01 BASIN STORAGE=0.3910E-03 PERCENT ERROR=   0.0

          RM127  MANE        4.00    156.30    804.00      1.61      4.00    156.30    804.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1119E+03 EXCESS=0.0000E+00 OUTFLOW=0.1120E+03 BASIN STORAGE=0.2435E-03 PERCENT ERROR=   0.0

          RM128  MANE        3.80    459.99    748.60      1.60      4.00    456.84    748.00        1.60

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1370E+03 EXCESS=0.0000E+00 OUTFLOW=0.1372E+03 BASIN STORAGE=0.1074E-02 PERCENT ERROR=  -0.2

          RM130  MANE        4.00     23.85    840.00      1.39      4.00     23.85    840.00        1.39

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3258E+02 EXCESS=0.0000E+00 OUTFLOW=0.3257E+02 BASIN STORAGE=0.6039E-03 PERCENT ERROR=   0.0


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

SECTION VII

HEC-1 Hydrology Results, 100-Year 24-Hour Storm (Future Conditions)

```
****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              MAY   1991              *
*           VERSION 4.0.1E             *
*                                      *
*  RUN DATE  10/05/93  TIME  11:23:57  *
*                                      *
****************************************
```

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

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

  1           ID       ACDC AREA DRAINAGE MASTER STUDY
  2           ID       FILENAME:  CUC324F.DAT        KHE JOB NO. 0146
  3           ID       WATERSHED CONTRIBUTING TO ACDC
  4           ID       CUDIA CITY WASH TO 10TH STREET WASH - FUTURE CONDITIONS
  5           ID       100-YEAR 24-HOUR DURATION STORM
              *                                                       *
              *           HEC-1 RUN FOR CUDIA CITY WASH WATERSHED     *
              *                 CREATED:  September 21, 1993          *
              *                                                       *
              *                                                       *
              *DIAGRAM
  6           IT       4 10OCT92    1200     800
  7           IO       5
              *   *   *   *   *   *   *   *
              *                           *
              *        CUDIA CITY WASH    *
              *      SUB-BASINS 100 - 107 *
              *                           *
              *   *   *   *   *   *   *   *

  8           KK    100S
  9           KM    RUNOFF GENERATED ON SUB-BASIN 100
 10           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 11           KM    L= 1.16 mi.  S= 698 ft/mi.  Adj. S= 315 ft/mi.  Kb= .043
 12           KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 13           BA    .468
 14           IN      30
 15           KM    ****************CUDIA CITY WASH, PRECIP. BASED UPON DA = 4.815 SQ.MI.
 16           KM    RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 17           KM    AN AREAL REDUCTION COEFFICIENT OF .975 WAS USED
 18           PB   3.705
 19           PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
 20           PC    .063    .071    .080    .089    .098    .109    .120    .133    .147    .163
 21           PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
 22           PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
 23           PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
 24           LG    .111    .263   4.740    .253  33.990
 25           UC    .267    .148
 26           UA       0       5      16      30      65      77      84      90      94      97
 27           UA     100

 28           KK   RM100
 29           KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 100 THROUGH 102
 30           KM             1) Reach Length = 3025 ft.
 31           RD    3025   .0073    .040            TRAP      15       2

 32           KK    101S
 33           KM    RUNOFF GENERATED ON SUB-BASIN 101
 34           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 35           KM    L= 1.73 mi.  S= 385 ft/mi.  Adj. S= 287 ft/mi.  Kb= .041
 36           KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 37           BA    .639
 38           LG    .159    .156   7.780    .118  20.170
 39           UC    .321    .210
 40           UA       0       5      16      30      65      77      84      90      94      97
```

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

  41          UA     100

  42          KK   RM101
  43          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 101 THROUGH 102
  44          KM             1) Reach Length = 1692 ft.
  45          RD    1692   .0089    .040            TRAP       5       2

  46          KK    102S
  47          KM    RUNOFF GENERATED ON SUB-BASIN 102
  48          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
  49          KM    L= 1.49 mi.  S= 600 ft/mi.  Adj. S= 315 ft/mi.  Kb= .046
  50          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
  51          BA    .907
  52          LG    .145    .272   3.610    .327  30.700
  53          UC    .317    .150
  54          UA       0       5      16      30      65      77      84      90      94      97
  55          UA     100

  56          KK   HC102
  57          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 102 WITH ROUTED FLOW FROM 100 & 101
  58          HC       3

  59          KK   RM102
  60          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 102 TO 103
  61          KM             1) Reach Length = 720 ft.
  62          RD
  63          RC    .045    .035    .045     720   .0110
  64          RX       0      25      35      70     100     125     155     200
  65          RY      14      12      10       6       6      10      12      14

  66          KK    103S
  67          KM    RUNOFF GENERATED ON SUB-BASIN 103
  68          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
  69          KM    L= 2.45 mi.  S=456 ft/mi.  Adj. S= 300 ft/mi.  Kb= .048
  70          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
  71          BA    .795
  72          LG    .150    .265   4.430    .256  24.310
  73          UC    .421    .330
  74          UA       0       5      16      30      65      77      84      90      94      97
  75          UA     100

  76          KK   HC103
  77          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 103 WITH ROUTED FLOW FROM 102
  78          HC       2

  79          KK   RM103
  80          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 103 TO 104
  81          KM             1) Reach Length = 1125 ft.
  82          RD
  83          RC    .045    .035    .045    1125   .0080
  84          RX       0      25      35      70     100     125     155     200
  85          RY      14      12      10       6       6      10      12      14
```

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

  86          KK    104S
  87          KM    RUNOFF GENERATED ON SUB-BASIN 104
  88          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
  89          KM    L= 1.41 mi.  S= 402 ft/mi.  Adj. S= 290 ft/mi.  Kb= .045
  90          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
  91          BA    .518
  92          LG    .100    .230   6.780    .163  22.240
  93          UC    .308    .192
  94          UA       0       5      16      30      65      77      84      90      94      97
  95          UA     100

  96          KK   HC104
  97          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 104 WITH ROUTED FLOW FROM 103
  98          HC       2

  99          KK   RM104
 100          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 104 THROUGH 105
 101          KM             1) Reach Length = 2631 ft.
 102          RD
 103          RC    .045    .035    .045    2631   .0068
 104          RX       0      50      60      75      90     115     150     200
 105          RY      20      18      14       9       9      14      14      15

 106          KK    105S
 107          KM    RUNOFF GENERATED ON SUB-BASIN 105
 108          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 109          KM    L= 1.10 mi.  S= 740 ft/mi.  Adj. S= 315 ft/mi.  Kb= .047
 110          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 111          BA    .402
 112          LG    .113    .276   3.500    .291  35.100
 113          UC    .275    .160
 114          UA       0       5      16      30      65      77      84      90      94      97
 115          UA     100

 116          KK   HC105
 117          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 105 WITH ROUTED FLOW FROM 104
 118          HC       2

 119          KK   RM105
 120          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 105 THROUGH 107
 121          KM             1) Reach Length = 5463 ft.
 122          RD
 123          RC    .045    .035    .045    5463   .0066
 124          RX       0      55      80      95     110     145     190     250
 125          RY      10       6       4       0       0       4       8      10

 126          KK    106S
 127          KM    RUNOFF GENERATED ON SUB-BASIN 106
 128          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 129          KM    L= 1.72 mi.  S= 562 ft/mi.  Adj. S= 310 ft/mi.  Kn= .057
 130          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 131          BA    .443
 132          LG    .114    .284   4.430    .256  28.260
 133          UC    .383    .313
```

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

 134          UA       0       5      16      30      65      77      84      90      94      97
 135          UA     100

 136          KK   RM106
 137          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 106 THROUGH 107
 138          KM             1) Reach Length = 5946 ft.
 139          RD
 140          RC    .045    .035    .045    5946   .0145
 141          RX       0     100     150     170     185     205     215     325
 142          RY       8       6       4       0       0       4       6       8

 143          KK    107S
 144          KM    RUNOFF GENERATED ON SUB-BASIN 107
 145          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 146          KM    L= 1.32 mi.  S= 139 ft/mi.  Adj. S= 139 ft/mi.  Kn= .035
 147          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 148          BA    .643
 149          LG    .102    .256   6.600    .174  22.640
 150          UC    .329    .173
 151          UA       0       5      16      30      65      77      84      90      94      97
 152          UA     100

 153          KK   HC107
 154          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 107 WITH ROUTED FLOW FROM 105 & 106
 155          HC       3

 156          KK   107RE
 157          KM    DIVERT FLOW FROM SUB-BASIN 107 INTO THE ACDC
 158          DT   107DC
 159          DI       0   10000
 160          DQ       0   10000
              *    *    *    *    *    *    *    *    *    *
              *                                          *
              *      CUDIA CITY WASH TO 10TH STREET WASH  *
              *            SUB-BASINS 110 - 131           *
              *                                          *
              *    *    *    *    *    *    *    *    *    *
 161          KM    *************JIM TAWARD'S SUBBASIN, PRECIP. BASED UPON DA = 0.278 SQ.MI.

 162          KK    110S
 163          KM    RUNOFF GENERATED ON SUB-BASIN 110
 164          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 165          KM    L= 1.34 mi.  S= 95 ft/mi.  Adj. S= 95 ft/mi.  Kb= .048
 166          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 167          BA    .278
 168          KM    RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 169          KM    AN AREAL REDUCTION COEFFICIENT OF .998 WAS USED
 170          PB   3.792
 171          LG    .100    .150   7.500    .116  17.680
 172          UC    .433    .383
 173          UA       0       5      16      30      65      77      84      90      94      97
 174          UA     100
```

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

 175          KK   110RE
 176          KM    DIVERT FLOW FROM SUB-BASIN 110 INTO THE ACDC
 177          DT   110DC
 178          DI       0   10000
 179          DQ       0   10000

 180          KK   HC110
 181          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 110 WITH REMAINING FLOW FROM 107
 182          HC       2
 183          KM    **************STANFORD WASH, PRECIP. BASED UPON DA = 1.169 SQ.MI.

