NEW RIVER WATERSHED

VOLUME 1.2

ARIZONA CANAL DIVERSION CHANNEL
AREA DRAINAGE MASTER STUDY

ACDC/ADMS PHASE 1

FLOOD CONTROL
DISTRICT
OF
MARICOPA
COUNTY

HYDROLOGY REPORT

MAY 1995

KAMINSKI
HUBBARD
engineering,inc.
SURVEYING * CIVIL * HYDROLOGY

NEW RIVER WATERSHED

Volume 1.2

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

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May, 1995

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NEW RIVER WATERSHED
HYDROLOGY REPORT

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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 New River from the New River Dam to its confluence with Skunk Creek for existing conditions. This study area (See Figure 1) contains approximately 27 square miles of rapidly developing desert land situated in the Cities of Glendale and Peoria. The New River watershed drains the area downstream of the New River Dam and is bounded by the Skunk Creek boundary on the east and southeast and the Agua Fria River boundary on the west. The low-level outflow from the New River Dam is considered in the 10- and 100-year analysis to account for the watershed contributing to the dam.

Various improvements such as new subdivision development projects and Loop 101/Agua Fria Freeway construction have changed the natural flow patterns within the watershed. These improvements include channelization and detention/retention basins within such subdivisions as Westbrook Village West, Westbrook Village East and the Arrowhead Ranch development. A drainage channel located north of the Agua Fria Freeway and beginning east of 59th Avenue will collect runoff from the north and convey it westerly to New River. Existing drainage structures such as the 91st Avenue Drain Channel has provided some downstream flood relief for property owners south of Greenway Road.

This report presents the hydrologic analysis of New River for existing conditions upstream of its confluence with Skunk Creek and downstream of New River Dam. Table 1 summarizes the computed peak discharges for existing conditions resulting from a 24-hour duration storm at specific locations within the watershed.

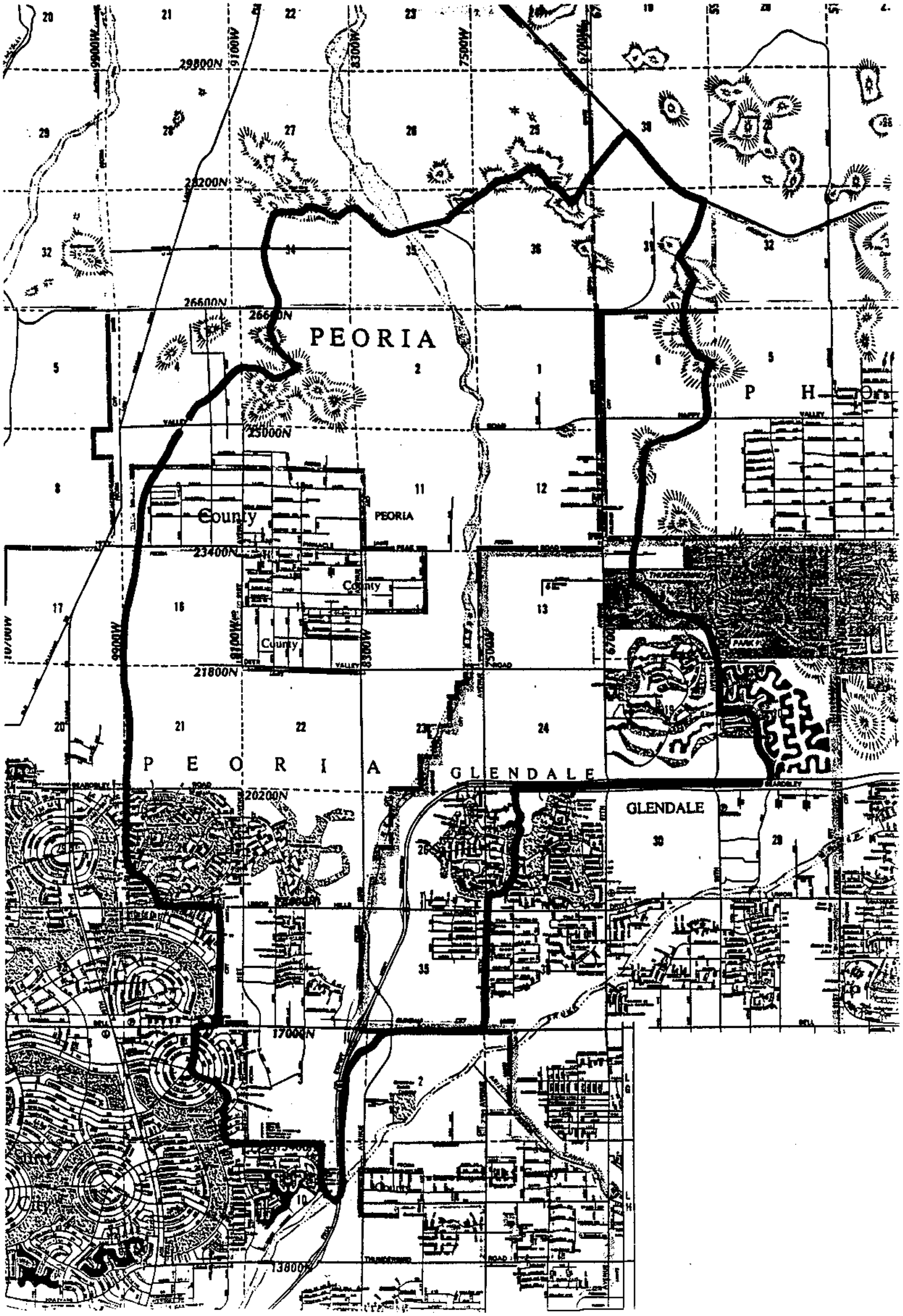
PEORIA
County
PEORIA
County
County
P E O R I A
GLENDALE
GLENDALE
29800N
28200N
26600N
25000N
23400N
21800N
20200N
17000N
13800N
9900W
9100W
8300W
7500W
6700W

FIGURE 1

TABLE 1

24-Hour Peak Discharge (Existing Conditions)

Location	Drainage Area (Sq. Mi.)	2-Yr. (cfs)	10-Yr. (cfs)	100-Yr. (cfs)
New River At Beardsley Road	13.8	101	2,868	7,253
New River At Bell Road	16.3	334	3,232	8,542
New River Upstream of Confluence with Skunk Creek	27.0	398	3,575	9,808
Westbrook Village West Inlet	3.0	7	171	873
Westbrook Village East - West Inlet	1.8	82	335	1,356
Westbrook Village East - East Inlet	2.0	90	309	655
Westbrook Village East Outlet	4.4	42	128	1,548
91st Avenue At Greenway Road	10.2	160	461	1,534
91st Avenue Drain At New River	10.2	158	457	1,271

2.0 INTRODUCTION

A hydrologic analysis of New River for existing 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 study reach of New River is from its confluence with Skunk Creek on the south and New River Dam on the north. The watershed is bounded by the Agua Fria River watershed boundary to the west and the Skunk Creek watershed boundary to the east.

The watershed contains several subdivision development projects that have incorporated channels and detention/retention basins to satisfy on-site retention requirements and alleviate the impacts of off-site flows. Detention and retention basins located within the Westbrook Village West and East subdivisions and Arrowhead Ranch developments have a significant impact on areas downstream. Previous subdivision drainage reports were reviewed for historical, as well as, relevant hydrologic information which could be used in our analysis.

A recent hydrologic investigation of the watershed area contributing to the 91st Avenue Drain was performed by the Watershed Management Branch of the FCDMC in cooperation with the City of Peoria (Ref. 11). This analysis was developed to reflect existing watershed conditions and monitor overall hydrologic changes resulting from future development. This previous analysis served as the foundation for sub-basin delineations for areas contributing to the 91st Avenue Drain for existing conditions.

Currently, the Agua Fria Freeway (Loop 101) is under construction from 75th Avenue to 31st Avenue. However, a drainage channel located north of the Agua Fria Freeway and beginning east of 59th Avenue has been constructed to collect off-site flows from the north and convey it westerly to New River. An existing drainage channel along the east side of the Agua Fria Freeway collects off-site flows from the east beginning north of Union Hills Drive and discharging into New River south of Bell Road.

This report presents the existing condition hydrologic analysis for the watershed contributing to New River from its confluence with Skunk Creek to the New River Dam. The hydrology was developed using the FCDMC's new drainage design criteria and incorporated results from previous hydrologic investigations.

3.0 STUDY PARAMETERS

3.1 Study Area

The watershed contributing storm runoff to New River from its confluence with Skunk Creek to the New River Dam is approximately 27 square miles. Approximately 164 square miles of watershed contributes to the New River Dam, which for this study will only be considered as a low level outflow from the dam. The New River watershed is bounded to the north by the New River Dam, the West and East Wing Mountains, and the Central Arizona Project Canal. The watershed is bounded to the west by the Agua Fria River drainage boundary and east by the Skunk Creek drainage boundary. The watershed area north of Beardsley Road is predominantly undeveloped and has a drainage pattern of undefined shallow washes with sparse desert vegetation. The area south of Beardsley Road has experienced rapid development in the last few years. The natural southwesterly drainage patterns have been changed to a network of street flows running north-south and east-west.

The watershed contains three man-made channels that contribute runoff directly to New River. The first channel, called the 91st Avenue Drain, collects runoff at Greenway Road from a 10.2 square mile watershed and discharges easterly into New River. The second channel drains an area of approximately 2.7 square miles located north of the Agua Fria Freeway beginning east of 59th Avenue and continuing westerly to New River. The last channel drains an area of approximately 1.4 square miles located east of the Agua Fria Freeway beginning north of Union Hills Drive and continuing south to the outlet south of Bell Road. The remaining watershed area contributes directly to New River from the dam to its confluence with Skunk Creek.

The watershed contains several subdivision development projects that use detention/retention basins to satisfy on-site retention requirements and alleviate the impacts of off-site flows. The detention/retention basins located within the Arrowhead Ranch and Westbrook Village subdivision developments have significantly reduced the flows impacting downstream properties.

3.2 Mapping

The available mapping utilized in this study are as follows:

1. **FCDMC Mapping:** The New River watershed was flown as 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 October 1990 and July 1991. These maps were used to establish the sub-basin drainage delineations and flow patterns. The aerial maps were also utilized to provide land use information for existing conditions.

2. **USGS Quadrangle Maps:** Calderwood Butte, Glendale, and Hedgpech Hills, 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 1981.

3. **Landiscor Aerial Photo Maps:** Photograph Nos. J-13, J-14, K-13, & K-14. The horizontal scale is 1 inch = 1,200 feet. These maps were flow on January 4, 1993.

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

5. **City of Peoria Zoning Maps:** These maps are at a scale of 1 inch = 1,200 feet and provide zoning designations and boundaries in the area.

6. **Maricopa County Zoning Maps:** These maps are at a scale of 1 inch = 1,200 feet and provide zoning designations and boundaries in the area.

7. **Construction Plans:** Construction plans for drainage structures associated with the Agua Fria Freeway were used for routing and sub-basin delineation purposes.

8. **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 reviewed.

9. **Glendale General Plan:** This general plan was used to determine the extent of future development. Areas of future parks, open spaces and traffic corridors were reviewed.

10. **Peoria Comprehensive Master Plan:** This general plan was used to determine the extent of future development. Areas of future parks, opens spaces and traffic corridors were reviewed.

11. **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. 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-hours 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 (5) 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 (MCUHP 1) 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. 16) data, as presented in the FCDMC's Drainage Design Manual (Ref. 10). This data is included in the MCUHP 1 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 MCUHP 1 Program.

10. New River Dam has the capacity to detain the 100-year storm runoff volume from the upstream watershed. For the purpose of this hydrologic analysis, a low-level outlet discharge of 1,700 CFS and 2,350 CFS was used for the 10- and 100-year storm event, respectively. This discharge will be treated as base flow to New River.

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.

12. Existing flow rates will be developed.

4.0 HYDROLOGY

4.1 General

The existing hydrology for the New River 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 New River 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 Normal Depth Storage Routing options were used in the HEC-1 computer model. The HEC-1 modeling included the routing of hydrographs through detention basins using the Modified Puls Method. The existing condition HEC-1 model incorporated the hydrologic modeling efforts developed for several subdivision projects having an extensive network of lakes, detention basins, drainage channels, and storm drains. This section describes the assumptions and methodologies used to develop the HEC-1 computer model for existing conditions within the New River watershed.

4.2 Previous Hydrologic Investigations

Previous hydrologic investigations of the watershed were reviewed for historical, as well as, hydrologic information which could be used as a part of our analysis for existing 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 New River watershed are presented below.

Gila River Basin, New River and Phoenix City Streams, Arizona, Design Memorandum No. 2, Hydrology Part 2 (Ref. 17)

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 New River watershed below the New River Dam and above the confluence with Skunk Creek was analyzed using three (3) sub-basins. The total area contributing to New River from these sub-basins was approximately 17.3 square miles. The sub-basins had a Mannings' roughness n-value of 0.020 to 0.023 and an impervious cover of 45 percent for fully developed conditions. The COE used the Phoenix Valley S-Graph to generate the basin hydrographs.

The terrain below the dam is very flat which could result in flows being directed east from the edge of the adjacent Agua Fria River basin and west from the Skunk Creek watershed to the New River by development in this area. Therefore, approximately 3.5 square miles of additional subarea between Skunk Creek and the New River was assumed to contribute to the New River and a allowance of 2,000 CFS was added to account for flows from the Agua Fria River basin. The 100-year peak discharge for the New River above the confluence with Skunk Creek was determined to be 15,000 CFS without the additional 3.5 square miles from the Skunk Creek watershed.

Westbrook Village Master Drainage Report (Ref. 4)

In 1983, a master drainage plan was prepared by Collar, Williams and White Engineering, Inc. (CWW) for the Westbrook Village West subdivision development. A 2.49 square mile watershed north of Beardsley Road and the Westbrook Village West sub-division was found to contribute a 100-year peak discharge of 733 CFS. The SCS hydrologic method was used to estimate peak discharges with an assumed curve number of 88 for the watershed north of Beardsley Road. According to the report, the volume of available storage within the subdivision was approximately 472 acre-feet. The estimated onsite retention requirement was estimated to be 31 acre-feet.

Bell Road Project Drainage Study Volume IV (Ref. 12)

A drainage plan for the expansion of Bell Road from Grand Avenue to Scottsdale Road was developed by Greiner, Inc. to handle onsite drainage and provide flood protection for the roadway. The HEC-1 computer program was used to generate hydrographs using the SCS method for a watershed of 51.4 square miles. The New River watershed was predominantly within Drainage Area 2 with a portion east of the Agua Fria Freeway located within Drainage Area 3. The proposed storm drains east of the Agua Fria Freeway were located in the City of Peoria and designed for a 2-year storm event. The portion of storm drain east of the Agua Fria Freeway was designed for a 10-year storm event.

The 42-inch diameter storm drain system along Union Hills Drive from 87th Avenue to New River was designed to carry 32 CFS. The proposed storm drain system along Bell Road from 87th Avenue to New River will begin as a 42-inch pipe and increase to a 54-inch pipe to convey 48 CFS. Open channels are proposed along 91st Avenue and 87th Avenue from Deer Valley Road to Beardsley Road. The 30-inch diameter storm drain system along Bell Road from 77th Avenue to New River was designed to carry 24 CFS.

City Of Peoria, Master Plan Of Storm Drainage (Ref. 14)

In 1988, a master plan of storm drainage was developed for the City of Peoria by James M. Montgomery Consulting Engineers. The study area was divided into three regions and encompassed approximately 62 square miles. The New River watershed is situated in all three regions, but is predominantly in Region 2 which is bounded to the north by Pinnacle Peak Road and to the south by Bell Road.

The portion of the study area situated north of Pinnacle Peak Road (Region 3) was modeled using the Unit Hydrograph method of HEC-1. Limited consideration was given to Region 3 due to its low development potential over the next 20 years. The area south of Pinnacle Peak Road (Regions 1 and 2) was modeled using the U.S. Environmental Protection Agency's (EPA) Storm Water Management Model (SWMM). The watershed was modeled for existing and future conditions using the 2-, 10-, 25-, and 100-year storm frequency.

91st Avenue Channel Improvement Study (Ref. 6)

In 1989, a drainage study was developed for the 91st Avenue Drain by Dibble and Associates for the Flood Control District of Maricopa County. The 4.65 square mile study area is bounded to the north by Pinnacle Peak Road and the south by Greenway Road. The study area did not include the area north of Pinnacle Peak Road which was predominantly natural desert. The watershed contributing to the 91st Avenue Drain was modeled using the SWMM. The 2-year 2-hour design peak flow at the intersection of Greenway Road and 91st Avenue was approximately 750 CFS.

Mass Grading And Drainage Plan, Westbrook Village, Section 27 (Ref. 2)

A drainage plan was prepared for the Westbrook Village East development project by Carter and Associates, Inc. in 1989 and revised by IMC Consultants, Ltd. in 1993. The development was bordered by Beardsley Road on the north, 83rd Avenue to the east, Union Hills Drive to the south, and 91st Avenue to the west. The offsite runoff estimate from a 4.29 square mile watershed north of Beardsley Road is 887 CFS for a 100-year storm event. The study utilized the HEC-1 computer model to estimate the magnitude of runoff from a study area using an SCS curve number of approximately 81.

The subdivision development contains two drainage channels having a total inlet design capacity of approximately 1,000 CFS. The drainage plan within the subdivision includes 10 retention basin having a total available volume of 112 acre-feet for the 10-year runoff event. The HEC-1 model used the initial and uniform loss rates with an outflow at the south entrance of approximately 700 CFS for a 100-year storm event.

91st Avenue Drain Hydrology Update (Ref. 11)

The FCDMC has developed a hydrologic model for the watershed contributing to the 91st Avenue Drain. This model was developed with the cooperation of the City of Peoria to monitor overall changes in the watershed resulting from development. The study area is located north of Greenway Road between 99th Avenue and 83rd Avenue. The watershed extends into the foothills north of the Happy Valley Road alignment. The contributing watershed is approximately 9.6 square miles.

The HEC-1 computer program was utilized to model the rainfall-runoff relationship for the 2-, 5-, 10-, 25-, 50-, and 100-year storm events. Each storm frequency was evaluated using the multi-ratio plan for a 6-hour duration storm. The Clark Unit Hydrograph method was used to develop the unit hydrographs. The Green and Ampt loss parameter method was used to estimate precipitation losses. Parameters for the Clark Unit Hydrograph method were determined using the MCUHP1 program. In the Westbrook Village East analysis, the SCS's unit dimensionless method was used to design the retention areas. Therefore, to convert this analysis to the Clark method, the computed lag times were divided by 0.60 to determine the times of concentration. The Normal Depth routing procedure was used for reach routing.

The FCDMC used the Westbrook Village West available on-site storage of 350 acre-feet developed by Erie and Associates (Ref. 7) instead of the 472 acre-feet estimated by CWW (Ref. 4). The retention basins in Westbrook Village West are effective in storing on-site and off-site flows for the 100-year 6-hour runoff volume. However, the ten (10) retention basins within Westbrook Village East are effective only in retaining the 100-year 2-hour off-site runoff volume. Also, the total off-site flow of 1,761 CFS entering the northern portion of Westbrook Village East at two inlets was greater than the design capacity of 1,000 CFS.

A total diversion of flow from the watershed for the 100-year 6-hour model was 1,288 CFS. This diversion was not considered in previous HEC-1 models. Diversion from the watershed occurs south along 83rd Avenue at Beardsley Road; east along Union Hills Drive and Bell Road to New River; south of Union Hills Drive along Country Club Road, and south along 91st Avenue at Greenway Road.

Arrowhead Ranch Development - Specific Area & Storm Drainage Plan (Ref. 5)

In 1982, a Storm Drainage Master Plan was developed for the Arrowhead Ranch master planned community by Dibble and Associates. The study area is bisected by the Agua Fria Freeway. The portion of the development north of the Agua Fria Freeway is bounded to the east by 51st Avenue, west by New River, and north by Thunderbird Park. The portion south of the freeway is bounded to the east by the 55th Avenue drainage channel, south by Union Hills drive and west by the Agua Fria Freeway. The Arrowhead Ranch development is served by an extensive network of lakes, detention basins, drainage channels and storm drains. The drainage system was modeled using the SCS TR-20 computer program for full buildout conditions using the 100-year 24-hour duration storm event.

The portion of the development north of the Agua Fria Freeway was divided into Systems I through IV. System I is located on the eastern side of the study area and discharges into the 55th Avenue drainage channel, which outfalls into Skunk Creek. Systems II through IV are served by a series of detention basins, channels and storm drains that ultimately outfall into the drainage channel located north of the freeway, which will convey it to New River.

The portion of the development south of the Agua Fria Freeway was divided into Systems V through XI. Systems V and IX through XI are located east of 75th Avenue and part of the watershed that contributes runoff to Skunk Creek. System VI drains a portion of the area east of 75th Avenue and between 75th Avenue and the Agua Fria Freeway north of Union Hills Drive. Runoff from System VI ultimately drains to the southwest corner of the area and discharges into a drainage channel east of the Agua Fria Freeway. This drainage channel ultimately outfalls into New River. Systems VII and VIII collect runoff in small basins and are conveyed under the Agua Fria Freeway through ADOT culverts. These culverts discharge directly into New River.

4.3 Parameter Estimation

4.3.1 Drainage Area Boundaries

The sub-basin boundaries were delineated using 1 inch = 400 feet topographic and aerial mapping, which was flown as a part of this study. Particular attention was given to areas contributing to New River at major road crossings. In-house drainage delineation was also supplemented by as-built drawings of major collector streets, freeways, and drainage structures.

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 patterns and possible flow split locations. These flow patterns were recorded and later referred to in determining times of concentration for each sub-basin. The field investigations also included the determination of on-site retention locations within the watershed. Observations were also made to determine non-contributing areas within the watershed that occur during the 2- and 10-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 to previous investigations.

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. 10) and contained in the MCUHP 1 Program. The SCS Type II distribution was used for the 24-hour storm. The rainfall distributions are presented in Tables 6 and 7 in Section I of the Appendix.

Precipitation Data

The point precipitation values used in this analysis were obtained from isopluvial maps for Maricopa County as published in the FCDMC's Drainage Design Manual (Ref. 10). The point precipitation values are presented in Table 4 in Section I of the Appendix.

Areal Reduction Factors

The point precipitation values used for this study were adjusted to account for the reduction in precipitation depth over a very large area. Reduction factors for the 6-hour duration storms were obtained from the FDCMC's Drainage Design Manual (Ref. 10). This information was also included in the FCDMC's MCUHP 1 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 5 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. 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. 10).

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 volummetric 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 Surveys (Ref.'s 18 & 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-Amp Loss Parameter spreadsheet. 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 (Ref. 10).

The Green-Ampt parameters computed above 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. 10) 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. 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 Surveys (Ref.'s 18 and 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 associates with various land use categories were determined for each sub-basin. The City of Glendale and Peoria zoning designations were classified into land use categories based on aerial mapping are presented in Table 8 in Section II of the Appendix.