 184          KK    111S
 185          KM    RUNOFF GENERATED ON SUB-BASIN 111
 186          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 187          KM    L= 1.94 mi.  S= 429 ft/mi.  Adj. S= 296 ft/mi.  Kb= .048
 188          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 189          BA    .533
 190          KM    RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 191          KM    AN AREAL REDUCTION COEFFICIENT OF .992 WAS USED
 192          PB   3.770
 193          LG    .107    .270   5.980    .198  25.360
 194          UC    .375    .303
 195          UA       0       5      16      30      65      77      84      90      94      97
 196          UA     100

 197          KK    112S
 198          KM    RUNOFF GENERATED ON SUB-BASIN 112
 199          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 200          KM    L= 2.36 mi.  S= 375 ft/mi.  Adj. S= 283 ft/mi.  Kb= .063
 201          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 202          BA    .636
 203          LG    .126    .301   3.870    .372  21.540
 204          UC    .500    .441
 205          UA       0       5      16      30      65      77      84      90      94      97
 206          UA     100

 207          KK  HC112A
 208          KM    COMBINE HYDROGRAPHS FROM SUBBASIN 111 AND 112
 209          HC       2

 210          KK   112RE
 211          KM    DIVERT FLOW FROM SUB-BASIN 112 INTO THE ACDC
 212          DT   112DC
 213          DI       0   10000
 214          DQ       0   10000

 215          KK  HC112B
 216          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 112 WITH REMAINING FLOW FROM 110
 217          HC       2
 218          KM    **************CUNNINGHAM'S SUBBASIN, PRECIP. BASED UPON DA = 0.371 SQ.MI.
```

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

 219          KK    113S
 220          KM    RUNOFF GENERATED ON SUB-BASIN 113
 221          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 222          KM    L= 1.28 mi.  S= 140 ft/mi.  Adj. S= 140 ft/mi.  Kb= .034
 223          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 224          BA    .371
 225          KM    RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 226          KM    AN AREAL REDUCTION COEFFICIENT OF .997 WAS USED
 227          PB   3.789
 228          LG    .117    .153   7.500    .127  36.090
 229          UC    .313    .218
 230          UA       0       5      16      30      65      77      84      90      94      97
 231          UA     100

 232          KK   113RE
 233          KM    DIVERT FLOW FROM SUB-BASIN 113 INTO THE ACDC
 234          DT   113DC
 235          DI       0   10000
 236          DQ       0   10000

 237          KK   HC113
 238          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 113 WITH REMAINING FLOW FROM 112
 239          HC       2
 240          KM    **************BILTMORE SUBBASIN, PRECIP. BASED UPON DA = 0.525 SQ.MI.

 241          KK    114S
 242          KM    RUNOFF GENERATED ON SUB-BASIN 114
 243          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 244          KM    L= 0.69 mi.  S= 472 ft/mi.  Adj. S= 301 ft/mi.  Kb= .061
 245          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 246          BA    .258
 247          LG    .126    .302   3.980    .396  38.600
 248          UC    .254    .130
 249          UA       0       5      16      30      65      77      84      90      94      97
 250          UA     100

 251          KK   DT114
 252          KM    THROW AWAY DETENTION BASIN VOLUME:  1) 5.4 AC-FT FROM SUB-BASIN 114
 253          KM                                           (Hydrograph identified as OR114)
 254          KM                                        2) Balance of runoff continues on.
 255          KM                                           (Hydrograph identified as DT114)
 256          DT   OR114     5.4
 257          DI       0   10000
 258          DQ       0   10000

 259          KK   RM114
 260          KM    KINEMATIC WAVE ROUTE IN CHANNEL FROM SUB-BASIN 114 THROUGH 115
 261          KM             1) Reach Length = 3143 ft.
 262          RD    3143   .0134    .045            TRAP      10       4
```

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

 263          KK    115S
 264          KM    RUNOFF GENERATED ON SUB-BASIN 115
 265          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 266          KM    L= 1.34 mi.  S= 384 ft/mi.  Adj. S= 288 ft/mi.  Kb= .040
 267          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 268          BA    .267
 269          LG    .121    .262   6.780    .172  41.900
 270          UC    .283    .245
 271          UA       0       5      16      30      65      77      84      90      94      97
 272          UA     100

 273          KK  HC115A
 274          KM    COMBINE HYDROGRAPHS FROM SUB-BASINS 114 & 115
 275          HC       2

 276          KK   115RE
 277          KM    DIVERT FLOW FROM SUB-BASIN 115 INTO THE ACDC
 278          DT   115DC
 279          DI       0   10000
 280          DQ       0   10000

 281          KK  HC115B
 282          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 115 WITH REMAINING FLOW FROM 113
 283          HC       2
 284          KM    ***************SEWAGE TRT SUBBASIN PRECIP. BASED UPON DA = 0.249 SQ.MI.

 285          KK    116S
 286          KM    RUNOFF GENERATED ON SUB-BASIN 116
 287          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 288          KM    L= 0.72 mi.  S= 263 ft/mi.  Adj. S= 250 ft/mi.  Kb= .038
 289          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 290          BA    .249
 291          LG    .116    .176   8.050    .094  64.680
 292          UC    .204    .108
 293          UA       0       5      16      30      65      77      84      90      94      97
 294          UA     100

 295          KK   116RE
 296          KM    DIVERT FLOW FROM SUB-BASIN 116 INTO THE ACDC
 297          DT   116DC
 298          DI       0   10000
 299          DQ       0   10000

 300          KK   HC116
 301          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 116 WITH REMAINING FLOW FROM 115
 302          HC       2
 303          KM    *****************UNNAMED SUBBASIN PRECIP. BASED UPON DA = 0.256 SQ.MI.

 304          KK    117S
 305          KM    RUNOFF GENERATED ON SUB-BASIN 117
 306          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 307          KM    L= 1.00 mi.  S= 156 ft/mi.  Adj. S= 156 ft/mi.  Kb= .031
 308          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 309          BA    .256
```

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

 310          LG    .136    .257   3.710    .399  37.080
 311          UC    .262    .182
 312          UA       0       5      16      30      65      77      84      90      94      97
 313          UA     100

 314          KK   117RE
 315          KM    DIVERT FLOW FROM SUB-BASIN 117 INTO THE ACDC
 316          DT   117DC
 317          DI       0   10000
 318          DQ       0   10000

 319          KK   HC117
 320          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 117 WITH REMAINING FLOW FROM 116
 321          HC       2
 322          KM    **************FLYNN LANE WASH, PRECIP. BASED UPON DA = 1.043 SQ.MI.

 323          KK    118S
 324          KM    RUNOFF GENERATED ON SUB-BASIN 118
 325          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 326          KM    L= 0.60 mi.  S= 449 ft/mi.  Adj. S= 298 ft/mi.  Kb= .093
 327          KM    CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 328          BA    .299
 329          KM    RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 330          KM    AN AREAL REDUCTION COEFFICIENT OF .993 WAS USED
 331          PB   3.773
 332          LG    .150    .350   4.030    .408  21.000
 333          UC    .308    .133
 334          UA       0       3       5       8      12      20      43      75      90      96
 335          UA     100

 336          KK   118RR
              * KO     3
 337          KM    RESERVOIR ROUTE THROUGH SQUAW PEAK PARK DETENTION BASIN NO. 1
 338          RS       1    ELEV    1461
 339          SV       0     .94    6.02    7.84   10.09   12.81   15.89
 340          SE    1461    1470    1480    1482    1484    1486    1488
 341          SQ       0      42      64      68      71     217     821

 342          KK   RM118
 343          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 118 THROUGH 119
 344          KM             1) Reach Length = 1601 ft.
 345          RD
 346          RC    .045    .045    .045    1601   .0368
 347          RX       0      50     110     130     140     170     180     200
 348          RY      30      28      20       5       5      20      25      30

 349          KK    119S
 350          KM    RUNOFF GENERATED ON SUB-BASIN 119
 351          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 352          KM    L= 0.57 mi.  S= 1849 ft/mi.  Adj. S= 320 ft/mi.  Kb= .101
 353          KM    CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 354          BA    .143
 355          LG    .150    .350   4.030    .408  21.000
 356          UC    .304    .191
 357          UA       0       3       5       8      12      20      43      75      90      96
```

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

 358          UA     100

 359          KK   HC119
 360          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 119 WITH ROUTED FLOW FROM 118
 361          HC       2

 362          KK   119RR
              * KO     3
 363          KM    RESERVOIR ROUTE THROUGH SQUAW PEAK PARK DETENTION BASIN NO. 2
 364          RS       1    ELEV    1402
 365          SV       0     .15     .81    2.55    4.14    6.38    9.18
 366          SE    1402    1406    1410    1414    1416    1418    1420
 367          SQ       0      25      40      50      57      99     685

 368          KK   RM119
 369          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 119 THROUGH 120
 370          KM            1) Reach Length = 4438 ft.
 371          RD
 372          RC    .050    .045    .050    4438   .0257
 373          RX       0       0      10      25      32      50      60      60
 374          RY      28      24      20       8       8      20      24      28

 375          KK    120S
 376          KM    RUNOFF GENERATED ON SUB-BASIN 120
 377          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 378          KM    L= 0.89 mi.  S= 688 ft/mi.  Adj. S= 320 ft/mi.  Kb= .064
 379          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 380          BA    .260
 381          LG    .128    .312   4.120    .268  32.060
 382          UC    .287    .182
 383          UA       0       5      16      30      65      77      84      90      94      97
 384          UA     100

 385          KK   HC120
 386          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 120 WITH ROUTED FLOW FROM 119
 387          HC       2

 388          KK   RM120
 389          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 120 THROUGH 121
 390          KM            1) Reach Length = 2378 ft.
 391          RD
 392          RC    .040    .040    .045    2378   .0185
 393          RX       0       0       5      10      18      25      42      42
 394          RY      18      10      10       8       8      10      16      18

 395          KK    121S
 396          KM    RUNOFF GENERATED ON SUB-BASIN 121
 397          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 398          KM    L= 1.75 mi.  S= 386 ft/mi.  Adj. S= 289 ft/mi.  Kb= .037
 399          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 400          BA    .341
 401          LG    .109    .268   3.820    .354  46.680
 402          UC    .313    .294
 403          UA       0       5      16      30      65      77      84      90      94      97
 404          UA     100
```

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

 405          KK  HC121A
 406          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 120 & 121
 407          HC       2

 408          KK   121RE
 409          KM    DIVERT FLOW FROM SUB-BASIN 121 INTO THE ACDC
 410          DT   121DC
 411          DI       0   10000
 412          DQ       0   10000

 413          KK  HC121B
 414          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 121 WITH REMAINING FLOW FROM 117
 415          HC       2
 416          KM    ******************MYRTLE AVE. WASH, PRECIP. BASED UPON DA = 0.797 SQ.MI.

 417          KK    123S
 418          KM    RUNOFF GENERATED ON SUB-BASIN 123
 419          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 420          KM    L= 0.71 mi.  S= 76 ft/mi.  Adj. S= 76 ft/mi.  Kb= .032
 421          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 422          BA    .035
 423          KM    RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 424          KM    AN AREAL REDUCTION COEFFICIENT OF .995 WAS USED
 425          PB   3.781
 426          LG    .100    .250   5.670    .186  78.290
 427          UC    .271    .446
 428          UA       0       5      16      30      65      77      84      90      94      97
 429          UA     100

 430          KK   123RR
              * KO     3
 431          KM    ROUTE FLOW THROUGH MYRTLE WASH DETENTION BASIN
 432          KM    SOURCE:  S.R. 51 Squaw Peak Highway, Glendale Avenue to Northern Avenue,
 433          KM             Final Drainage Design Report.  Prepared for ADOT, Highway Division,
 434          KM             ADOT Proj. No. RAM-600-2-502, September 1989, by HNTB Architects,
 435          KM             Engineers & Planners.
 436          RS       1    ELEV    1280
 437          SV     .24    1.26    2.40    3.67    4.35    5.07    5.82    6.61
 438          SE    1281    1283    1285    1287    1288    1289    1290    1291
 439          SQ       0     1.8     3.1     4.1     4.8     5.4     6.0     6.5     7.0     7.5
 440          SQ     7.9     8.3
 441          SE    1280    1281    1282    1283    1284    1285    1286    1287    1288    1289
 442          SE    1290    1291

 443          KK    122S
 444          KM    RUNOFF GENERATED ON SUB-BASIN 122
 445          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 446          KM    L= 1.90 mi.  S= 504 ft/mi.  Adj. S= 306 ft/mi.  Kb= .069
 447          KM    CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 448          BA    .679
 449          LG    .137    .332   3.810    .280  27.420
 450          UC    .450    .318
 451          UA       0       3       5       8      12      20      43      75      90      96
 452          UA     100
```

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

 453          KK   HC122
 454          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 122 WITH DETENTION BASIN OUTFLOW
 455          HC       2

 456          KK   RM122
 457          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 122 THROUGH 124
 458          KM             1) Reach Length = 2580 ft.
 459          RD
 460          RC    .045    .035    .045    2580   .0120
 461          RX       0       0      18      34      40      55      70      70
 462          RY      12       9       8       2       2       8      10      12

 463          KK    124S
 464          KM    RUNOFF GENERATED ON SUB-BASIN 124
 465          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 466          KM    L= 0.60 mi.  S= 67 ft/mi.  Adj. S= 67 ft/mi.  Kb= .029
 467          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 468          BA    .083
 469          LG    .100    .250   4.300    .461  53.470
 470          UC    .254    .222
 471          UA       0       5      16      30      65      77      84      90      94      97
 472          UA     100

 473          KK  HC124A
 474          KM    COMBINE HYDROGRAPH FROM SUB-BASIN 122 & 124
 475          HC       2

 476          KK   124RE
 477          KM    DIVERT FLOW FROM SUB-BASIN 124 INTO THE ACDC
 478          DT   124DC
 479          DI       0   10000
 480          DQ       0   10000

 481          KK  HC124B
 482          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 124 WITH REMAINING FLOW FROM 121
 483          HC       2
 484          KM    **********DREAMY DRAW EAST SUBBASIN, PRECIP. BASED UPON DA = 0.678 SQ.MI.