The total "percent impervious" value for each sub-basin was computed as a summation of the above two "percent impervious" values. The computation was also incorporated into the Green-Ampt Loss Parameter spreadsheet. The average Green-Ampt parameters for each sub-basin are presented on Table 9 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. 10):

$$T_c = 1.14L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$$

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 flow path for T_c and its corresponding slope within each sub-basin were determined using 1 inch = 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. 10):

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

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. 10). All vacant hillslope areas were placed under the category of moderately high roughness (Type C). Undeveloped urban lands, low density residential, 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 T_c and R values for the Westbrook Village West subdivision (Sub-Basin No. 503) and the Westbrook Village East Subdivision (Sub-Basin Nos. 533A through 533K) were obtained from the 91st Avenue Drain report for the 100-year 6-hour duration storm event (Ref. 11). The original hydrologic analysis was performed using the SCS unit dimensionless method which required the estimation of sub-basin lag times for hydrograph generation (Ref. 2). The FCDMC converted the model to the Clark Unit Hydrograph method using a T_c derived from the empirical relationship of sub-basin lag time divided by 0.60.

The T_c and R values for the 10-year, 6-hour and 24-hour and 100-year, 24-hour duration storm events were estimated for the above sub-basins by analyzing and extrapolating a relationship from the T_c and R results developed by the MCUHP1 program for Sub-Basin Nos. 512, 522, 532 and 554. The T_c for a 100-year, 24-hour duration storm event was estimated as 1.075 times the T_c for a 100-year, 6-hour duration event. The T_c for a 10-year, 6-hour duration storm event was estimated as 1.724 times the T_c for a 100-year, 6-hour duration storm event. The T_c for a 10-year, 24-hour duration storm was estimated as 1.563 times the T_c for a 100-year, 24-hour duration storm. The T_c values for the 2-year storm event was estimated to be the same as the 10-year storm results. The above calculations are presented in Section III of the Appendix.

The time of concentration flow paths for existing conditions are presented in Plates 7 and 8. The hydrologic sub-basin characteristics for existing conditions are presented in Tables 11, 12, and 13 in Section III of the Appendix.

4.3.4 Routing Parameters

Channel Routing

For this study, the Normal Depth Storage 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 conditions are presented in Plates 7 and 8. Channel routing work sheets are presented in Section IV of the Appendix.

Reservoir Routing

The Modified Puls method was used for reservoir routing through a detention basin. The Westbrook Village West development contains several golf courses having an estimated 472 acre-feet of available storage based on a report developed by Collar, Williams and White Engineering (Ref. 4). However, based on a field reconnaissance and assessment of the site by Erie and Associates, the actual capacity was estimated to be approximately 350 acre-feet (Ref. 7). A rating curve for the detention effects caused by the golf courses was developed by Erie and Associates and subsequently, incorporated into the FCDMC's 91st Avenue Drain report (Ref. 11) and the KHE report.

The drainage master plan for the Westbrook Village East development contains ten (10) retention basins having a total available retention volume of 112 acre-feet. The reservoir routing parameters for the retention basins were developed by Carter and Associates and revised by IMC Consultants, Ltd (Ref. 2). These parameters were used in the FCDMC's 91st Avenue Drain study (Ref. 11) and the KHE study.

The Arrowhead Ranch development is served by several major drainage systems such as detention basins and lakes. A portion of Arrowhead Ranch located north of the Agua Fria Freeway has two systems (Systems II and III) which contain detention basins and lakes. System II has five (5) lakes and two (2) detention basins that control runoff through the development. Currently, seven (7) detention basins have yet to be completed. These basins are located in portions of the development that are vacant or undeveloped. The outflow from System II eventually discharge into the ADOT drainage channel located north of the Agua Fria Freeway. System III contains a series of ten (10) lakes that regulate flows through the subdivision. The outflow from this system eventually flows south along the east side of 67th Avenue to the ADOT drainage channel.

A portion of Arrowhead Ranch located south of the Agua Fria Freeway and contributing to New River (System VI) has a system of six (6) lakes that control the amount of runoff leaving the area. This outflow is collected north of Union Hills Drive in the ADOT drainage channel located east of the Agua Fria Freeway. The reservoir routing parameters for the detention basins and lakes within Systems II, III and VI were developed by Dibble and Associates (Ref. 5), and incorporated into the KHE study.

4.4 Special Considerations

4.4.1 Flow Splits

Flow splits are a major problem to consider when developing the hydrologic model for a relatively flat watershed. For the New River watershed, the area south of Pinnacle Peak Road is relatively flat with slopes averaging 0.5%. Runoff typically "sheet flows" across the watershed in a southerly direction, concentrating in major streets. As a result of this condition, flow splits occur whenever the capacity of a street is exceeded.

Sub-basin boundaries were carefully selected in order to reduce the number of potential flow split locations. In most cases, the effect of flow splits on the runoff characteristics were minimal because the split flow would eventually converge at the next downstream concentration point. The flow split analysis for this study was limited to areas that pass additional runoff into downstream areas that may drastically alter flow characteristics or may divert flow out of the New River watershed.

Based on the above criteria, there are nine (9) flow split locations within the model for existing conditions. These locations are as follows:

1. Beardsley Road west of 91st Avenue;
2. 89th Avenue and Calle Lejos;
3. 83rd Avenue and Beardsley Road;
4. Country Club Parkway and Union Hills Drive;
5. 87th Avenue and Union Hills Drive;
6. 89th Avenue and Union Hills Drive;
7. 87th Avenue and Bell Road;
8. 87th Avenue and Paradise Lane; and
9. 91st Avenue and Greenway Road.

At Location 1, a majority of runoff from Sub-Basin No. 512 collects at a low point approximately 1,000 feet west of 91st Avenue. This area along Beardsley Road from the north inlet into the Westbrook Village West development to 91st Avenue is very flat. A drainage channel north of Beardsley Road will convey some flows westerly to the north inlet into the Westbrook Village West development. However, this area will become flooded because of the flatness of the area and the lack of adequate channels for conveyance. Therefore, it was assumed for this study that a 50 percent flow split to the west and 50 percent flow split to the east would occur.

At Location 2, a drainage swale north of Calle Lejos was constructed to collect runoff emanating from hillslopes to the north. This drainage swale begins west of 87th Avenue and continues east to 83rd Avenue. The capacity of the channel was approximately 137 CFS (Ref. 11).

At Location 3, the FCDMC assumed that about 70 percent of the flow at the intersection of 83rd Avenue and Beardsley Road will proceed south along 83rd Avenue. This assumption has been incorporated into the study to be consistent with the FCDMC's 91st Avenue Drain study.

The south outlet of the Westbrook Village East development is a major flow split location that diverts flows in three direction (Location 4). The first option models the diversion of 100 CFS eastward along Union Hills Drive to New River. The 100 CFS diversion is divided into 50 CFS through a 42" CMP and 50 CFS from overland or surface flows. The remaining flows undergo another flow split that models the crown overtopping of Union Hills Drive. These flows are diverted south along Country Club Road. The remaining flows continue westward along Union Hills Drive to 87th Avenue. The 100 CFS diversion was obtained from the FCDMC's 91st Avenue Drain report (Ref. 11) and the diversion that occurs from the overtopping of Union Hills Drive was developed by Erie and Associates (Ref. 7).

The two flow split locations along Union Hills Drive (Location 5 and 6) were analyzed to determine the magnitude of flows continuing south as a result of crown overtopping. The crown overflow was analyzed as a large broad crested weir having a coefficient of 2.6. The broad crested weir length for Location 5 was 680 feet and Location 6 was 1,320 feet. The divert parameters were developed by Erie and Associates (Ref. 7), The flow split location at 87th Avenue and Bell Road (Location 7) diverts flow in three direction. The first option models the 50 percent diversion of flows up to a maximum of 150 CFS to New River along Bell Road. The remaining flows undergo another flow split that models the crown overtopping of Bell Road. These flows are diverted south along 87th Avenue to Paradise Lane. The remaining flows continue westward along Bell Road to 91st Avenue. The diverted flows along 87th Avenue at Paradise Lane undergo another flow split (Location 8) where flow is diverted southeasterly to New River and the remaining flows continue westward to the 91st Avenue drainage channel. The flow split calculations for the above locations were developed by Erie and Associates (Ref. 7) and incorporated into this study.

Finally, the flow split that occurs at the 91st Avenue and Greenway Road intersection for flows in excess of the design capacity of the triple barrel 10'x6' concrete box culvert was incorporated in the model. The flow that is diverted south along 91st Avenue was determined by treating the intersection as a 200 foot weir. The rating curve for this diversion was developed by Erie and Associates (Ref. 7) and included in the FCDMC's 91st Avenue Drain study.

4.4.2 Channelization

Currently, there are four (4) channel systems throughout the watershed. These channels are as follows:

1. The Calle Lejos Channel;
2. The Westbook Village East channels;
3. The 91st Avenue Drain; and
4. The Agua Fria Freeway Drainage Channels.

Runoff from the southern slopes of mountains located north of Pinnacle Peak Road drain into the Calle Lejos drainage channel. The drainage channel begins west of 87th Avenue and continues eastward to 83rd Avenue along the north side of Calle Lejos. The channel capacity was estimated to be 137 CFS (Ref. 11).

There are two inlets along the northern boundary of the Westbrook Village East development that accept off-site flows. Each inlet has a channel that conveys off-site flows to a system of lakes and detention basins located within the development. The total design capacity of the two inlet channels was approximately 1,000 CFS (Ref. 2).

The 91st Avenue Drain begins at Bell Road and continues south to Greenway Road where the channel turns eastward and continues along the Greenway Road alignment to New River. The channel was designed by the FDCMC to convey a peak discharge of about 750 CFS to the New River.

The Agua Fria Freeway improvements include drainage channels along the freeway alignment that collect pavement and off-site runoff. The first channel is located north of the freeway, beginning east of 59th Avenue and proceeding westward to New River. The channel outlet is located west of 75th Avenue. The second channel is located east of the freeway, beginning north of Union Hills Drive and continuing southerly to Bell Road where it discharges into New River.

5.0 RESULTS AND CONCLUSIONS

The HEC-1 computer model was used to compute the 2-, 10-, and 100-year peak discharges for existing conditions within the New River watershed. The 6-hour and 24-hour duration events were evaluated using the Clark Unit Hydrograph method for each storm frequency. The hydrologic analysis for existing 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 New River watershed are summarized in Table 2. Evaluation of the results indicate that larger peak discharges occur from a 24-hour duration storm for all three (3) recurrence intervals. The retention basins located within the Westbrook Village West development are effective in storing on-site and off-site runoff volumes resulting from a 100-year 24-hour duration storm event. The retention basins located within the Westbrook Village East development are ineffective in retaining the off-site runoff volumes resulting from a 100-year, 24-hour duration storm event.

The 91st Avenue Drain capacity was insufficient to convey the runoff generated from a 100-year, 24-hour duration storm peak discharge of 1,534 CFS. Therefore, at 91st Avenue and Greenway Road, the excess flow of 259 CFS would overflow the intersection and continue south along 91st Avenue. The remaining 1,275 CFS would continue eastward in the channel to New River.

A comparison between this study's peak discharge results and FCDMC's results for the area contributing to the 91st Avenue Drain is presented in Table 3. The KHE peak discharge results shown in Table 3 are for a 24-hour duration storm. The KHE 6-hour duration peak discharge results are slightly lower than the results shown in Table 3. The KHE peak discharge results for the area contributing to the 91st Avenue Drain are slightly higher than the FCDMC's results, but quite comparable. The FCDMC's analysis was developed using significantly smaller sub-basins and a greater number of flow split locations.

A comparison between this study's peak discharge results and the results reported by FEMA for selected locations along New River are also presented in Table 3. The KHE peak discharge results are significantly lower than the FEMA results. KHE was unable to explain the difference in results due to the uncertainty of watershed modeling used for the FEMA results. The COE reports a 100-year peak discharge of 19,000 CFS for New River upstream of its confluence with Skunk Creek for future conditions (Ref. 17). The total contributing area was 20.7 square miles, of which 3.5 square miles was added from a sub-area between Skunk Creek and New River. Also, an additional 2,000 CFS was added to the COE result to account for potential redirection of runoff from the Agua Fria River basin.