 485          KK    125S
 486          KM    RUNOFF GENERATED ON SUB-BASIN 125
 487          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 488          KM    L= 0.47 mi.  S= 232 ft/mi.  Adj. S= 228 ft/mi.  Kb= .099
 489          KM    CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 490          BA    .056
 491          LG    .142    .335   3.710    .337  26.620
 492          UC    .296    .271
 493          UA       0       3       5       8      12      20      43      75      90      96
 494          UA     100
```

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

495           KK   125RR
              * KO     3
496           KM    ROUTE FLOW THROUGH DETENTION BASIN AT DREAMY DRAW CONDOMINIUMS
497           RS       1    ELEV    85.5
498           SV       0     .36     .94    2.21    4.28    7.11
499           SE    85.5      90      92      94      96      98
500           SQ       0     5.5     6.5     7.3     8.0     9.0

501           KK   RM125
502           KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 125 THROUGH 126
503           KM            1) Reach Length = 3868 ft.
504           RD
505           RC    .050    .040    .050    3868   .0124
506           RX       0       0      25      60      75     110     150     170
507           RY      10     4.5       4       0       0       4       6      10

508           KK    126S
509           KM    RUNOFF GENERATED ON SUB-BASIN 126
510           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
511           KM    L= 1.99 mi.  S= 281 ft/mi.  Adj. S= 258 ft/mi.  Kb= .033
512           KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
513           BA    .622
514           LG    .109    .273   6.600    .174  60.540
515           UC    .317    .235
516           UA       0       5      16      30      65      77      84      90      94      97
517           UA     100

518           KK   DT126
519           KM    THROW AWAY 10-YR 2-HR RETENTION VOLUME:  1) 7.8 AC-FT FROM SUB-BASIN 126
520           KM    (INCLUDES 100-YR 2-HR FUTURE VOLUME)       (Hydrograph identified as OR126)
521           KM                                              2) Balance of runoff continues on.
522           KM                                                (Hydrograph identified as DT126)
523           DT   OR126     7.8
524           DI       0   10000
525           DQ       0   10000

526           KK  HC126A
527           KM    COMBINE HYDROGRAPH FROM SUB-BASIN 125 & 126
528           HC       2

529           KK   126RE
530           KM    DIVERT FLOW FROM SUB-BASIN 126 INTO THE ACDC
531           DT   126DC
532           DI       0   10000
533           DQ       0   10000

534           KK  HC126B
535           KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 126 WITH REMAINING FLOW FROM 124
536           HC       2
537           KM    *************DREAMY DRAW SUBBASIN, PRECIP. BASED UPON DA = 2.074 SQ.MI.
```

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

 538          KK    127S
 539          KM    RUNOFF GENERATED ON SUB-BASIN 127
 540          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 541          KM    L= 2.39 mi.  S= 293 ft/mi.  Adj. S= 263 ft/mi.  Kb= .063
 542          KM    CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 543          BA   1.398
 544          KM    RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 545          KM    AN AREAL REDUCTION COEFFICIENT OF .987 WAS USED
 546          PB   3.751
 547          LG    .138    .327   4.240    .452  28.590
 548          UC    .533    .305
 549          UA       0       3       5       8      12      20      43      75      90      96
 550          UA     100

 551          KK   127RR
              * KO     3
 552          KM    ROUTE FLOW THROUGH DREAMY DRAW DAM
 553          KM    SOURCE:  Gila River Basin, New River and Phoenix City Streams, Arizona,
 554          KM             Design Memorandum No. 1, Feature Design for Dreamy Draw Dam,
 555          KM             January 1972, by U.S. Army Corps of Engineers.
 556          RS       1    ELEV    1370
 557          SV       0       0       5      17      50     112     200     254     370     465
 558          SV     650     830
 559          SE    1370    1375    1380    1385    1390    1395    1400    1405    1407    1410
 560          SE    1415    1419
 561          SQ       0      82     116     136     154     170     184     198     753    2510
 562          SQ    7272   12381

 563          KK   RM127
 564          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 127 THROUGH 128
 565          KM             1) Reach Length = 2612 ft.
 566          RD
 567          RC    .050    .040    .050    2612   .0142
 568          RX       0      30      50      70      80     100     150     190
 569          RY      20      20      10       6       6      10      18      20

 570          KK    128S
 571          KM    RUNOFF GENERATED ON SUB-BASIN 128
 572          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 573          KM    L= 0.94 mi.  S= 399 ft/mi.  Adj. S= 290 ft/mi.  Kb= .090
 574          KM    CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 575          BA    .319
 576          LG    .148    .346   3.920    .382  22.920
 577          UC    .379    .230
 578          UA       0       3       5       8      12      20      43      75      90      96
 579          UA     100

 580          KK   HC128
 581          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 128 WITH ROUTED FLOW FROM 127
 582          HC       2
```

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

 583          KK   RM128
 584          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 128 THROUGH 129
 585          KM             1) Reach Length = 7766 ft.
 586          RD
 587          RC    .050    .040    .050    7766   .0121
 588          RX       0       0      20      40      55      80     100     100
 589          RY      15      11      10       6       6      10      11      15

 590          KK    129S
 591          KM    RUNOFF GENERATED ON SUB-BASIN 129
 592          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 593          KM    L= 1.61 mi.  S= 72 ft/mi.  Adj. S= 72 ft/mi.  Kb= .026
 594          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 595          BA    .357
 596          LG    .101    .251   3.500    .284  66.740
 597          UC    .375    .328
 598          UA       0       5      16      30      65      77      84      90      94      97
 599          UA     100

 600          KK   DT129
 601          KM    THROW AWAY 10-YR 2-HR RETENTION VOLUME:  1) 7.2 AC-FT FROM SUB-BASIN 129
 602          KM    (INCLUDES 100-YR 2-HR FUTURE VOLUME)       (Hydrograph identified as OR129)
 603          KM                                              2) Balance of runoff continues on.
 604          KM                                                (Hydrograph identified as DT129)
 605          DT   OR129     7.2
 606          DI       0   10000
 607          DQ       0   10000

 608          KK  HC129A
 609          KM    COMBINE HYDROGRAPH FROM SUB-BASIN 128 & 129
 610          HC       2

 611          KK   129RE
 612          KM    DIVERT FLOW FROM SUB-BASIN 129 INTO THE ACDC
 613          DT   129DC
 614          DI       0   10000
 615          DQ       0   10000

 616          KK  HC129B
 617          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 129 WITH REMAINING FLOW FROM 126
 618          HC       2
 619          KM    ************NORTHERN AVE. WASH, PRECIP. BASED UPON DA = 0.984 SQ.MI.

 620          KK    130S
 621          KM    RUNOFF GENERATED ON SUB-BASIN 130
 622          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 623          KM    L= 1.25 mi.  S= 519 ft/mi.  Adj. S= 308 ft/mi.  Kb= .082
 624          KM    CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 625          BA    .436
 626          KM    RAINFALL DEPTH OF 3.80 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
 627          KM    AN AREAL REDUCTION COEFFICIENT OF .993 WAS USED
 628          PB   3.773
 629          LG    .147    .372   5.050    .230  17.000
 630          UC    .400    .257
```

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

 631          UA       0       3       5       8      12      20      43      75      90      96
 632          UA     100

 633          KK   130RR
              * KO     3
 634          KM    ROUTE FLOW THROUGH NORTH MOUNTAIN DETENTION BASIN NO. 4
 635          RS       1    ELEV    1317
 636          SV       0      .1      .5     1.5     3.5     7.5    14.9    27.1    44.6    68.0
 637          SV    96.9
 638          SE    1317    1320    1322    1324    1326    1328    1330    1332    1334    1336
 639          SE    1338
 640          SL  1317.7    1.33      .6      .5
 641          SS    1332      80     2.7     1.5

 642          KK   RM130
 643          KM    MUSKINGUM-CUNGE ROUTE IN CHANNEL FROM SUB-BASIN 130 THROUGH 131
 644          KM             1) Reach Length = 6520 ft.
 645          RD
 646          RC    .050    .040    .050    6520   .0126
 647          RX       0       0      10      30      42      60      70      70
 648          RY      15      13      12       5       5      12      13      15

 649          KK    131S
 650          KM    RUNOFF GENERATED ON SUB-BASIN 131
 651          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 652          KM    L= 2.06 mi.  S= 278 ft/mi.  Adj. S= 257 ft/mi.  Kb= .038
 653          KM    CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 654          BA    .548
 655          LG    .113    .284   5.360    .220  44.460
 656          UC    .354    .294
 657          UA       0       5      16      30      65      77      84      90      94      97
 658          UA     100

 659          KK   DT131
 660          KM    THROW AWAY 10-YR 2-HR RETENTION VOLUME:  1) 2.4 AC-FT FROM SUB-BASIN 131
 661          KM    (INCLUDES 100-YR 2-HR FUTURE VOLUME)       (Hydrograph identified as OR131)
 662          KM                                              2) Balance of runoff continues on.
 663          KM                                                (Hydrograph identified as DT131)
 664          DT   OR131     2.4
 665          DI       0   10000
 666          DQ       0   10000

 667          KK  HC131A
 668          KM    COMBINE HYDROGRAPH FROM SUB-BASIN 130 & 131
 669          HC       2

 670          KK   131RE
 671          KM    DIVERT FLOW FROM SUB-BASIN 131 INTO THE ACDC
 672          DT   131DC
 673          DI       0   10000
 674          DQ       0   10000
```

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

 675          KK  HC131B
 676          KM    COMBINE HYDROGRAPHS FROM SUB-BASIN 131 WITH REMAINING FLOW FROM 129
 677          HC       2
 678          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

  8       100S
             V
             V
 28      RM100
             .
             .
 32          .        101S
             .           V
             .           V
 42          .       RM101
             .           .
             .           .
 46          .           .        102S
             .           .           .
             .           .           .
 56      HC102.......................
             V
             V
 59      RM102
             .
             .
 66          .        103S
             .           .
             .           .
 76      HC103............
             V
             V
 79      RM103
             .
             .
 86          .        104S
             .           .
             .           .
 96      HC104............
             V
             V
 99      RM104
             .
             .
106          .        105S
             .           .
             .           .
116      HC105............
             V
             V
119      RM105
             .
             .
126          .        106S
             .           V
             .           V
136          .       RM106
             .           .
             .           .
143          .           .        107S
             .           .           .
             .           .           .
153      HC107.......................
             .
```

```
            .
158         .-------->   107DC
156      107RE
            .
            .
162         .        110S
            .           .
            .           .
177         .           .-------->   110DC
175         .       110RE
            .           .
            .           .
180      HC110............
            .
            .
184         .        111S
            .           .
            .           .
197         .           .        112S
            .           .           .
            .           .           .
207         .      HC112A............
            .           .
            .           .
212         .           .-------->   112DC
210         .       112RE
            .           .
            .           .
215      HC112B............
            .
            .
219         .        113S
            .           .
            .           .
234         .           .-------->   113DC
232         .       113RE
            .           .
            .           .
237      HC113............
            .
            .
241         .        114S
            .           .
            .           .
256         .           .-------->   OR114
251         .       DT114
            .           V
            .           V
259         .       RM114
            .           .
            .           .
263         .           .        115S
            .           .           .
            .           .           .
273         .      HC115A............
            .           .
            .           .
278         .           .-------->   115DC
276         .       115RE
            .           .
            .           .
281      HC115B............
            .
            .
285         .        116S
            .           .
```

```
          .          .
297       .          .-------->   116DC
295       .      116RE
          .          .
          .          .
300   HC116............
          .
          .
304       .       117S
          .          .
          .          .
316       .          .-------->   117DC
314       .      117RE
          .          .
          .          .
319   HC117............
          .
          .
323       .       118S
          .          V
          .          V
336       .      118RR
          .          V
          .          V
342       .      RM118
          .          .
          .          .
349       .          .        119S
          .          .          .
          .          .          .
359       .      HC119............
          .          V
          .          V
362       .      119RR
          .          V
          .          V
368       .      RM119
          .          .
          .          .
375       .          .        120S
          .          .          .
          .          .          .
385       .      HC120............
          .          V
          .          V
388       .      RM120
          .          .
          .          .
395       .          .        121S
          .          .          .
          .          .          .
405       .     HC121A............
          .          .
          .          .
410       .          .-------->   121DC
408       .      121RE
          .          .
          .          .
413   HC121B............
          .
          .
417       .       123S
          .          V
          .          V
430       .      123RR
          .          .
```

```
          .          .
443       .          .        122S
          .          .          .
          .          .          .
453       .      HC122............
          .          V
          .          V
456       .      RM122
          .          .
          .          .
463       .          .        124S
          .          .          .
          .          .          .
473       .     HC124A............
          .          .
          .          .
478       .          .-------->   124DC
476       .      124RE
          .          .
          .          .
481    HC124B............
          .
          .
485       .       125S
          .          V
          .          V
495       .      125RR
          .          V
          .          V
501       .      RM125
          .          .
          .          .
508       .          .        126S
          .          .          .
          .          .          .
523       .          .          .-------->   OR126
518       .          .      DT126
          .          .          .
          .          .          .
526       .     HC126A............
          .          .
          .          .
531       .          .-------->   126DC
529       .      126RE
          .          .
          .          .
534    HC126B............
          .
          .
538       .       127S
          .          V
          .          V
551       .      127RR
          .          V
          .          V
563       .      RM127
          .          .
          .          .
570       .          .        128S
          .          .          .
          .          .          .
580       .      HC128............
          .          V
          .          V
583       .      RM128
          .          .
```

```
                .          .
590             .          .        129S
                .          .          .
                .          .          .
[illegible]5    .          .          .-------->   OR129
[illegible]0    .          .      DT129
                .          .          .
                .          .          .
608             .      HC129A............
                .          .
                .          .
613             .          .-------->   129DC
611             .      129RE
                .          .
                .          .
616         HC129B............
                .
                .
620             .       130S
                .          V
                .          V
633             .      130RR
                .          V
                .          V
642             .      RM130
                .          .
                .          .
649             .          .        131S
                .          .          .
                .          .          .
664             .          .          .-------->   OR131
659             .          .      DT131
                .          .          .
                .          .          .
667             .      HC131A............
                .          .
                .          .
672             .          .-------->   131DC
670             .      131RE
                .          .
                .          .
675         HC131B............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              MAY   1991               *
*           VERSION 4.0.1E              *
*                                       *
*  RUN DATE  10/05/93  TIME  11:23:57   *
*                                       *
*****************************************
```

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

```
                    ACDC AREA DRAINAGE MASTER STUDY
                    FILENAME:  CUC324F.DAT        KHE JOB NO. 0146
                    WATERSHED CONTRIBUTING TO ACDC
                    CUDIA CITY WASH TO 10TH STREET WASH - FUTURE CONDITIONS
                    100-YEAR 24-HOUR DURATION STORM

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

   IT          HYDROGRAPH TIME DATA
                      NMIN           4  MINUTES IN COMPUTATION INTERVAL
                     IDATE     10OCT92  STARTING DATE
                     ITIME        1200  STARTING TIME
                        NQ         800  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     12OCT92  ENDING DATE
                    NDTIME        1716  ENDING TIME
                    ICENT           19  CENTURY MARK

              COMPUTATION INTERVAL    0.07 HOURS
                   TOTAL TIME BASE   53.27 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
```

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	100S	688.	12.00	83.	25.	11.	0.47		
ROUTED TO	RM100	679.	12.13	83.	25.	11.	0.47		
HYDROGRAPH AT	101S	917.	12.07	116.	33.	15.	0.64		
ROUTED TO	RM101	894.	12.07	116.	33.	15.	0.64		
HYDROGRAPH AT	102S	1277.	12.07	151.	46.	21.	0.91		
3 COMBINED AT	HC102	2847.	12.07	349.	104.	47.	2.01		
ROUTED TO	RM102	2825.	12.07	349.	104.	47.	2.01		
HYDROGRAPH AT	103S	868.	12.13	128.	38.	17.	0.80		
2 COMBINED AT	HC103	3671.	12.07	477.	141.	64.	2.81		
ROUTED TO	RM103	3613.	12.13	477.	141.	64.	2.81		
HYDROGRAPH AT	104S	731.	12.07	88.	25.	11.	0.52		
2 COMBINED AT	HC104	4329.	12.07	565.	167.	75.	3.33		
ROUTED TO	RM104	4294.	12.13	565.	167.	75.	3.33		
HYDROGRAPH AT	105S	580.	12.00	71.	22.	10.	0.40		
2 COMBINED AT	HC105	4796.	12.13	636.	188.	85.	3.73		
ROUTED TO	RM105	4742.	12.27	636.	188.	85.	3.73		
HYDROGRAPH AT	106S	499.	12.13	74.	22.	10.	0.44		
ROUTED TO	RM106	498.	12.27	74.	22.	10.	0.44		
HYDROGRAPH AT	107S	914.	12.07	107.	31.	14.	0.64		
3 COMBINED AT	HC107	5750.	12.27	817.	241.	109.	4.82		
DIVERSION TO	107DC	5750.	0.07	817.	241.	109.	4.82		
HYDROGRAPH AT	107RE	0.	0.07	0.	0.	0.	4.82		
HYDROGRAPH AT	110S	320.	12.13	52.	14.	7.	0.28		
DIVERSION TO	110DC	320.	0.07	52.	14.	7.	0.28		
HYDROGRAPH AT	110RE	0.	0.07	0.	0.	0.	0.28		
2 COMBINED AT	HC110	0.	0.07	0.	0.	0.	5.09		
HYDROGRAPH AT	111S	630.	12.07	91.	27.	12.	0.53		
HYDROGRAPH AT	112S	557.	12.13	95.	28.	12.	0.64		
2 COMBINED AT	HC112A	1184.	12.13	185.	54.	25.	1.17		

DIVERSION TO	112DC	1184.	0.07	185.	54.	25.	1.17		
HYDROGRAPH AT	112RE	0.	0.07	0.	0.	0.	1.17		
2 COMBINED AT	HC112B	0.	0.07	0.	0.	0.	6.26		
HYDROGRAPH AT	113S	551.	12.07	76.	23.	10.	0.37		
DIVERSION TO	113DC	551.	0.07	76.	23.	10.	0.37		
HYDROGRAPH AT	113RE	0.	0.07	0.	0.	0.	0.37		
2 COMBINED AT	HC113	0.	0.07	0.	0.	0.	6.63		
HYDROGRAPH AT	114S	378.	12.00	46.	14.	6.	0.26		
DIVERSION TO	OR114	31.	12.00	8.	3.	1.	0.26		
HYDROGRAPH AT	DT114	378.	12.00	43.	12.	5.	0.26		
ROUTED TO	RM114	374.	12.13	43.	12.	5.	0.26		
HYDROGRAPH AT	115S	371.	12.07	53.	17.	7.	0.27		
2 COMBINED AT	HC115A	738.	12.07	95.	28.	13.	0.52		
DIVERSION TO	115DC	738.	0.07	95.	28.	13.	0.52		
HYDROGRAPH AT	115RE	0.	0.07	0.	0.	0.	0.52		
2 COMBINED AT	HC115B	0.	0.07	0.	0.	0.	7.16		
HYDROGRAPH AT	116S	440.	12.00	61.	20.	9.	0.25		
DIVERSION TO	116DC	440.	0.07	61.	20.	9.	0.25		
HYDROGRAPH AT	116RE	0.	0.07	0.	0.	0.	0.25		
2 COMBINED AT	HC116	0.	0.07	0.	0.	0.	7.41		
HYDROGRAPH AT	117S	355.	12.07	45.	14.	6.	0.26		
DIVERSION TO	117DC	355.	0.07	45.	14.	6.	0.26		
HYDROGRAPH AT	117RE	0.	0.07	0.	0.	0.	0.26		
2 COMBINED AT	HC117	0.	0.07	0.	0.	0.	7.66		
HYDROGRAPH AT	118S	386.	12.07	42.	12.	6.	0.30		
ROUTED TO	118RR	164.	12.33	42.	12.	6.	0.30	1485.28	12.33
ROUTED TO	RM118	170.	12.40	42.	12.	6.	0.30		
HYDROGRAPH AT	119S	173.	12.13	20.	6.	3.	0.14		
2 COMBINED AT	HC119	243.	12.33	62.	18.	8.	0.44		
ROUTED TO	119RR	222.	12.47	62.	18.	8.	0.44	1418.42	12.47
ROUTED TO	RM119	237.	12.60	62.	18.	8.	0.44		
HYDROGRAPH AT	120S	368.	12.07	45.	14.	6.	0.26		
2 COMBINED AT	HC120	398.	12.07	107.	32.	15.	0.70		