TABLE 2

Existing Peak Discharges
Within New River Watershed (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.	
New River at Beardsley Road	HC553	77	101	2,204	2,868	6,307	7,253	13.3
New River at Bell Road	HC555B	289	334	2,961	3,232	7,584	8,542	13.5
New River Upstream of Confluence with Skunk Creek	HC556A	347	398	3,273	3,575	8,848	9,808	13.7
Westbrook Village West Inlet	HC502	8	7	78	171	757	873	13.2
Westbrook Village East-West Inlet	HC522	49	82	260	335	1,194	1,356	12.7
Westbrook Village East-East Inlet	532RE	75	90	277	309	625	655	12.7
Westbrook Village East Outlet	HC533K	36	42	93	128	1,534	1,548	13.2
91st Avenue at Greenway Road	HC535	127	160	408	461	1,547	1,534	13.5
91st Avenue Drain at New River	RM535	126	158	406	457	1,277	1,271	13.6

TABLE 3

Comparison Of 100-Year Peak Discharges In New River Watershed W/Previous Studies

Location	KHE (1995)		FCDMC (1994) (Ref. 11)		FEMA (1991) (Ref. 8)	
	Drainage Area (Sq. Mi.)	Q (CFS)	Drainage Area (Sq. Mi.)	Q (CFS)	Drainage Area (Sq. Mi.)	Q (CFS)
New River at Beardsley Road	13.8	7,253	--	--	10.3	9,800
New River Upstream of Confluence with Skunk Creek	27.0	9,808	--	--	17.3	12,000
Westbrook Village West Inlet	3.0	873	2.5	614	--	--
Westbrook Village East-West Inlet	1.8	1,356	1.7	1,236	--	--
Westbrook Village East-East Inlet	2.0	655	1.8	525	--	--
91st Avenue at Greenway Road	10.2	1,534	9.6	1,369	--	--
91st Avenue Drain at New River	10.2	1,271	9.8	1,310	--	--

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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 Parameters
SECTION VI	HEC-1 Hydrology Results, 100-Year 24-Hour Storm
SECTION VII	Plates 1-8
SECTION VIII	HEC-1 Data Files On Computer Diskette

SECTION I
Rainfall and Physical Hydrologic Parameters

TABLE 4

Point Precipitation Values For New River Study Area (Inches)

Return Period (Years)	Storm Duration	
	6-Hr.	24-Hr.
2	1.20	1.50
10	2.00	2.50
100	3.20	4.00

Source: NOAA Atlas Isopluvial Maps For Arizona

TABLE 5

Areal Precipitation Reduction Data

Watershed Area (Sq. Mi.)	Storm Duration	
	6-Hr[1]	24-Hr[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. 10)
(2) NOAA Technical Memorandum NWS HYDRO-40, (Ref. 21)

TABLE 6

6-HOUR STORM RAINFALL DISTRIBUTIONS
(Furnished by FCDMC's Maricopa County Unit Hydrograph Procedure 1)
Cumulative Rainfall Table

Storm Time (Hours)	Watershed (Sq. Mi.)				
	≤0.5	2.8	16	90	500
0.00	0.000	0.000	0.000	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 7

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

Storm Time (Hours)	Precipitation 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	Precipitation 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

SECTION II
Green-Ampt & Land Use Parameters

TABLE 8

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 R1-18 R1-14	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 Family 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	Planned Area Development	Variable	---	Variable
PSC	Planned Shopping Center	Planned Shopping Center	PSC or PLND.SHP	85
P-1	Parking (Open)	Parking	PARKING	Variable
P-2	Parking (Structure)	Parking	PARKING	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

<u>**TABLE 9**</u>

Average Green-Ampt Parameters
(Existing Conditions)

Sub-Basin	IA(in)	DTHETA	PSIF(in)	XKSAT(in/Hr)	RTIMP (%)
408	0.298	0.275	3.87	0.415	18.17
500	0.282	0.323	4.080	0.419	5.53
501	0.350	0.350	3.920	0.384	0.00
502	0.350	0.350	3.820	0.361	0.00
503	0.350	0.250	3.500	0.280	30.00
510	0.209	0.322	3.980	0.396	8.13
511	0.336	0.345	3.770	0.350	0.82
512	0.350	0.350	3.610	0.315	0.00
520	0.202	0.318	3.920	0.384	11.03
521	0.100	0.250	6.290	0.186	15.53
522	0.388	0.290	6.780	0.185	0.00
530	0.139	0.276	3.550	0.303	13.32
531	0.225	0.170	10.100	0.036	9.53
532	0.438	0.103	10.100	0.046	0.00
533A	0.250	0.250	3.500	0.280	30.00
533B	0.250	0.250	3.500	0.280	45.00
533C	0.350	0.250	8.400	0.060	35.00
533D	0.350	0.150	8.400	0.060	45.00
533E	0.350	0.250	3.500	0.290	45.00
533F	0.350	0.250	3.500	0.290	45.00
533G	0.350	0.250	3.500	0.290	45.00
533H	0.350	0.150	8.400	0.060	60.00
533I	0.350	0.150	8.400	0.060	45.00
533J	0.350	0.150	8.400	0.060	60.00
533K	0.350	0.250	5.00	0.280	45.00
534	0.264	0.281	7.500	0.116	18.18
535	0.301	0.164	6.290	0.227	20.75

TABLE 9

Average Green-Ampt Parameters (Existing Conditions)

Sub-Basin	IA(in)	DTHETA	PSIF(in)	XKSAT(in/Hr)	RTIMP (%)
540	0.250	0.350	3.610	0.315	5.02
541	0.250	0.350	4.030	0.408	0.00
542	0.383	0.239	3.770	0.405	0.74
550	0.250	0.350	4.140	0.431	3.60
551	0.248	0.349	4.190	0.443	0.68
552	0.244	0.340	3.820	0.363	7.32
553	0.419	0.165	5.36	0.284	2.76
554	0.326	0.248	3.61	0.347	17.17
555	0.326	0.293	5.05	0.252	11.75
556	0.426	0.110	3.92	0.514	8.40
560	0.250	0.360	4.120	0.268	4.15
571	0.409	0.109	5.98	0.266	9.13
581	0.206	0.184	3.92	0.429	54.37

LOSS PARAMETERS FOR SUBBASIN: 500

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PWB	0.293	71.50	0.38	-0.300	0.00	0.00
CV	0.063	15.29	0.39	-0.063	0.00	0.00
GN	0.039	9.63	0.25	-0.058	0.00	0.00
GYD	0.015	3.58	0.26	-0.021	0.00	0.00
TOTAL =	0.410 SQ.MI.		XKSAT =	0.36	%ROCK=	0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.08

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.298	VACANT	72.76	DRY	25.00	0.00	0.00	0.35	0.255
0.053	V.L.D.R	12.84	NORMAL	25.00	15.00	0.01	0.10	0.013
0.059	L.D.R.	14.40	NORMAL	25.00	25.00	0.01	0.10	0.014
0.410	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.02	AVG. =	0.282
					% =	5.53		

PERCENT OF SUBBASIN DRY = 72.76 %
NORMAL = 27.24 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.323

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.419

IMPERVIOUS AREA: URBAN @ 100 % effective = 5.53
ROCK OUTCROP @ 60 % effective = 0.00

% EFFECTIVE IMP. = 5.53

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
500	0.410	1.455	0.078	50.00	0.282	0.323	4.08	0.419	5.53

LOSS PARAMETERS FOR SUBBASIN: 501

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PWB	0.172	32.83	0.38	-0.138	0.00	0.00
PT	0.159	30.29	0.4	-0.121	0.00	0.00
Ve	0.082	15.57	0.25	-0.094	0.00	0.00
Te	0.073	13.93	0.25	-0.084	0.00	0.00
LcA	0.031	5.89	0.25	-0.035	0.00	0.00
PsA	0.008	1.49	0.25	-0.009	0.00	0.00
TOTAL =	0.524 SQ.MI.		XKSAT =	0.33	%ROCK=	0.00

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.
0.524	VACANT	100.00	DRY	25.00	0.00	0.00	0.35	0.350
0.524	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.00	AVG. =	0.350
					% =	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 = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
501	0.524	1.031	0.087	32.00	0.350	0.350	3.92	0.384	0.00

LOSS PARAMETERS FOR SUBBASIN: 502

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PT	0.245	44.36	0.4	-0.177	0.00	0.00
LcA	0.174	31.57	0.25	-0.190	0.00	0.00
Ve	0.075	13.57	0.25	-0.082	0.00	0.00
Mp	0.030	5.47	0.25	-0.033	0.00	0.00
PsA	0.020	3.57	0.25	-0.022	0.00	0.00
PWB	0.004	0.78	0.38	-0.003	0.00	0.00
Te	0.004	0.67	0.25	-0.004	0.00	0.00
TOTAL =	0.553 SQ.MI.		XKSAT =	0.31	%ROCK=	0.00

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.
0.553	VACANT	100.00	DRY	25.00	0.00	0.00	0.35	0.350
0.553	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.00	AVG. =	0.350
					% =	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. = 0.361

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

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
502	0.553	1.452	0.086	23.00	0.350	0.350	3.82	0.361	0.00

LOSS PARAMETERS FOR SUBBASIN: 510

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PWB	0.259	41.47	0.38	-0.174	0.00	0.00
GN	0.180	28.76	0.25	-0.173	0.00	0.00
CV	0.110	17.59	0.39	-0.072	0.00	0.00
RS	0.064	10.21	0.4	-0.041	65.00	6.64
GYD	0.012	1.97	0.26	-0.012	0.00	0.00
TOTAL =	0.625 SQ.MI.		XKSAT =	0.34	%ROCK=	6.64

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.
0.452	VACANT	72.34	DRY	25.00	0.00	0.00	0.25	0.181
0.173	V.L.D.R	27.66	NORMAL	25.00	15.00	0.03	0.10	0.028
0.625	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.03	AVG. =	0.209
					% =	4.15		

PERCENT OF SUBBASIN DRY = 72.34 %
NORMAL = 27.66 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.322

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.396

IMPERVIOUS AREA: URBAN @ 100 % effective = 4.15
ROCK OUTCROP @ 60 % effective = 3.98

% EFFECTIVE IMP. = 8.13

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
510	0.625	1.577	0.074	93.00	0.209	0.322	3.98	0.396	8.13

LOSS PARAMETERS FOR SUBBASIN: 511

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LcA	0.221	50.54	0.25	-0.304	0.00	0.00
PWB	0.128	29.27	0.38	-0.123	0.00	0.00
PT	0.028	6.31	0.4	-0.025	0.00	0.00
CV	0.024	5.48	0.39	-0.022	0.00	0.00
Mp	0.019	4.36	0.25	-0.026	0.00	0.00
Te	0.013	2.87	0.25	-0.017	0.00	0.00
PeA	0.005	1.17	0.37	-0.005	0.00	0.00
TOTAL =	0.437 SQ.MI.		XKSAT =	0.30	%ROCK=	0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.77

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.413	VACANT	94.54	DRY	25.00	0.00	0.00	0.35	0.331
0.024	V.L.D.R	5.46	NORMAL	25.00	15.00	0.00	0.10	0.005
0.437	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.00	AVG. =	0.336
					% =	0.82		

PERCENT OF SUBBASIN
DRY = 94.54 %
NORMAL = 5.46 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.345

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.350

IMPERVIOUS AREA:
URBAN @ 100 % effective = 0.82
ROCK OUTCROP @ 60 % effective = 0.00

% EFFECTIVE IMP. = 0.82

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
511	0.437	1.025	0.087	34.00	0.336	0.345	3.77	0.350	0.82

LOSS PARAMETERS FOR SUBBASIN: 512
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Soil Survey Used   CENTRAL