ROUTED TO	RM120	395.	12.13	107.	32.	15.	0.70		
HYDROGRAPH AT	121S	424.	12.07	67.	21.	10.	0.34		
2 COMBINED AT	HC121A	811.	12.07	172.	53.	24.	1.04		
DIVERSION TO	121DC	811.	0.07	172.	53.	24.	1.04		
HYDROGRAPH AT	121RE	0.	0.07	0.	0.	0.	1.04		
2 COMBINED AT	HC121B	0.	0.07	0.	0.	0.	8.71		
HYDROGRAPH AT	123S	41.	12.07	9.	3.	1.	0.04		
ROUTED TO	123RR	6.	13.53	5.	3.	1.	0.04	1285.82	13.60
HYDROGRAPH AT	122S	761.	12.27	113.	34.	15.	0.68		
2 COMBINED AT	HC122	765.	12.27	117.	37.	17.	0.71		
ROUTED TO	RM122	760.	12.33	117.	37.	17.	0.71		
HYDROGRAPH AT	124S	113.	12.07	17.	6.	2.	0.08		
2 COMBINED AT	HC124A	825.	12.27	134.	42.	19.	0.80		
DIVERSION TO	124DC	825.	0.07	134.	42.	19.	0.80		
HYDROGRAPH AT	124RE	0.	0.07	0.	0.	0.	0.80		
2 COMBINED AT	HC124B	0.	0.07	0.	0.	0.	9.50		
HYDROGRAPH AT	125S	67.	12.13	9.	3.	1.	0.06		
ROUTED TO	125RR	8.	12.93	7.	3.	1.	0.06	94.85	12.93
ROUTED TO	RM125	8.	13.67	7.	3.	1.	0.06		
HYDROGRAPH AT	126S	901.	12.07	141.	46.	21.	0.62		
DIVERSION TO	OR126	19.	12.07	14.	4.	2.	0.62		
HYDROGRAPH AT	DT126	901.	12.07	141.	42.	19.	0.62		
2 COMBINED AT	HC126A	902.	12.07	145.	45.	20.	0.68		
DIVERSION TO	126DC	902.	0.07	145.	45.	20.	0.68		
HYDROGRAPH AT	126RE	0.	0.07	0.	0.	0.	0.68		
2 COMBINED AT	HC126B	0.	0.07	0.	0.	0.	10.18		
HYDROGRAPH AT	127S	1381.	12.27	211.	64.	29.	1.40		
ROUTED TO	127RR	159.	13.27	151.	64.	29.	1.40	1391.45	13.27
ROUTED TO	RM127	159.	13.40	151.	64.	29.	1.40		
HYDROGRAPH AT	128S	368.	12.20	47.	14.	6.	0.32		
2 COMBINED AT	HC128	497.	12.20	192.	78.	35.	1.72		
ROUTED TO	RM128	491.	12.47	192.	78.	35.	1.72		
HYDROGRAPH AT	129S	447.	12.13	83.	28.	12.	0.36		

DIVERSION TO	OR129	18.	12.13	11.	4.	2.	0.36		
HYDROGRAPH AT	DT129	447.	12.13	83.	24.	11.	0.36		
2 COMBINED AT	HC129A	759.	12.33	263.	102.	46.	2.07		
DIVERSION TO	129DC	759.	0.07	263.	102.	46.	2.07		
HYDROGRAPH AT	129RE	0.	0.07	0.	0.	0.	2.07		
2 COMBINED AT	HC129B	0.	0.07	0.	0.	0.	12.25		
HYDROGRAPH AT	130S	516.	12.20	64.	18.	8.	0.44		
ROUTED TO	130RR	24.	13.27	24.	18.	8.	0.44	1331.83	13.27
ROUTED TO	RM130	24.	13.87	24.	18.	8.	0.44		
HYDROGRAPH AT	131S	689.	12.07	109.	34.	15.	0.55		
DIVERSION TO	OR131	9.	12.07	5.	1.	1.	0.55		
HYDROGRAPH AT	DT131	689.	12.07	109.	33.	15.	0.55		
2 COMBINED AT	HC131A	699.	12.07	126.	50.	23.	0.98		
DIVERSION TO	131DC	699.	0.07	126.	50.	23.	0.98		
HYDROGRAPH AT	131RE	0.	0.07	0.	0.	0.	0.98		
2 COMBINED AT	HC131B	0.	0.07	0.	0.	0.	13.24		

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)
RM100	MANE	4.00	679.04	728.00	2.01	4.00	679.04	728.00	2.01

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5015E+02 EXCESS=0.0000E+00 OUTFLOW=0.5016E+02 BASIN STORAGE=0.5786E-02 PERCENT ERROR= 0.0

RM101	MANE	3.04	900.89	724.66	1.90	4.00	894.03	724.00	1.90

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6483E+02 EXCESS=0.0000E+00 OUTFLOW=0.6483E+02 BASIN STORAGE=0.1616E-02 PERCENT ERROR= 0.0

RM102	MANE	1.16	2834.48	725.09	1.92	4.00	2825.16	724.00	1.92

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2059E+03 EXCESS=0.0000E+00 OUTFLOW=0.2059E+03 BASIN STORAGE=0.8377E-04 PERCENT ERROR= 0.0

RM103	MANE	1.79	3642.93	725.44	1.87	4.00	3613.00	728.00	1.87

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2806E+03 EXCESS=0.0000E+00 OUTFLOW=0.2806E+03 BASIN STORAGE=0.1385E-03 PERCENT ERROR= 0.0

RM104	MANE	4.00	4294.06	728.00	1.86	4.00	4294.06	728.00	1.86

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3307E+03 EXCESS=0.0000E+00 OUTFLOW=0.3307E+03 BASIN STORAGE=0.3395E-03 PERCENT ERROR= 0.0

RM105	MANE	4.00	4741.79	736.00	1.88	4.00	4741.79	736.00	1.88

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3743E+03 EXCESS=0.0000E+00 OUTFLOW=0.3742E+03 BASIN STORAGE=0.6559E-03 PERCENT ERROR= 0.0

RM106	MANE	4.00	498.10	736.00	1.86	4.00	498.10	736.00	1.86

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.4386E+02 EXCESS=0.0000E+00 OUTFLOW=0.4396E+02 BASIN STORAGE=0.6617E-03 PERCENT ERROR= -0.2

RM114	MANE	2.60	373.61	728.00	1.69	4.00	373.61	728.00	1.68

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.2320E+02 EXCESS=0.0000E+00 OUTFLOW=0.2323E+02 BASIN STORAGE=0.3305E-02 PERCENT ERROR= -0.2

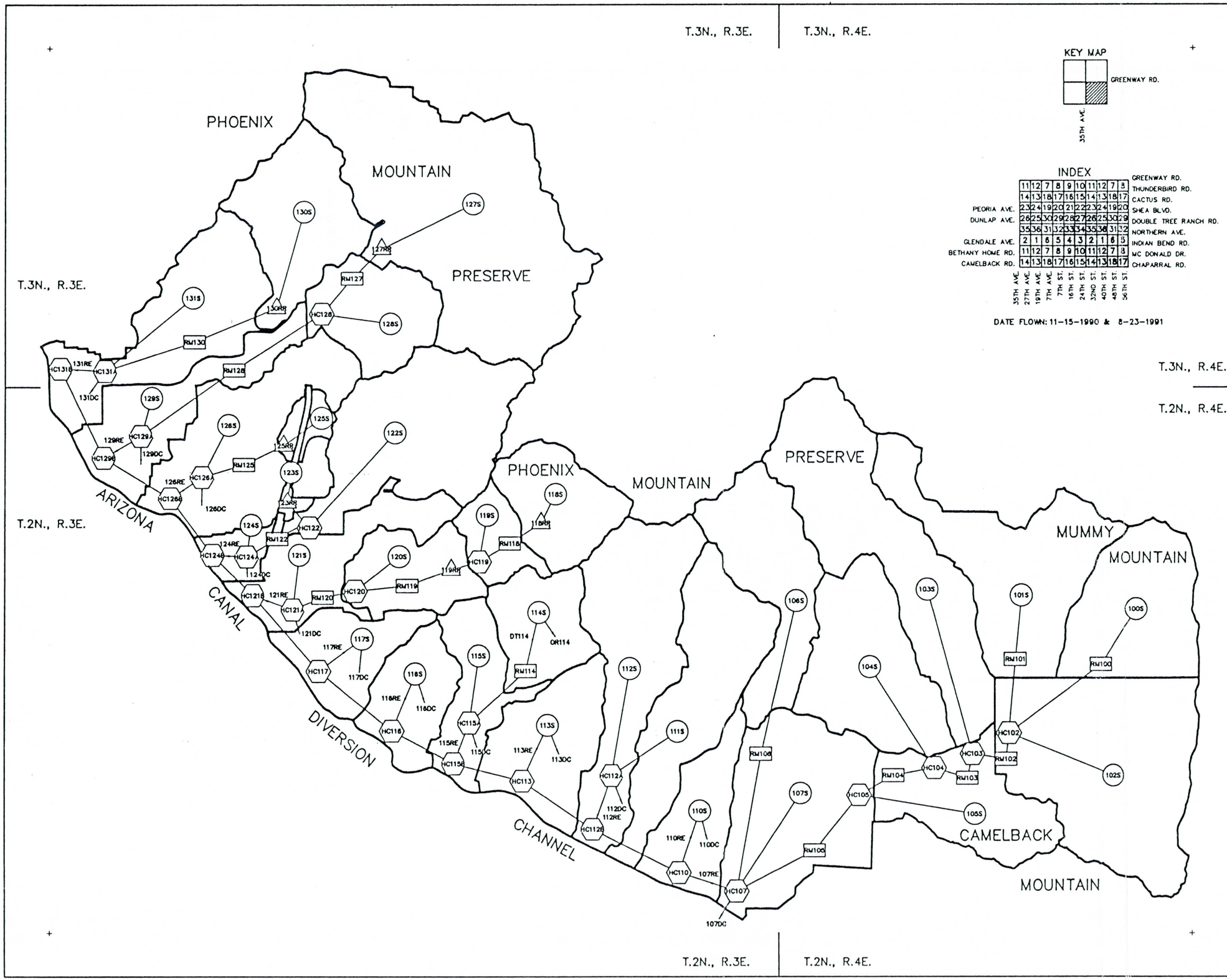
RM118	MANE	4.00	169.92	744.00	1.54	4.00	169.92	744.00	1.54

INUITY SUMMARY (AC-FT) - INFLOW=0.2463E+02 EXCESS=0.0000E+00 OUTFLOW=0.2463E+02 BASIN STORAGE=0.7063E-04 PERCENT ERROR= 0.0

RM119	MANE	4.00	237.45	756.00	1.54	4.00	237.45	756.00	1.54

```
CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3640E+02 EXCESS=0.0000E+00 OUTFLOW=0.3642E+02 BASIN STORAGE=0.2158E-03 PERCENT ERROR=  -0.1

          RM120  MANE        4.00    395.26    728.00      1.71      4.00    395.26    728.00        1.71

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.6386E+02 EXCESS=0.0000E+00 OUTFLOW=0.6387E+02 BASIN STORAGE=0.2213E-03 PERCENT ERROR=   0.0

          RM122  MANE        4.00    760.41    740.00      1.92      4.00    760.41    740.00        1.92

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.7294E+02 EXCESS=0.0000E+00 OUTFLOW=0.7295E+02 BASIN STORAGE=0.2844E-03 PERCENT ERROR=   0.0

          RM125  MANE        4.00      7.60    820.00      1.78      4.00      7.60    820.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.5321E+01 EXCESS=0.0000E+00 OUTFLOW=0.5320E+01 BASIN STORAGE=0.3858E-03 PERCENT ERROR=   0.0

          RM127  MANE        4.00    158.64    804.00      1.72      4.00    158.64    804.00        1.72

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1283E+03 EXCESS=0.0000E+00 OUTFLOW=0.1283E+03 BASIN STORAGE=0.3516E-03 PERCENT ERROR=   0.0

          RM128  MANE        4.00    490.72    748.00      1.70      4.00    490.72    748.00        1.70

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.1558E+03 EXCESS=0.0000E+00 OUTFLOW=0.1560E+03 BASIN STORAGE=0.9536E-03 PERCENT ERROR=  -0.2

          RM130  MANE        4.00     24.05    832.00      1.56      4.00     24.05    832.00        1.56

CONTINUITY SUMMARY (AC-FT) - INFLOW=0.3620E+02 EXCESS=0.0000E+00 OUTFLOW=0.3619E+02 BASIN STORAGE=0.6651E-03 PERCENT ERROR=   0.0


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

SECTION VIII
Plates 1-8



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ACDC/ADMS PHASE 1 CUDIA CITY WASH TO 10TH STREET WASH HYDROLOGY STUDY

LEGEND

- Drainage Basin Boundary
- (A) Compute Runoff from Sub-Basin A
- (B) Compute Runoff from Sub-Basin B
- (C) Combine Hydrographs
- [D] Route Hydrograph
- (E) Route Hydrograph through Retention Basin E
- G/F Divide Hydrograph into F and G

DRAINAGE AREA MAP & HEC-1 SCHEMATIC

EXISTING CONDITIONS

PLATE 1

KAMINSKI HUBBARD engineering, inc.
SURVEYING • CIVIL • HYDROLOGY
4550 N. BLACK CANYON HWY., SUITE C
PHOENIX, ARIZONA 85017
(602) 242-5588

N

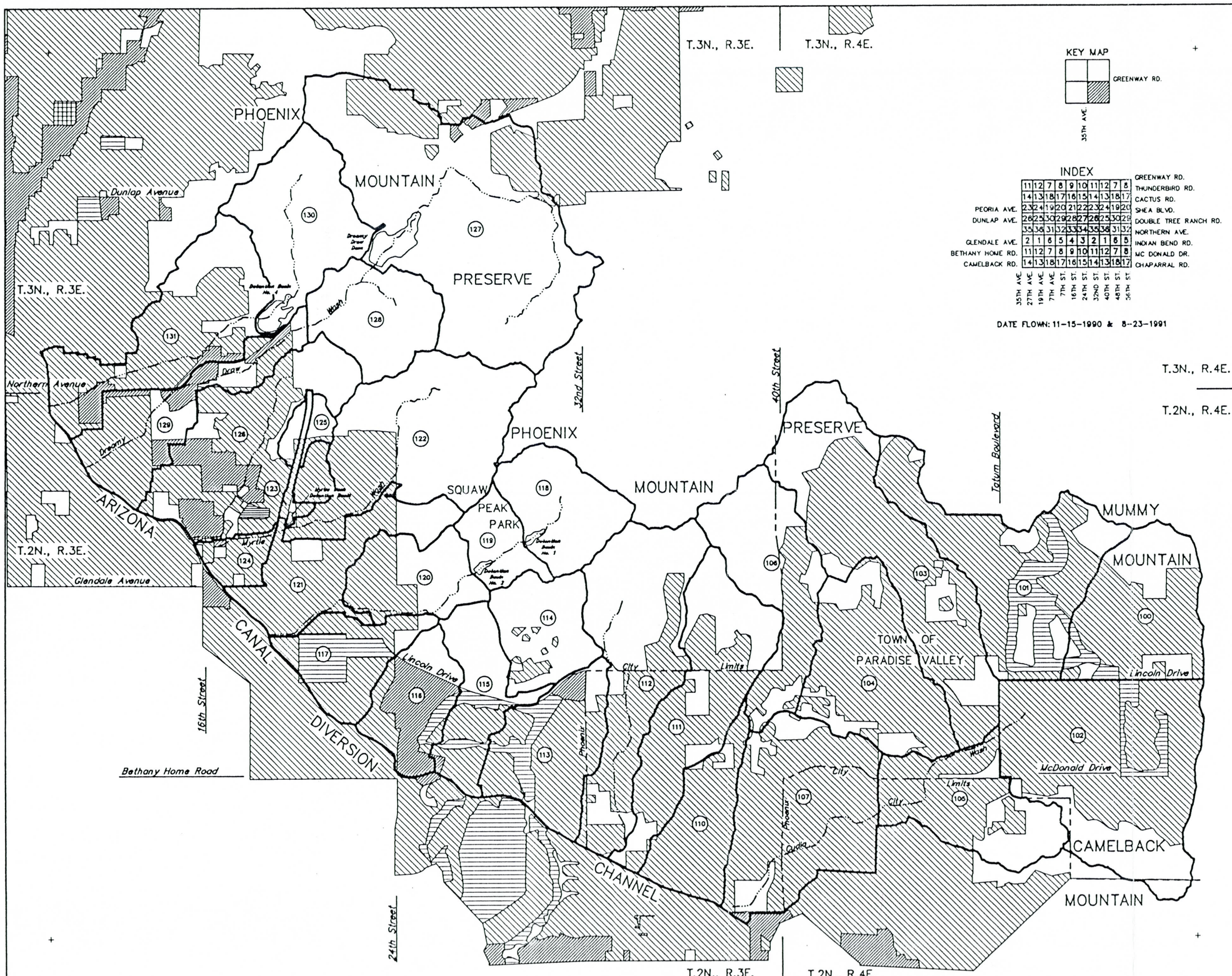