XKSAT
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Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LcA	0.315	67.22	0.25	-0.405	0.00	0.00
PT	0.096	20.53	0.4	-0.082	0.00	0.00
Te	0.031	6.66	0.25	-0.040	0.00	0.00
Mp	0.016	3.49	0.25	-0.021	0.00	0.00
GxA	0.010	2.10	0.23	-0.013	0.00	0.00
TOTAL =	0.469 SQ.MI.		XKSAT =	0.27	%ROCK=	0.00

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.
0.469	VACANT	100.00	DRY	25.00	0.00	0.00	0.35	0.350
0.469	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.00	AVG. =	0.350
					% =	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. = 0.315

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

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
512	0.469	1.210	0.088	26.00	0.350	0.350	3.61	0.315	0.00

LOSS PARAMETERS FOR SUBBASIN: 520

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PWB	0.305	45.14	0.38	-0.190	0.00	0.00
GN	0.241	35.73	0.25	-0.215	0.00	0.00
RS	0.109	16.08	0.4	-0.064	65.00	10.45
CV	0.012	1.71	0.39	-0.007	0.00	0.00
GWD	0.009	1.33	0.35	-0.006	0.00	0.00
TOTAL =	0.675 SQ.MI.	XKSAT =		0.33	%ROCK=	10.45

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.
0.461	VACANT	68.28	DRY	25.00	0.00	0.00	0.25	0.171
0.214	V.L.D.R	31.72	NORMAL	25.00	15.00	0.03	0.10	0.032
0.675	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.03	AVG. =	0.202
					% =	4.76		

PERCENT OF SUBBASIN DRY = 68.28 %
NORMAL = 31.72 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.318

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.384

IMPERVIOUS AREA: URBAN @ 100 % effective = 4.76
ROCK OUTCROP @ 60 % effective = 6.27

% EFFECTIVE IMP. = 11.03

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
520	0.675	1.569	0.071	238.00	0.202	0.318	3.92	0.384	11.03

LOSS PARAMETERS FOR SUBBASIN: 521

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LcA	0.314	50.85	0.25	-0.306	0.00	0.00
Mr	0.158	25.58	0.05	-0.333	0.00	0.00
GN	0.074	11.98	0.25	-0.072	0.00	0.00
Mp	0.046	7.42	0.25	-0.045	0.00	0.00
CV	0.015	2.42	0.39	-0.010	0.00	0.00
Vf	0.006	0.99	0.01	-0.020	0.00	0.00
Tu	0.003	0.53	0.25	-0.003	0.00	0.00
PT	0.001	0.23	0.4	-0.001	0.00	0.00
TOTAL =	0.617 SQ.MI.		XKSAT =	0.16	%ROCK=	0.00

DTHETA		PSIF	
Dry =	0.4	=	6.29
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.
0.584	V.L.D.R	94.68	NORMAL	25.00	15.00	0.09	0.10	0.095
0.033	L.D.R.	5.32	NORMAL	25.00	25.00	0.01	0.10	0.005
0.617	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.10	AVG. =	0.100
					% =	15.53		

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 =	15.53
	ROCK OUTCROP @	60 % effective =	0.00
		% EFFECTIVE IMP. =	15.53

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
521	0.617	1.176	0.044	30.00	0.100	0.250	6.29	0.186	15.53

LOSS PARAMETERS FOR SUBBASIN: 522

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LcA	0.274	53.89	0.25	-0.324	0.00	0.00
Mr	0.132	26.06	0.05	-0.339	0.00	0.00
Tw	0.029	5.68	0.05	-0.074	0.00	0.00
Tg	0.024	4.74	0.04	-0.066	0.00	0.00
Mp	0.020	3.89	0.25	-0.023	0.00	0.00
Te	0.017	3.31	0.25	-0.020	0.00	0.00
Tu	0.012	2.43	0.25	-0.015	0.00	0.00
TOTAL =	0.508 SQ.MI.		XKSAT =	0.14	%ROCK=	0.00

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.
0.378	VACANT	74.35	DRY	25.00	0.00	0.00	0.35	0.260
0.130	AGR	25.65	WET	80.00	0.00	0.00	0.50	0.128
0.508	=TOTAL AREA	OK	AVERAGE =	39.11	TOTAL =	0.00	AVG. =	0.388
					% =	0.00		

PERCENT OF SUBBASIN
DRY = 74.35 %
NORMAL = 0.00 %
WET = 25.65 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.290

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.185

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

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
522	0.508	1.186	0.077	24.00	0.388	0.290	6.78	0.185	0.00

LOSS PARAMETERS FOR SUBBASIN: 530

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
GN	0.427	52.04	0.25	-0.313	0.00	0.00
GWD	0.245	29.88	0.35	-0.136	0.00	0.00
PWB	0.061	7.48	0.38	-0.031	0.00	0.00
RS	0.046	5.59	0.4	-0.022	65.00	3.63
Vf	0.035	4.27	0.01	-0.085	0.00	0.00
AGB	0.006	0.74	0.4	-0.003	0.00	0.00
TOTAL =	0.821 SQ.MI.		XKSAT =	0.26	%ROCK=	3.63

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.55

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.211	VACANT	25.73	DRY	25.00	0.00	0.00	0.25	0.064
0.609	V.L.D.R	74.27	NORMAL	25.00	15.00	0.09	0.10	0.074
0.821	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.09	AVG. =	0.139
					% =	11.14		

PERCENT OF SUBBASIN DRY = 25.73 %
NORMAL = 74.27 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.276

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.303

IMPERVIOUS AREA: URBAN @ 100 % effective = 11.14
ROCK OUTCROP @ 60 % effective = 2.18

% EFFECTIVE IMP. = 13.32

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
530	0.821	1.452	0.053	280.00	0.139	0.276	3.55	0.303	13.32

LOSS PARAMETERS FOR SUBBASIN: 531

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
Vf	0.294	44.91	0.01	-0.898	0.00	0.00
Mr	0.230	35.13	0.05	-0.457	0.00	0.00
GN	0.128	19.53	0.25	-0.118	0.00	0.00
Tw	0.003	0.43	0.05	-0.006	0.00	0.00
TOTAL =	0.654 SQ.MI.	XKSAT =		0.03	%ROCK=	0.00

DTHETA

Dry = 0.25
Normal = 0.13
Wet = 0

PSIF

= 10.1

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.262	VACANT	40.03	DRY	25.00	0.00	0.00	0.35	0.140
0.254	V.L.D.R	38.75	NORMAL	25.00	15.00	0.04	0.10	0.039
0.097	L.D.R.	14.89	NORMAL	25.00	25.00	0.02	0.10	0.015
0.041	AGR	6.33	WET	80.00	0.00	0.00	0.50	0.032
0.654	=TOTAL AREA	OK	AVERAGE =	28.48	TOTAL =	0.06	AVG. =	0.225
					% =	9.53		

PERCENT OF SUBBASIN DRY = 40.03 %
NORMAL = 53.64 %
WET = 6.33 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.170

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.036

IMPERVIOUS AREA: URBAN @ 100 % effective = 9.53
ROCK OUTCROP @ 60 % effective = 0.00

% EFFECTIVE IMP. = 9.53

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
531	0.654	1.193	0.060	25.00	0.225	0.170	10.10	0.036	9.53

LOSS PARAMETERS FOR SUBBASIN: 532

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
Mr	0.343	65.80	0.05	-0.856	0.00	0.00
Vf	0.138	26.39	0.01	-0.528	0.00	0.00
Th	0.019	3.57	0.04	-0.050	0.00	0.00
Tw	0.017	3.25	0.05	-0.042	0.00	0.00
Tg	0.005	0.99	0.04	-0.014	0.00	0.00
TOTAL =	0.521 SQ.MI.		XKSAT =	0.03	%ROCK=	0.00

DTHETA

Dry = 0.25
Normal = 0.13
Wet = 0

PSIF

= 10.1

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.214	VACANT	41.14	DRY	25.00	0.00	0.00	0.35	0.144
0.307	AGR	58.86	WET	80.00	0.00	0.00	0.50	0.294
0.521	=TOTAL AREA	OK	AVERAGE =	57.37	TOTAL =	0.00	AVG. =	0.438
					% =	0.00		

PERCENT OF SUBBASIN DRY = 41.14 %
NORMAL = 0.00 %
WET = 58.86 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.103

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.046

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

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
532	0.521	1.109	0.062	25.00	0.438	0.103	10.10	0.046	0.00

LOSS PARAMETERS FOR SUBBASIN: 534

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
Mr	0.482	53.82	0.05	-0.700	0.00	0.00
GxA	0.121	13.53	0.23	-0.086	0.00	0.00
LcA	0.104	11.65	0.25	-0.070	0.00	0.00
RbA	0.041	4.53	0.26	-0.026	0.00	0.00
Es	0.036	3.98	0.25	-0.024	0.00	0.00
PT	0.030	3.37	0.4	-0.013	0.00	0.00
Mp	0.027	3.06	0.25	-0.018	0.00	0.00
Ve	0.021	2.33	0.25	-0.014	0.00	0.00
Tg	0.013	1.50	0.04	-0.021	0.00	0.00
Ms	0.010	1.15	0.01	-0.023	0.00	0.00
GgA	0.010	1.08	0.25	-0.006	0.00	0.00
TOTAL =	0.896	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.
0.588	VACANT	65.64	DRY	25.00	0.00	0.00	0.35	0.230
0.075	M.F.R.	8.42	NORMAL	25.00	65.00	0.05	0.10	0.008
0.212	M.D.R.	23.65	NORMAL	25.00	45.00	0.10	0.10	0.024
0.021	COMM	2.29	NORMAL	20.00	90.00	0.02	0.10	0.002
0.896	=TOTAL AREA	OK	AVERAGE =	24.89	TOTAL =	0.16	AVG. =	0.264
					% =	18.18		

PERCENT OF SUBBASIN DRY = 65.64 %
NORMAL = 34.36 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.281

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.116

IMPERVIOUS AREA: URBAN @ 100 % effective = 18.18
ROCK OUTCROP @ 60 % effective = 0.00

% EFFECTIVE IMP. = 18.18

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
534	0.896	1.571	0.061	18.00	0.264	0.281	7.50	0.116	18.18

LOSS PARAMETERS FOR SUBBASIN: 535

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LcA	0.240	37.37	0.25	-0.225	0.00	0.00
PeA	0.145	22.60	0.37	-0.098	0.00	0.00
Mr	0.108	16.80	0.05	-0.219	0.00	0.00
Tw	0.060	9.31	0.05	-0.121	0.00	0.00
Th	0.023	3.59	0.04	-0.050	0.00	0.00
GxA	0.019	2.95	0.23	-0.019	0.00	0.00
Mp	0.015	2.27	0.25	-0.014	0.00	0.00
RbA	0.014	2.23	0.26	-0.013	0.00	0.00
Tg	0.012	1.81	0.04	-0.025	0.00	0.00
Le	0.007	1.07	0.04	-0.015	0.00	0.00
TOTAL =	0.642 SQ.MI.	XKSAT =		0.16	%ROCK=	0.00

DTHETA

Dry = 0.4
Normal = 0.25
Wet = 0

PSIF

= 6.29

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.084	VACANT	13.10	DRY	25.00	0.00	0.00	0.35	0.046
0.279	M.D.R.	43.51	NORMAL	25.00	45.00	0.13	0.10	0.044
0.008	COMM	1.30	NORMAL	20.00	90.00	0.01	0.10	0.001
0.270	AGR	42.09	WET	80.00	0.00	0.00	0.50	0.210
0.642	=TOTAL AREA	OK	AVERAGE =	48.08	TOTAL =	0.13	AVG. =	0.301
					% =	20.75		

PERCENT OF SUBBASIN DRY = 13.10 %
NORMAL = 44.81 %
WET = 42.09 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.164

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.227

IMPERVIOUS AREA: URBAN @ 100 % effective = 20.75
ROCK OUTCROP @ 60 % effective = 0.00

% EFFECTIVE IMP. = 20.75

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
535	0.642	1.176	0.040	22.00	0.301	0.164	6.29	0.227	20.75

LOSS PARAMETERS FOR SUBBASIN: 540

Soil Survey Used AGUILA & CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
AGB	0.414	18.45	0.4	-0.073	0.00	0.00
110	0.364	16.24	0.13	-0.144	0.00	0.00
115	0.284	12.68	0.39	-0.052	0.00	0.00
18	0.254	11.34	0.33	-0.055	15.00	1.70
TSC	0.218	9.73	0.14	-0.083	0.00	0.00
RS	0.201	8.98	0.4	-0.036	65.00	5.83
100	0.093	4.16	0.4	-0.017	20.00	0.83
GWD	0.092	4.09	0.35	-0.019	0.00	0.00
GM	0.081	3.62	0.29	-0.019	0.00	0.00
PWB	0.074	3.29	0.38	-0.014	0.00	0.00
112	0.061	2.73	0.39	-0.011	0.00	0.00
13	0.050	2.24	0.01	-0.045	0.00	0.00
21	0.028	1.26	0.38	-0.005	0.00	0.00
3	0.024	1.08	0.58	-0.003	0.00	0.00
GN	0.003	0.12	0.25	-0.001	0.00	0.00
TOTAL =	2.244 SQ.MI.	XKSAT =		0.27	%ROCK=	8.37

DTHETA

Dry =	0.35	PSIF =	3.61
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.
2.244	VACANT	100.00	DRY	25.00	0.00	0.00	0.25	0.250
2.244	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.00	AVG. =	0.250
					% =	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. = 0.315

IMPERVIOUS AREA:
URBAN @ 100 % effective = 0.00
ROCK OUTCROP @ 60 % effective = 5.02

% EFFECTIVE IMP. = 5.02

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
540	2.244	2.367	0.071	28.00	0.250	0.350	3.61	0.315	5.02

LOSS PARAMETERS FOR SUBBASIN: 541

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
AGB	0.291	62.17	0.4	-0.247	0.00	0.00
GM	0.108	23.02	0.29	-0.124	0.00	0.00
GN	0.069	14.81	0.25	-0.089	0.00	0.00
TOTAL =	0.467 SQ.MI.	XKSAT =		0.35	%ROCK=	0.00

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.
0.467	VACANT	100.00	DRY	25.00	0.00	0.00	0.25	0.250
0.467	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.00	AVG. =	0.250
					% =	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 = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
541	0.467	1.081	0.088	31.00	0.250	0.350	4.03	0.408	0.00

LOSS PARAMETERS FOR SUBBASIN: 542

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
AfA	0.093	19.00	0.38	-0.080	0.00	0.00
AGB	0.091	18.60	0.4	-0.074	0.00	0.00
Ge	0.083	16.90	0.26	-0.099	0.00	0.00
GN	0.072	14.77	0.25	-0.089	0.00	0.00
Aa	0.045	9.25	0.26	-0.054	0.00	0.00
AbA	0.041	8.28	0.38	-0.035	0.00	0.00
Cb	0.025	5.20	0.4	-0.021	0.00	0.00
BS	0.015	2.96	0.39	-0.012	0.00	0.00
Mr	0.014	2.93	0.05	-0.038	0.00	0.00
Tw	0.005	1.09	0.05	-0.014	0.00	0.00
LcA	0.005	1.01	0.25	-0.006	0.00	0.00
TOTAL =	0.490	SQ.MI.	XKSAT =	0.30	%ROCK=	0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.77

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
0.317	VACANT	64.66	DRY	25.00	0.00	0.00	0.35	0.226
0.024	V.L.D.R	4.93	NORMAL	25.00	15.00	0.00	0.10	0.005
0.149	AGR	30.41	WET	80.00	0.00	0.00	0.50	0.152
0.490	=TOTAL AREA	OK	AVERAGE =	41.73	TOTAL =	0.00	AVG. =	0.383
					% =	0.74		

PERCENT OF SUBBASIN
DRY = 64.66 %
NORMAL = 4.93 %
WET = 30.41 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.239

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.405

IMPERVIOUS AREA:
URBAN @ 100 % effective = 0.74
ROCK OUTCROP @ 60 % effective = 0.00

% EFFECTIVE IMP. = 0.74

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
542	0.490	1.059	0.073	33.00	0.383	0.239	3.77	0.405	0.74

LOSS PARAMETERS FOR SUBBASIN: 550

Soil Survey Used AGUILA & CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
100	0.584	30.02	0.4	-0.119	20.00	6.00
115	0.440	22.61	0.39	-0.092	0.00	0.00
AGB	0.245	12.60	0.4	-0.050	0.00	0.00
110	0.170	8.72	0.13	-0.077	0.00	0.00
112	0.121	6.23	0.39	-0.025	0.00	0.00
10	0.106	5.45	0.94	-0.001	0.00	0.00
98	0.092	4.71	0.37	-0.020	0.00	0.00
3	0.072	3.70	0.58	-0.009	0.00	0.00
GN	0.065	3.32	0.25	-0.020	0.00	0.00
PT	0.029	1.52	0.4	-0.006	0.00	0.00
GM	0.022	1.13	0.29	-0.006	0.00	0.00
TOTAL =	1.946	SQ.MI.	XKSAT =	0.37	%ROCK=	6.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.14

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
1.946	VACANT	100.00	DRY	25.00	0.00	0.00	0.25	0.250
1.946	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.00	AVG. =	0.250
					% =	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. = 0.431

IMPERVIOUS AREA: URBAN @ 100 % effective = 0.00
ROCK OUTCROP @ 60 % effective = 3.60

% EFFECTIVE IMP. = 3.60

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
550	1.946	1.701	0.073	63.00	0.250	0.350	4.14	0.431	3.60

LOSS PARAMETERS FOR SUBBASIN: 551

Soil Survey Used AGUILA & CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
AGB	0.499	34.43	0.4	-0.137	0.00	0.00
AL	0.461	31.81	0.4	-0.127	0.00	0.00
GWD	0.106	7.31	0.35	-0.033	0.00	0.00
10	0.088	6.09	0.94	-0.002	0.00	0.00
GgA	0.083	5.71	0.25	-0.034	0.00	0.00
LcA	0.066	4.57	0.25	-0.028	0.00	0.00
PRB	0.051	3.54	0.28	-0.020	0.00	0.00
GM	0.037	2.55	0.29	-0.014	0.00	0.00
GN	0.030	2.06	0.25	-0.012	0.00	0.00
CO	0.015	1.06	0.29	-0.006	20.00	0.21
RS	0.013	0.88	0.4	-0.003	65.00	0.57
TOTAL =	1.448 SQ.MI.	XKSAT =		0.38	%ROCK=	0.78

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.
1.428	VACANT	98.60	DRY	25.00	0.00	0.00	0.25	0.246
0.020	V.L.D.R	1.40	NORMAL	25.00	15.00	0.00	0.10	0.001
1.448	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.00	AVG. =	0.248
					% =	0.21		

PERCENT OF SUBBASIN DRY = 98.60 %
NORMAL = 1.40 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.349

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.443

IMPERVIOUS AREA: URBAN @ 100 % effective = 0.21
ROCK OUTCROP @ 60 % effective = 0.47

% EFFECTIVE IMP. = 0.68

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
551	1.448	2.280	0.075	46.00	0.248	0.349	4.19	0.443	0.68

LOSS PARAMETERS FOR SUBBASIN: 552

Soil Survey Used AGUILA & CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LcA	0.766	32.13	0.25	-0.193	0.00	0.00
RS	0.326	13.66	0.4	-0.054	65.00	8.88
GgA	0.260	10.92	0.25	-0.066	0.00	0.00
PRB	0.181	7.57	0.28	-0.042	0.00	0.00
CO	0.148	6.20	0.29	-0.033	20.00	1.24
PeA	0.124	5.18	0.37	-0.022	0.00	0.00
PT	0.106	4.43	0.4	-0.018	0.00	0.00
AGB	0.082	3.46	0.4	-0.014	0.00	0.00
AfA	0.076	3.19	0.38	-0.013	0.00	0.00
RbA	0.060	2.53	0.26	-0.015	0.00	0.00
GN	0.054	2.24	0.25	-0.014	0.00	0.00
10	0.053	2.24	0.94	-0.001	0.00	0.00
GWD	0.053	2.23	0.35	-0.010	0.00	0.00
Cb	0.048	2.03	0.4	-0.008	0.00	0.00
GxB	0.048	2.00	0.24	-0.012	0.00	0.00
TOTAL =	2.385	SQ.MI.	XKSAT =	0.31	%ROCK=	10.12

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.
2.220	VACANT	93.06	DRY	25.00	0.00	0.00	0.25	0.233
0.111	V.L.D.R	4.67	NORMAL	25.00	15.00	0.02	0.10	0.005
0.029	M.D.R.	1.23	NORMAL	25.00	45.00	0.01	0.10	0.001
0.025	AGR	1.04	WET	80.00	0.00	0.00	0.50	0.005
2.385	=TOTAL AREA	OK	AVERAGE =	25.57	TOTAL =	0.03	AVG. =	0.244
					% =	1.25		

PERCENT OF SUBBASIN DRY = 93.06 %
NORMAL = 5.89 %
WET = 1.04 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.340

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.363

IMPERVIOUS AREA: URBAN @ 100 % effective = 1.25
ROCK OUTCROP @ 60 % effective = 6.07

% EFFECTIVE IMP. = 7.32

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
552	2.385	3.216	0.068	46.00	0.244	0.340	3.82	0.363	7.32

LOSS PARAMETERS FOR SUBBASIN: 553

Soil Survey Used AGUILA & CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
Mr	0.263	28.14	0.05	-0.366	0.00	0.00
AfA	0.162	17.38	0.38	-0.073	0.00	0.00
Cb	0.123	13.18	0.4	-0.052	0.00	0.00
Ge	0.101	10.83	0.26	-0.063	0.00	0.00
10	0.089	9.57	0.94	-0.003	0.00	0.00
Vh	0.027	2.92	0.27	-0.017	0.00	0.00
GgA	0.020	2.12	0.25	-0.013	0.00	0.00
Mp	0.018	1.97	0.25	-0.012	0.00	0.00
LcA	0.018	1.94	0.25	-0.012	0.00	0.00
Tg	0.016	1.70	0.04	-0.024	0.00	0.00
Aa	0.016	1.70	0.26	-0.010	0.00	0.00
Vf	0.015	1.66	0.01	-0.033	0.00	0.00
Th	0.012	1.30	0.04	-0.018	0.00	0.00
Bs	0.011	1.15	0.39	-0.005	0.00	0.00
AbA	0.010	1.07	0.38	-0.005	0.00	0.00
Ma	0.009	0.98	0.4	-0.004	0.00	0.00
Tw	0.006	0.64	0.05	-0.008	0.00	0.00
Mo	0.005	0.54	0.39	-0.002	0.00	0.00
Te	0.004	0.44	0.25	-0.003	0.00	0.00
Es	0.004	0.39	0.25	-0.002	0.00	0.00
Ve	0.004	0.38	0.25	-0.002	0.00	0.00
TOTAL =	0.933 SQ.MI.		XKSAT =	0.19	%ROCK=	0.00

DTHETA

Dry =	0.38	PSIF =	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.
0.374	VACANT	40.03	DRY	25.00	0.00	0.00	0.35	0.140
0.023	V.L.D.R	2.50	NORMAL	25.00	15.00	0.00	0.10	0.003
0.025	ROW	2.65	NORMAL	20.00	90.00	0.02	0.10	0.003
0.512	AGR	54.82	WET	80.00	0.00	0.00	0.50	0.274
0.933	=TOTAL AREA	OK	AVERAGE =	55.02	TOTAL =	0.03	AVG. =	0.419
					% =	2.76		