SCALE

1200 600 0 1200 2400

FEET

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ACDC/ADMS PHASE 1 CUDIA CITY WASH TO 10TH STREET WASH HYDROLOGY STUDY



LEGEND

- Drainage Basin Boundary
- Phoenix City Limits Boundary
- Residential Land Use
- Commercial Land Use
- Golf Course/Park
- Utility Land Use
- Industrial Land Use
- Vacant Land Use
- (140) Drainage Sub-Basin Number

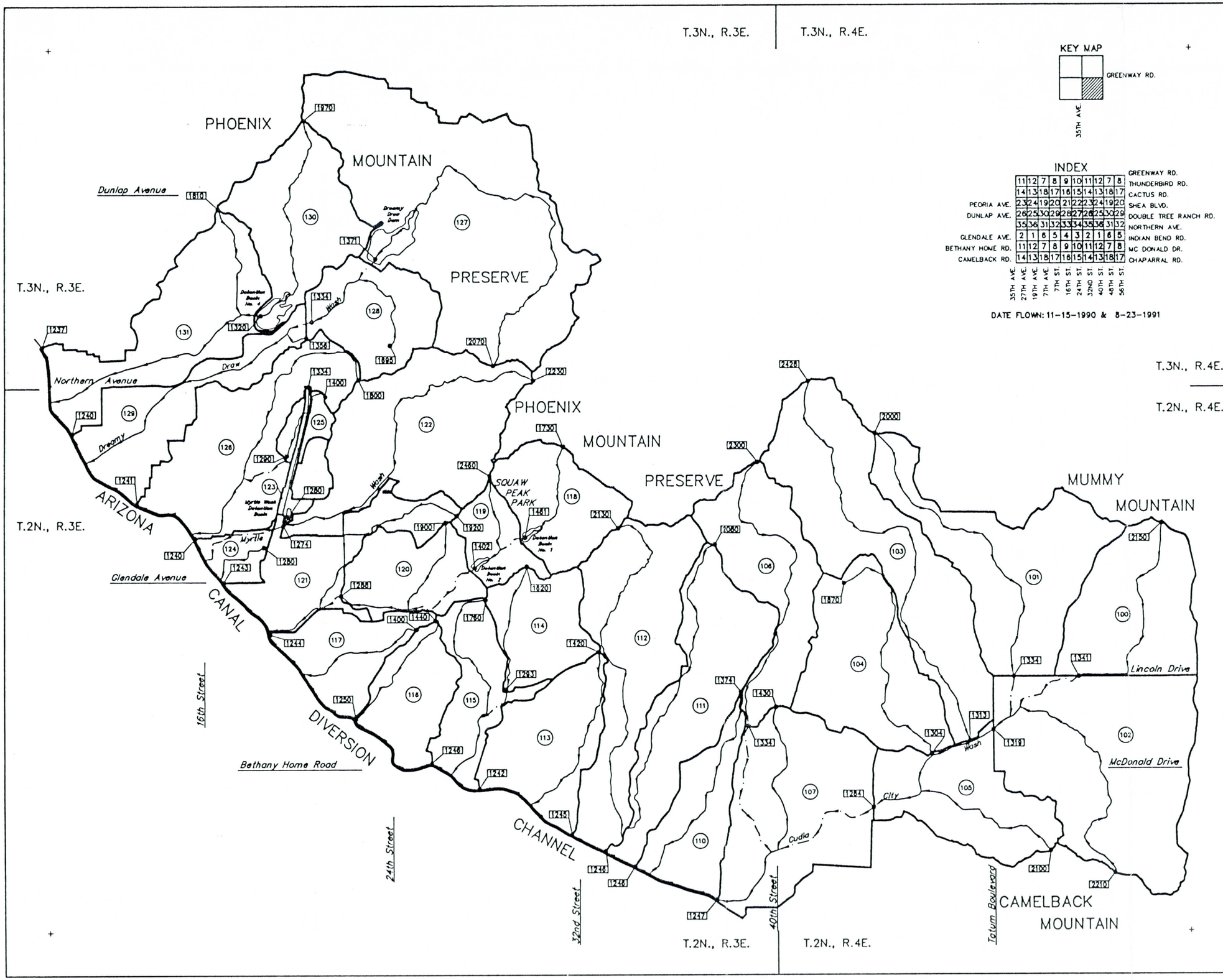
LAND USE MAP
EXISTING CONDITIONS

PLATE 2

KAMINSKI HUBBARD engineering, inc.
SURVEYING • CIVIL • HYDROLOGY
4550 N. BLACK CANYON HWY., SUITE C
PHOENIX, ARIZONA 85017
(602) 242-5588

N

SCALE
1200 600 0 1200 2400
FEET



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ACDC/ADMS PHASE 1 CUDIA CITY WASH TO 10TH STREET WASH HYDROLOGY STUDY

LEGEND

- Drainage Basin Boundary
- (140) Drainage Sub-Basin Number
- ● Major Drainage Basin Concentration Point
- • Drainage Sub-Basin Concentration Point
- ▽ Flow Diversion Point
- —·— Routing Flow Path
- Length of Longest Watercourse
- [1514] Elevation Along Flow Path

FLOW ROUTING MAP
EXISTING CONDITIONS

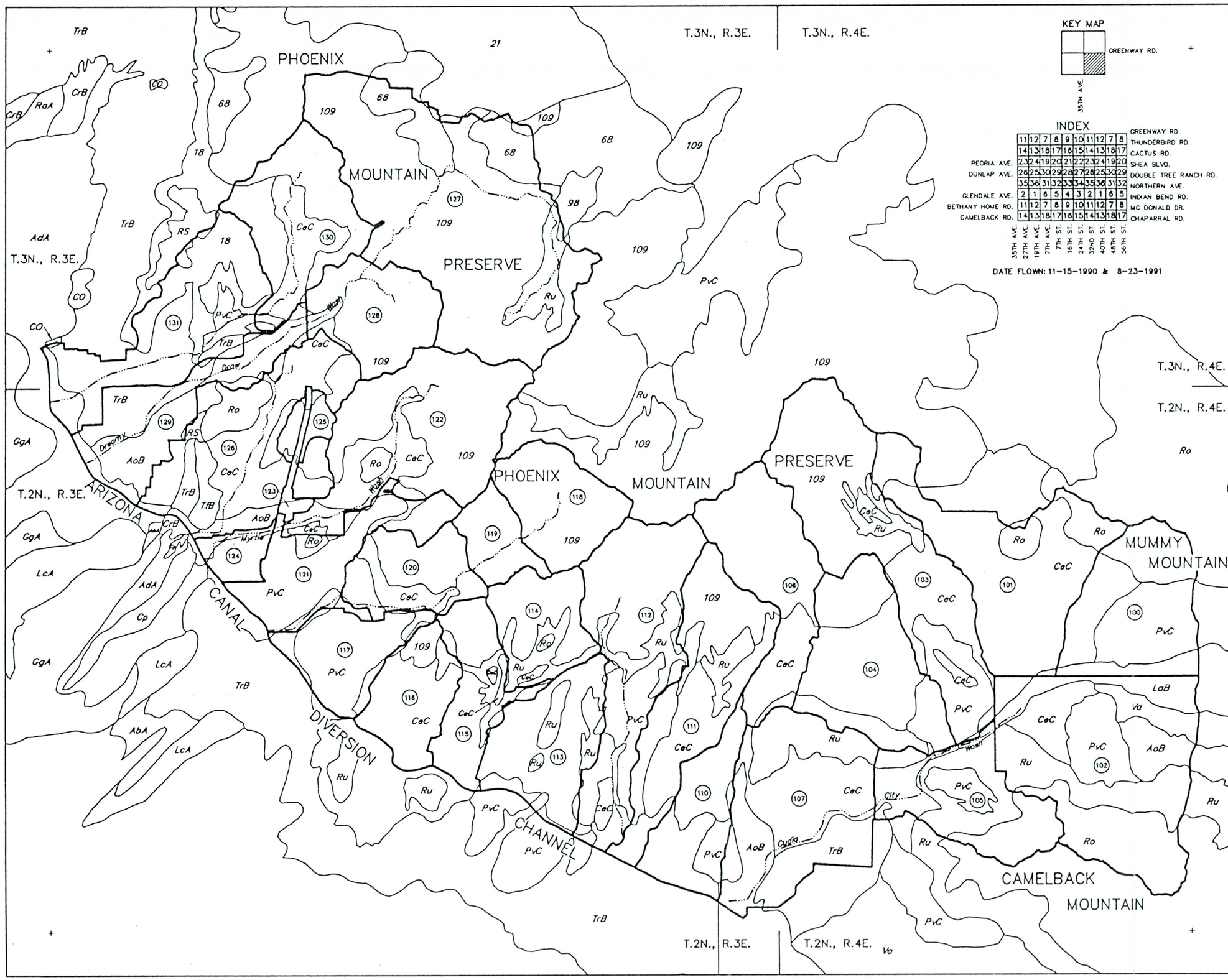
PLATE 4

KAMINSKI HUBBARD engineering, inc.
SURVEYING • CIVIL • HYDROLOGY
4550 N. BLACK CANYON HWY., SUITE C
PHOENIX, ARIZONA 85017
(602) 242-5588

N

SCALE
1200 600 0 1200 2400
FEET

CONTOUR INTERVAL 10 FEET



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ACDC/ADMS PHASE 1 CUDIA CITY WASH TO 10TH STREET WASH HYDROLOGY STUDY

LEGEND

- Drainage Basin Boundary
- (140) Drainage Sub-Basin Number
- CrB Soil Unit Boundary
- CO Soil Unit Identification
  Reference: USDA, Soil Conservation Service, Soil Survey of Maricopa County, Arizona Central Part
- 109 Soil Unit Identification
  Reference: USDA, Soil Conservation Service, Soil Survey of Aguila-Carefree Area Parts of Maricopa and Pinal Counties, Arizona

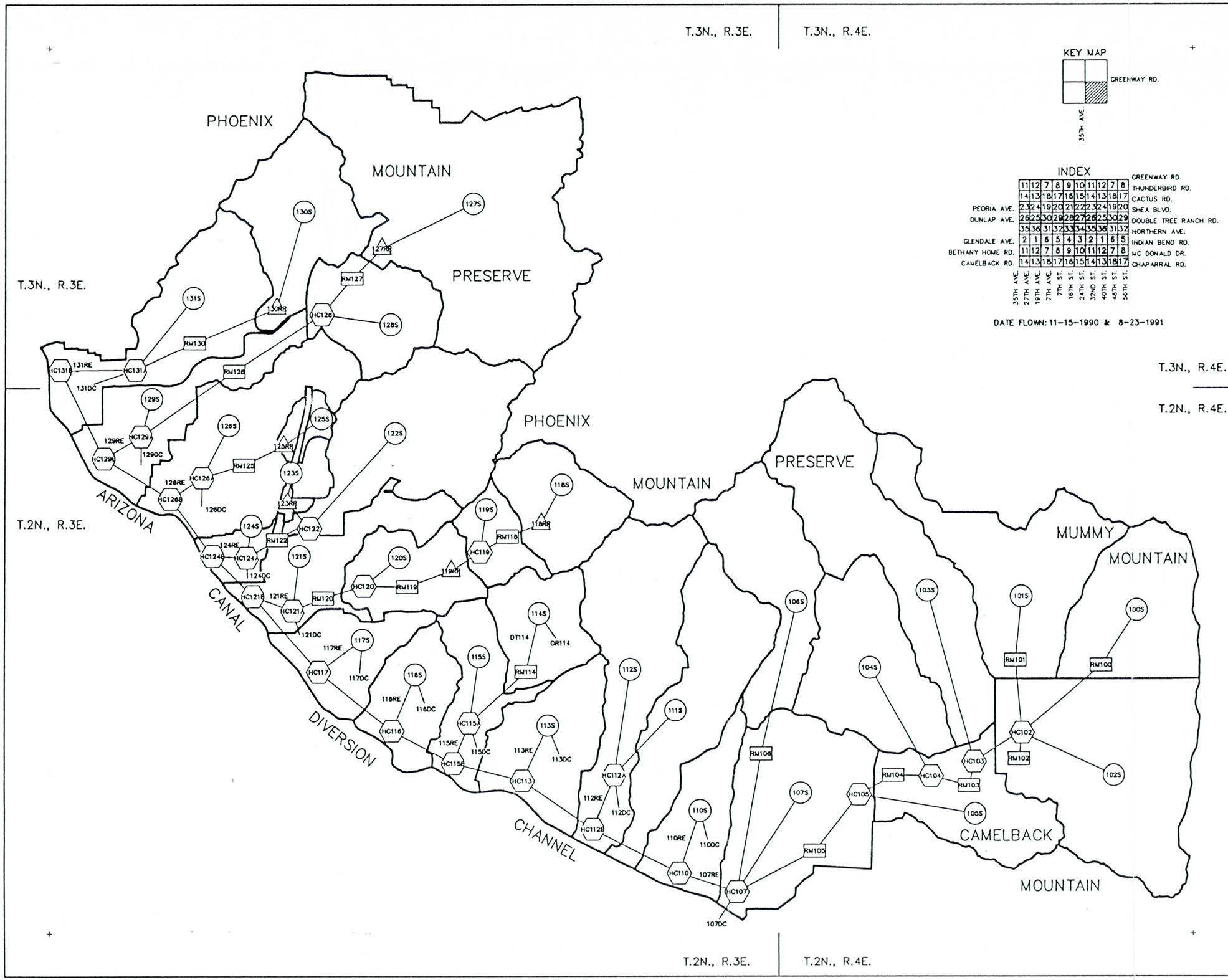
SOILS MAP
EXISTING CONDITIONS

PLATE 3

KAMINSKI HUBBARD engineering, inc.
SURVEYING • CIVIL • HYDROLOGY
4550 N. BLACK CANYON HWY., SUITE C
PHOENIX, ARIZONA 85017
(602) 242-5588

N

SCALE
1200 600 0 1200 2400



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ACDC/ADMS PHASE 1 CUDIA CITY WASH TO 10TH STREET WASH HYDROLOGY STUDY

LEGEND

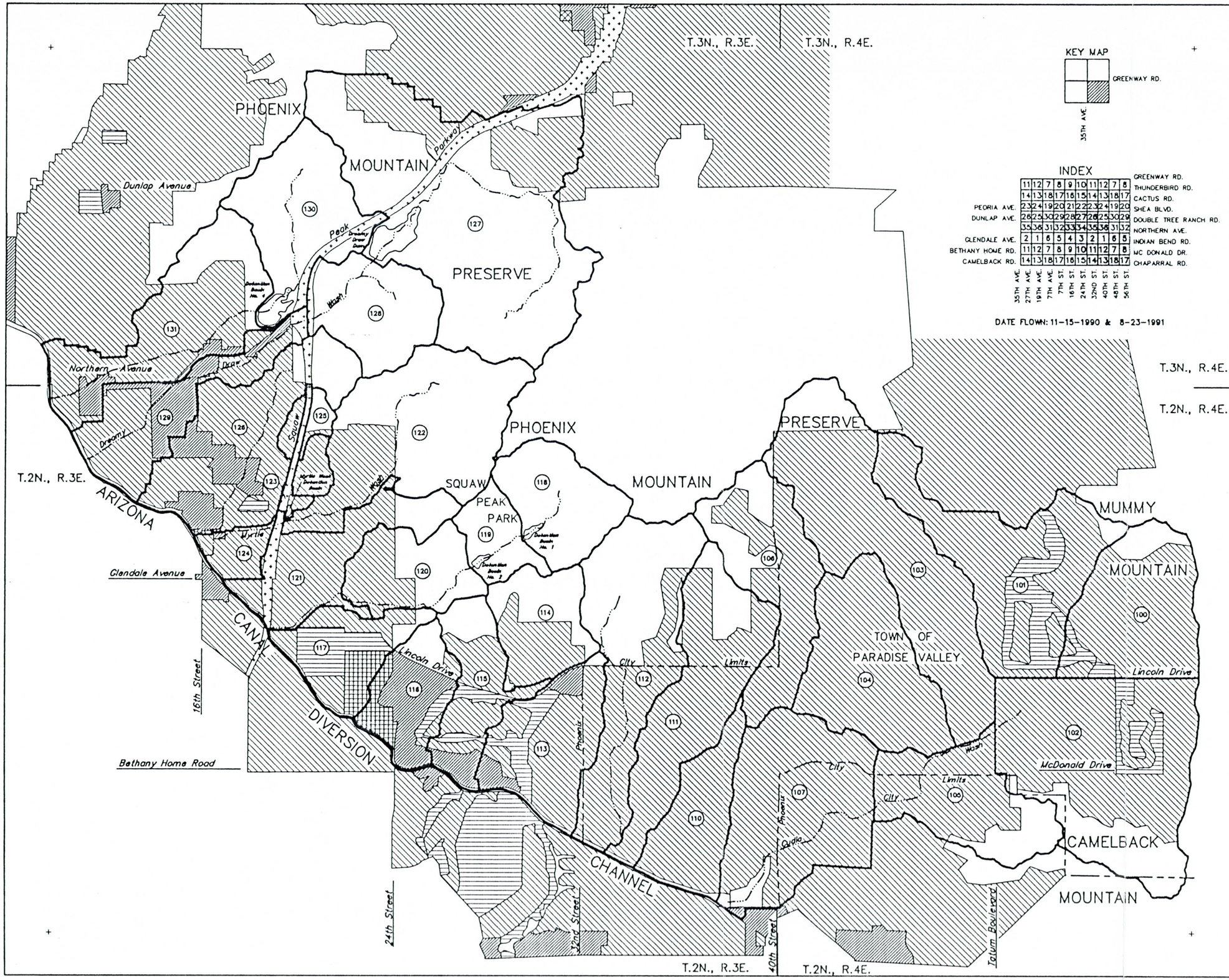
- Drainage Basin Boundary
- A — Compute Runoff from Sub-Basin A
- B — Compute Runoff from Sub-Basin B
- C — Combine Hydrographs
- D — Route Hydrograph
- E — Route Hydrograph through Retention Basin E
- G, F — Divide Hydrograph into F and G

DRAINAGE AREA MAP & HEC-1 SCHEMATIC

FUTURE CONDITIONS

PLATE 5

KAMINSKI HUBBARD engineering, inc.
SURVEYING • CIVIL • HYDROLOGY
4550 N. BLACK CANYON HWY., SUITE C
PHOENIX, ARIZONA 85017
(602) 242-5588



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ACDC/ADMS PHASE 1 CUDIA CITY WASH TO 10TH STREET WASH HYDROLOGY STUDY

LEGEND

- Drainage Basin Boundary
- Phoenix City Limits Boundary
- Residential Land Use
- Commercial Land Use
- Golf Course/Park
- Utility Land Use
- Industrial Land Use
- Right-of-Way
- Vacant Land Use
- (140) Drainage Sub-Basin Number

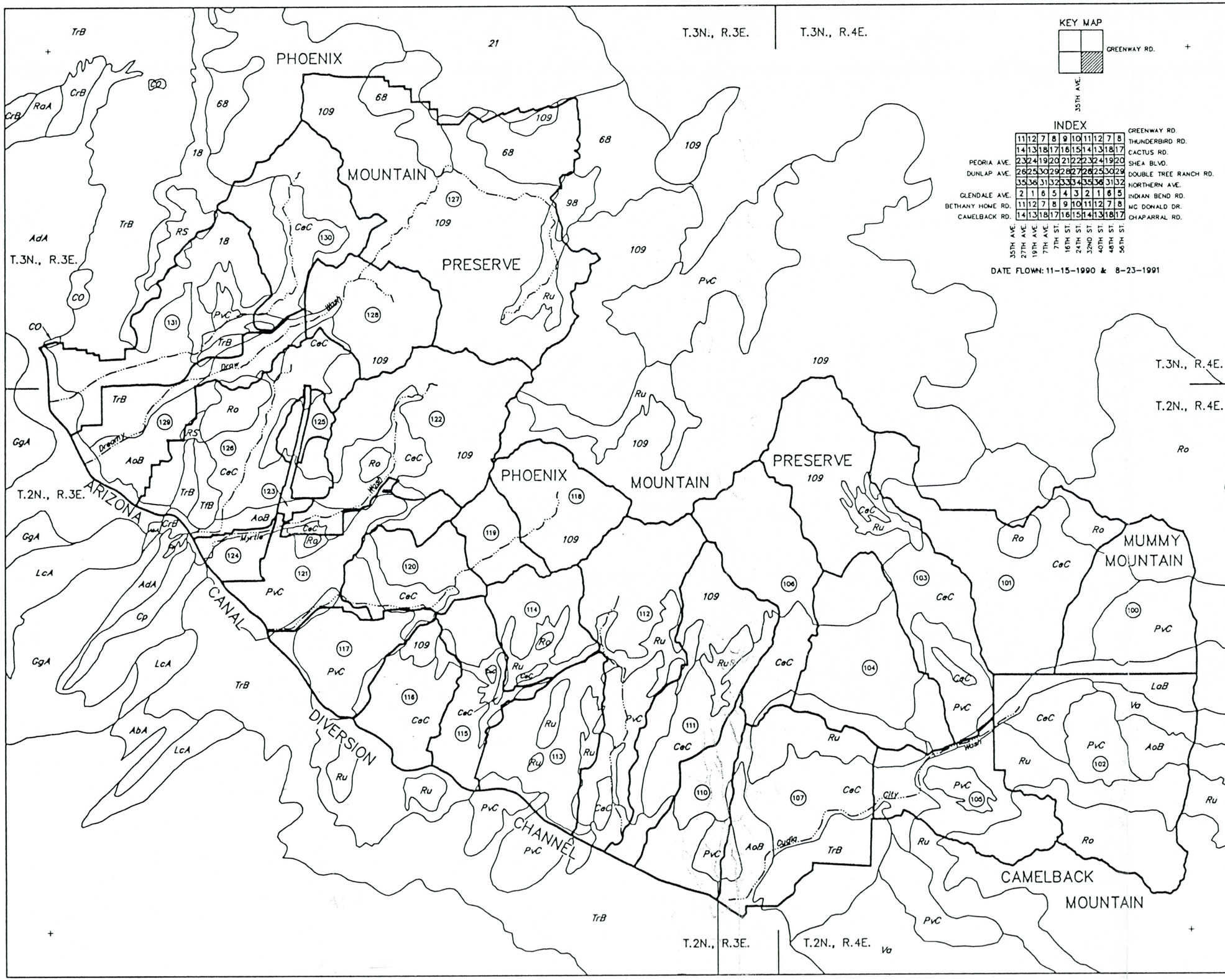
LAND USE MAP
FUTURE CONDITIONS

PLATE 6

KAMINSKI HUBBARD engineering, inc.
SURVEYING • CIVIL • HYDROLOGY
4550 N. BLACK CANYON HWY., SUITE C
PHOENIX, ARIZONA 85017
(602) 242-5588

N

SCALE
1200 600 0 1200 2400
FEET



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ACDC/ADMS PHASE 1 CUDIA CITY WASH TO 10TH STREET WASH HYDROLOGY STUDY

LEGEND

Drainage Basin Boundary

(140) Drainage Sub-Basin Number

CrB Soil Unit Boundary

CO Soil Unit Identification
Reference: USDA, Soil Conservation Service,
Soil Survey of Maricopa County, Arizona
Central Part

109 Soil Unit Identification
Reference: USDA, Soil Conservation Service,
Soil Survey of Aguila-Carefree Area
Parts of Maricopa and Pinal Counties, Arizona

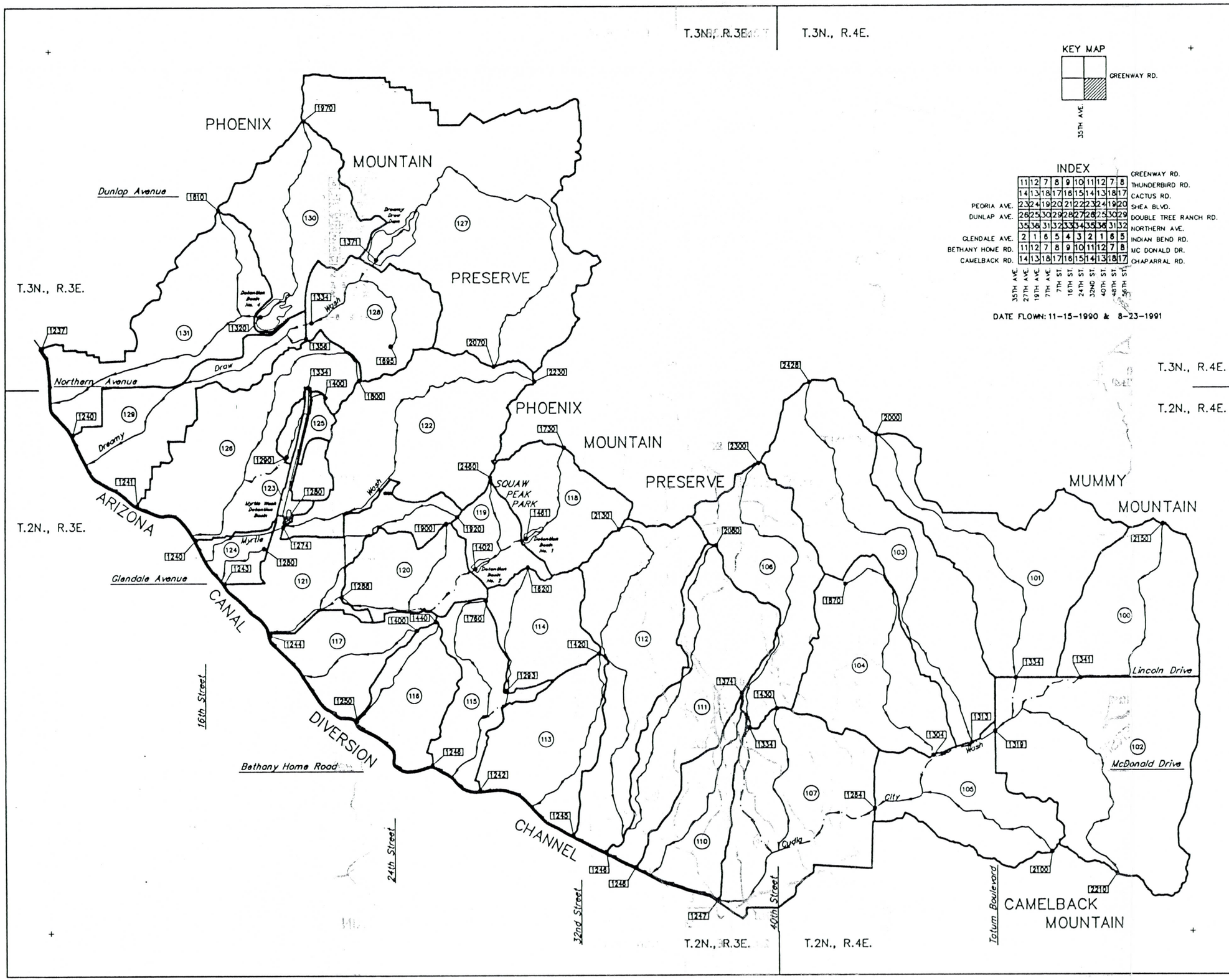
SOILS MAP
FUTURE CONDITIONS

PLATE 7

KAMINSKI HUBBARD engineering, inc.
SURVEYING • CIVIL • HYDROLOGY
4550 N. BLACK CANYON HWY., SUITE C
PHOENIX, ARIZONA 85017
(602) 242-5588

N

SCALE
1200 600 0 1200 2400



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ACDC/ADMS PHASE 1 CUDIA CITY WASH TO 10TH STREET WASH HYDROLOGY STUDY

LEGEND

- Drainage Basin Boundary
- (140) Drainage Sub-Basin Number
- Major Drainage Basin Concentration Point
- Drainage Sub-Basin Concentration Point
- Flow Diversion Point
- Routing Flow Path
- Length of Longest Watercourse
- [1514] Elevation Along Flow Path

FLOW ROUTING MAP
FUTURE CONDITIONS

PLATE 8

KAMINSKI HUBBARD engineering, inc.
SURVEYING • CIVIL • HYDROLOGY
4550 N. BLACK CANYON HWY., SUITE C
PHOENIX, ARIZONA 85017
(602) 242-5588

N

SCALE
1200 600 0 1200 2400
FEET

CONTOUR INTERVAL 10 FEET

SECTION IX

HEC-1 Data Files on Computer Diskette

SECTION IX

HEC-1 Data Files on Computer Diskette