PERCENT OF SUBBASIN	DRY =	40.03 %
	NORMAL =	5.15 %
	WET =	54.82 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.165

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.284

IMPERVIOUS AREA:	URBAN @	100 % effective =	2.76
	ROCK OUTCROP @	60 % effective =	0.00
		% EFFECTIVE IMP. =	2.76

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
553	0.933	1.052	0.056	38.00	0.419	0.165	5.36	0.284	2.76

LOSS PARAMETERS FOR SUBBASIN: 554

Soil Survey Used AGUILA & CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
AfA	0.257	47.55	0.38	-0.200	0.00	0.00
Mr	0.097	17.89	0.05	-0.233	0.00	0.00
Cb	0.069	12.83	0.4	-0.051	0.00	0.00
10	0.067	12.38	0.94	-0.003	0.00	0.00
Vh	0.027	5.09	0.27	-0.029	0.00	0.00
Le	0.010	1.76	0.04	-0.025	0.00	0.00
GgA	0.008	1.49	0.25	-0.009	0.00	0.00
Tg	0.005	1.01	0.04	-0.014	0.00	0.00
TOTAL =	0.540 SQ.MI.		XKSAT =	0.27	%ROCK=	0.00

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.
0.298	VACANT	55.25	DRY	25.00	0.00	0.00	0.35	0.193
0.018	M.D.R.	3.33	NORMAL	25.00	45.00	0.01	0.10	0.003
0.067	ROW	12.40	NORMAL	20.00	90.00	0.06	0.10	0.012
0.032	IND	6.02	NORMAL	20.00	75.00	0.02	0.10	0.006
0.120	AGR	22.20	WET	80.00	0.00	0.00	0.50	0.111
0.004	WS	0.80	WET	0.00	0.00	0.00	0.00	0.000
0.540	=TOTAL AREA	OK	AVERAGE =	36.09	TOTAL =	0.09	AVG. =	0.326
					% =	17.17		

PERCENT OF SUBBASIN
DRY = 55.25 %
NORMAL = 21.74 %
WET = 23.01 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.248

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.347

IMPERVIOUS AREA:
URBAN @ 100 % effective = 17.17
ROCK OUTCROP @ 60 % effective = 0.00

% EFFECTIVE IMP. = 17.17

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
554	0.540	1.531	0.064	25.00	0.326	0.248	3.61	0.347	17.17

LOSS PARAMETERS FOR SUBBASIN: 555

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
Mr	0.184	34.33	0.05	-0.447	0.00	0.00
Cb	0.116	21.61	0.4	-0.086	0.00	0.00
AfA	0.084	15.71	0.38	-0.066	0.00	0.00
10	0.047	8.72	0.94	-0.002	0.00	0.00
GRV	0.037	6.92	1.2	0.005	0.00	0.00
Mp	0.031	5.81	0.25	-0.035	0.00	0.00
Tg	0.013	2.43	0.04	-0.034	0.00	0.00
Es	0.008	1.46	0.25	-0.009	0.00	0.00
Aa	0.008	1.40	0.26	-0.008	0.00	0.00
Ma	0.005	0.92	0.4	-0.004	0.00	0.00
Vf	0.004	0.71	0.01	-0.014	0.00	0.00
TOTAL =	0.536	SQ.MI.	XKSAT =	0.20	%ROCK=	0.00

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.
0.346	VACANT	64.41	DRY	25.00	0.00	0.00	0.35	0.225
0.067	M.D.R.	12.56	NORMAL	25.00	45.00	0.03	0.10	0.013
0.036	ROW	6.78	NORMAL	20.00	90.00	0.03	0.10	0.007
0.087	AGR	16.25	WET	80.00	0.00	0.00	0.50	0.081
0.536	=TOTAL AREA	OK	AVERAGE =	33.60	TOTAL =	0.06	AVG. =	0.326
					% =	11.75		

PERCENT OF SUBBASIN
DRY = 64.41 %
NORMAL = 19.33 %
WET = 16.25 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.293

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.252

IMPERVIOUS AREA:
URBAN @ 100 % effective = 11.75
ROCK OUTCROP @ 60 % effective = 0.00

% EFFECTIVE IMP. = 11.75

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
555	0.536	1.108	0.068	34.00	0.326	0.293	5.05	0.252	11.75

LOSS PARAMETERS FOR SUBBASIN: 556

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LcA	0.203	36.32	0.25	-0.219	0.00	0.00
Cb	0.087	15.65	0.4	-0.062	0.00	0.00
10	0.043	7.63	0.94	-0.002	0.00	0.00
AbA	0.033	5.87	0.38	-0.025	0.00	0.00
GgA	0.032	5.74	0.25	-0.035	0.00	0.00
Mp	0.029	5.23	0.25	-0.031	0.00	0.00
TD	0.029	5.22	1.2	0.004	0.00	0.00
Vh	0.025	4.52	0.27	-0.026	0.00	0.00
Bs	0.020	3.50	0.39	-0.014	0.00	0.00
RbA	0.014	2.57	0.26	-0.015	0.00	0.00
Va	0.009	1.57	0.39	-0.006	0.00	0.00
Es	0.008	1.48	0.25	-0.009	0.00	0.00
Mo	0.008	1.44	0.39	-0.006	0.00	0.00
Aa	0.007	1.31	0.26	-0.008	0.00	0.00
Le	0.007	1.22	0.04	-0.017	0.00	0.00
Vf	0.004	0.73	0.01	-0.015	0.00	0.00
TOTAL =	0.558	SQ.MI.	XKSAT =	0.33	%ROCK=	0.00

DTHETA		PSIF	
Dry =	0.35	=	3.92
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.
0.138	VACANT	24.71	DRY	25.00	0.00	0.00	0.35	0.086
0.044	ROW	7.80	NORMAL	20.00	90.00	0.04	0.10	0.008
0.009	COMM	1.53	NORMAL	20.00	90.00	0.01	0.10	0.002
0.368	AGR	65.96	WET	80.00	0.00	0.00	0.50	0.330
0.558	=TOTAL AREA	OK	AVERAGE =	60.81	TOTAL =	0.05	AVG. =	0.426
					% =	8.40		

PERCENT OF SUBBASIN		
DRY =	24.71	%
NORMAL =	9.33	%
WET =	65.96	%

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.110

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.514

IMPERVIOUS AREA:	URBAN @	100 % effective =	8.40
	ROCK OUTCROP @	60 % effective =	0.00
		% EFFECTIVE IMP. =	8.40

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
556	0.558	1.379	0.053	26.00	0.426	0.110	3.92	0.514	8.40

LOSS PARAMETERS FOR SUBBASIN: 560

Soil Survey Used AGUILA & CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
110	0.452	40.55	0.13	-0.359	0.00	0.00
100	0.177	15.89	0.4	-0.063	20.00	3.18
98	0.128	11.48	0.37	-0.050	0.00	0.00
18	0.128	11.47	0.33	-0.055	15.00	1.72
AGB	0.085	7.59	0.4	-0.030	0.00	0.00
68	0.040	3.56	0.63	-0.007	0.00	0.00
RS	0.035	3.11	0.4	-0.012	65.00	2.02
101	0.034	3.06	0.28	-0.017	0.00	0.00
44	0.033	2.98	0.03	-0.045	0.00	0.00
PT	0.003	0.29	0.4	-0.001	0.00	0.00
TOTAL =	1.116 SQ.MI.		XKSAT =	0.23	%ROCK=	6.92

DTHETA

Dry = 0.36
Normal = 0.25
Wet = 0

PSIF

= 4.12

LAND USE

AREA SQ.MI.	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea SQ.MI.	IA in.	Wgtd.IA in.
1.116	VACANT	100.00	DRY	25.00	0.00	0.00	0.25	0.250
1.116	=TOTAL AREA	OK	AVERAGE =	25.00	TOTAL =	0.00	AVG. =	0.250
					% =	0.00		

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

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.360

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.268

IMPERVIOUS AREA: URBAN @ 100 % effective = 0.00
ROCK OUTCROP @ 60 % effective = 4.15

% EFFECTIVE IMP. = 4.15

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
560	1.116	1.866	0.079	192.00	0.250	0.360	4.12	0.268	4.15

LOSS PARAMETERS FOR SUBBASIN: 571

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LcA	0.597	44.43	0.25	-0.267	0.00	0.00
Mp	0.285	21.21	0.25	-0.128	0.00	0.00
Mr	0.204	15.18	0.05	-0.198	0.00	0.00
Es	0.122	9.05	0.25	-0.055	0.00	0.00
Vf	0.066	4.88	0.01	-0.098	0.00	0.00
PeA	0.023	1.69	0.37	-0.007	0.00	0.00
Tu	0.019	1.39	0.25	-0.008	0.00	0.00
GgA	0.015	1.12	0.25	-0.007	0.00	0.00
Ve	0.006	0.45	0.25	-0.003	0.00	0.00
Ma	0.004	0.32	0.4	-0.001	0.00	0.00
Te	0.004	0.28	0.25	-0.002	0.00	0.00
TOTAL =	1.345 SQ.MI.		XKSAT =	0.17	%ROCK=	0.00

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.
0.236	VACANT	17.59	DRY	25.00	0.00	0.00	0.35	0.062
0.019	V.L.D.R	1.44	NORMAL	25.00	15.00	0.00	0.10	0.001
0.129	M.D.R.	9.62	NORMAL	25.00	45.00	0.06	0.10	0.010
0.068	ROW	5.09	NORMAL	20.00	90.00	0.06	0.10	0.005
0.891	AGR	66.26	WET	80.00	0.00	0.00	0.50	0.331
1.345	=TOTAL AREA	OK	AVERAGE =	61.19	TOTAL =	0.12	AVG. =	0.409
					% =	9.13		

PERCENT OF SUBBASIN DRY = 17.59 %
NORMAL = 16.16 %
WET = 66.26 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.109

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.266

IMPERVIOUS AREA: URBAN @ 100 % effective = 9.13
ROCK OUTCROP @ 60 % effective = 0.00

% EFFECTIVE IMP. = 9.13

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
571	1.345	2.272	0.044	26.00	0.409	0.109	5.98	0.266	9.13

LOSS PARAMETERS FOR SUBBASIN: 581

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
AfA	0.588	71.46	0.38	-0.300	0.00	0.00
LcA	0.061	7.43	0.25	-0.045	0.00	0.00
Ma	0.054	6.58	0.4	-0.026	0.00	0.00
RbA	0.053	6.41	0.26	-0.037	0.00	0.00
GgA	0.023	2.80	0.25	-0.017	0.00	0.00
Th	0.017	2.01	0.04	-0.028	0.00	0.00
Cb	0.015	1.85	0.4	-0.007	0.00	0.00
Mr	0.009	1.07	0.05	-0.014	0.00	0.00
Tg	0.003	0.39	0.04	-0.005	0.00	0.00
TOTAL =	0.823	SQ.MI.	XKSAT =	0.33	%ROCK=	0.00

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.
0.215	M.D.R.	26.08	NORMAL	25.00	45.00	0.10	0.10	0.026
0.046	ROW	5.64	NORMAL	20.00	90.00	0.04	0.10	0.006
0.343	COMM	41.73	NORMAL	20.00	90.00	0.31	0.10	0.042
0.218	AGR	26.54	WET	80.00	0.00	0.00	0.50	0.133
0.823	=TOTAL AREA	OK	AVERAGE =	37.23	TOTAL =	0.45	AVG. =	0.206
					% =	54.37		

PERCENT OF SUBBASIN
DRY = 0.00 %
NORMAL = 73.45 %
WET = 26.54 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.184

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.429

IMPERVIOUS AREA:
URBAN @ 100 % effective = 54.37
ROCK OUTCROP @ 60 % effective = 0.00

% EFFECTIVE IMP. = 54.37

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
581	0.823	1.836	0.033	15.00	0.206	0.184	3.92	0.429	54.37

LOSS PARAMETERS FOR SUBBASIN: 408

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA SQ.MI.	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
GgA	0.204	18.99	0.25	-0.114	0.00	0.00
AfA	0.143	13.33	0.38	-0.056	0.00	0.00
Aa	0.140	12.99	0.26	-0.076	0.00	0.00
Ma	0.135	12.54	0.4	-0.050	0.00	0.00
AbA	0.094	8.78	0.38	-0.037	0.00	0.00
LcA	0.093	8.65	0.25	-0.052	0.00	0.00
Vh	0.083	7.70	0.27	-0.044	0.00	0.00
GxA	0.066	6.16	0.23	-0.039	0.00	0.00
TD	0.045	4.14	1.2	0.003	0.00	0.00
Cb	0.038	3.49	0.4	-0.014	0.00	0.00
RbA	0.021	1.95	0.26	-0.011	0.00	0.00
Mp	0.014	1.27	0.25	-0.008	0.00	0.00
TOTAL =	1.076 SQ.MI.	XKSAT =		0.32	%ROCK=	0.00

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.
0.549	VACANT	50.97	DRY	25.00	0.00	0.00	0.35	0.178
0.051	DRNWAY	4.77	DRY	25.00	0.00	0.00	0.35	0.017
0.027	V.L.D.R	2.50	NORMAL	25.00	15.00	0.00	0.10	0.002
0.031	ROW	2.87	NORMAL	20.00	90.00	0.03	0.10	0.003
0.182	COMM	16.90	NORMAL	20.00	90.00	0.16	0.10	0.017
0.106	PARK	9.86	NORMAL	90.00	0.00	0.00	0.20	0.020
0.131	AGR	12.14	WET	80.00	0.00	0.00	0.50	0.061
1.076	=TOTAL AREA	OK	AVERAGE =	37.10	TOTAL =	0.20	AVG. =	0.298
					% =	18.17		

PERCENT OF SUBBASIN
DRY = 55.74 %
NORMAL = 32.12 %
WET = 12.14 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.275

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.415

IMPERVIOUS AREA:
URBAN @ 100 % effective = 18.17
ROCK OUTCROP @ 60 % effective = 0.00

% EFFECTIVE IMP. = 18.17

INPUT VALUES FOR MCUHP1 PROGRAM

SUBBASIN	AREA sq.mi.	LENGTH miles	Kb	SLOPE ft/mile	IA inches	DTHETA	PSIF	XKSAT	RTIMP %
408	1.076	1.935	0.057	22.00	0.298	0.275	3.87	0.415	18.17

SECTION III
Hydrologic Sub-Basin Characteristics

TABLE 10

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)
408	1.076	1.935	22	0.057	2.255	1.980
500	0.410	1.455	50	0.078	1.523	1.600
501	0.524	1.031	32	0.087	1.672	1.711
502	0.553	1.452	23	0.086	2.536	2.984
503	0.952	---	---	---	1.724	1.680
510	0.625	1.577	93	0.074	1.112	1.108
511	0.437	1.025	34	0.087	1.540	1.540
512	0.469	1.210	26	0.088	2.000	1.989
520	0.675	1.569	238	0.071	0.667	0.650
521	0.617	1.176	30	0.044	0.808	0.817
522	0.508	1.186	24	0.077	1.765	1.731
530	0.821	1.452	280	0.053	0.425	0.429
531	0.654	1.193	25	0.060	0.983	1.000
532	0.521	1.109	25	0.062	1.021	0.992
533A	0.008	---	---	---	0.293	0.286
533B	0.281	---	---	---	0.500	0.488
533C	0.123	---	---	---	0.574	0.559
533D	0.101	---	---	---	1.172	1.142
533E	0.013	---	---	---	0.305	0.297
533F	0.064	---	---	---	0.416	0.405
533G	0.079	---	---	---	0.491	0.478
533H	0.033	---	---	---	0.375	0.366
533I	0.084	---	---	---	0.747	0.728
533J	0.034	---	---	---	0.288	0.281
533K	0.057	---	---	---	0.469	0.456
534	0.896	1.571	18	0.061	1.734	1.675
535	0.642	1.176	22	0.040	0.883	0.879
540	2.244	2.367	28	0.071	3.359	2.584
541	0.467	1.081	31	0.088	1.740	1.839

TABLE 10

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)
542	0.490	1.059	33	0.073	1.362	1.388
550	1.946	1.701	63	0.073	2.361	1.500
551	1.448	2.280	46	0.075	3.382	2.568
552	2.385	3.216	46	0.068	3.531	2.619
553	0.933	1.052	38	0.056	1.021	0.917
554	0.540	1.531	25	0.064	1.596	1.596
555	0.536	1.108	34	0.068	1.163	1.167
556	0.558	1.379	26	0.053	1.346	1.350
560	1.116	1.866	192	0.079	1.004	0.879
571	1.345	2.272	26	0.044	1.714	1.547
581	0.823	1.836	15	0.033	1.154	0.896

TABLE 11

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)
408	1.076	1.935	22	0.057	2.255	1.980
500	0.410	1.455	50	0.078	1.523	1.600
501	0.524	1.031	32	0.087	1.672	1.711
502	0.553	1.452	23	0.086	2.536	2.984
503	0.952	---	---	---	1.724	1.680
510	0.625	1.577	93	0.074	1.112	1.108
511	0.437	1.025	34	0.087	1.540	1.540
512	0.469	1.210	26	0.088	2.000	1.989
520	0.675	1.569	238	0.071	0.667	0.650
521	0.617	1.176	30	0.044	0.808	0.817
522	0.508	1.186	24	0.077	1.765	1.731
530	0.821	1.452	280	0.053	0.425	0.429
531	0.654	1.193	25	0.060	0.983	1.000
532	0.521	1.109	25	0.062	1.021	0.992
533A	0.008	---	---	---	0.293	0.286
533B	0.281	---	---	---	0.500	0.488
533C	0.123	---	---	---	0.574	0.559
533D	0.101	---	---	---	1.172	1.142
533E	0.013	---	---	---	0.305	0.297
533F	0.064	---	---	---	0.416	0.405
533G	0.079	---	---	---	0.491	0.478
533H	0.033	---	---	---	0.375	0.366
533I	0.084	---	---	---	0.747	0.728
533J	0.034	---	---	---	0.288	0.281
533K	0.057	---	---	---	0.469	0.456
534	0.896	1.571	18	0.061	1.734	1.675
535	0.642	1.176	22	0.040	0.883	0.879
540	2.244	2.367	28	0.071	3.359	2.584
541	0.467	1.081	31	0.088	1.740	1.839

TABLE 11

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)
542	0.490	1.059	33	0.073	1.362	1.388
550	1.946	1.701	63	0.073	2.361	1.500
551	1.448	2.280	46	0.075	3.382	2.568
552	2.385	3.216	46	0.068	3.531	2.619
553	0.933	1.052	38	0.056	1.021	0.917
554	0.540	1.531	25	0.064	1.596	1.596
555	0.536	1.108	34	0.068	1.163	1.167
556	0.558	1.379	26	0.053	1.346	1.350
560	1.116	1.866	192	0.079	1.004	0.879
571	1.345	2.272	26	0.044	1.714	1.547
581	0.823	1.836	15	0.033	1.154	0.896

TABLE 12

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)
408	1.076	1.935	22	0.057	1.521	1.337
500	0.410	1.455	50	0.078	0.983	0.983
501	0.524	1.031	32	0.087	0.979	1.033
502	0.553	1.452	23	0.086	1.483	1.729
503	0.952	---	---	---	1.000	1.075
510	0.625	1.577	93	0.074	0.679	0.721
511	0.437	1.025	34	0.087	0.904	0.971
512	0.469	1.210	26	0.088	1.167	1.263
520	0.675	1.569	238	0.071	0.429	0.454
521	0.617	1.176	30	0.044	0.558	0.592
522	0.508	1.186	24	0.077	1.033	1.104
530	0.821	1.452	280	0.053	0.308	0.346
531	0.654	1.193	25	0.060	0.725	0.775
532	0.521	1.109	25	0.062	0.704	0.758
533A	0.008	---	---	---	0.170	0.183
533B	0.281	---	---	---	0.290	0.312
533C	0.123	---	---	---	0.333	0.358
533D	0.101	---	---	---	0.680	0.731
533E	0.013	---	---	---	0.177	0.190
533F	0.064	---	---	---	0.241	0.259
533G	0.079	---	---	---	0.285	0.306
533H	0.033	---	---	---	0.218	0.234
533I	0.084	---	---	---	0.433	0.466
533J	0.034	---	---	---	0.167	0.180
533K	0.057	---	---	---	0.272	0.292
534	0.896	1.571	18	0.061	1.129	1.183
535	0.642	1.176	22	0.040	0.600	0.633
540	2.244	2.367	28	0.071	1.751	1.718
541	0.467	1.081	31	0.088	1.038	1.108

TABLE 12

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)
542	0.490	1.059	33	0.073	0.808	0.871
550	1.946	1.701	63	0.073	1.025	0.958
551	1.448	2.280	46	0.075	1.566	1.473
552	2.385	3.216	46	0.068	1.729	1.695
553	0.933	1.052	38	0.056	0.608	0.613
554	0.540	1.531	25	0.064	1.021	1.121
555	0.536	1.108	34	0.068	0.729	0.788
556	0.558	1.379	26	0.053	0.833	0.904
560	1.116	1.866	192	0.079	0.596	0.587
571	1.345	2.272	26	0.044	1.038	1.058
581	0.823	1.836	15	0.033	0.833	0.896

TABLE 13

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

Sub-Basin	2-Year		10-Year		100-Year	
	6-Hr.	24-Hr.	6-Hr.	24-Hr.	6-Hr.	24-Hr.
21	3	5	12	17	28	39
22	8	11	17	23	32	42
23	1	2	4	6	9	12
24	1	2	3	4	6	8
25	7	11	21	30	47	63
27	11	18	41	61	100	137
29	3	4	14	22	40	57
30	7	11	22	31	50	67
31	2	3	11	18	34	48
32	2	3	11	18	34	48
34	3	5	16	26	48	69
41	3	5	10	14	22	30
42	5	8	20	30	52	72
43	0	0	1	1	2	4
44	3	4	10	16	26	37
45	5	7	11	15	20	26
46	8	12	24	34	53	71
47	4	6	13	19	30	41
48	6	10	20	30	48	66
49	0	0	1	1	8	12
50	3	4	9	12	20	26
51	17	27	53	76	118	159
52	3	4	6	9	12	15
53	5	8	14	20	30	40
54	8	11	17	23	32	42
55	4	6	10	14	21	28
56	4	7	14	21	34	46
57	10	16	35	52	84	116

TABLE 13

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

Sub-Basin	2-Year		10-Year		100-Year	
	6-Hr.	24-Hr.	6-Hr.	24-Hr.	6-Hr.	24-Hr.
58	0	1	2	2	4	6
61	5	8	27	43	78	113
90	3	4	15	21	43	58
91	3	4	15	22	42	60
92	4	6	13	19	29	40
93	1	1	7	11	26	39
94	3	4	15	23	44	64
95	2	3	12	20	38	57
96	9	13	29	40	67	88
97	0	1	5	6	19	22
98	2	3	7	10	16	22
99	2	3	10	16	30	43
408	39	39	88	145	380	499
500	6	5	23	44	162	204
501	0	0	23	60	246	310
502	0	0	17	33	172	179
503	64	72	175	199	572	575
510	16	16	74	130	383	466
511	1	1	31	63	227	272
512	0	1	29	54	204	227
520	32	35	142	242	563	705
521	61	104	237	297	611	706
522	0	4	50	80	276	309
530	72	152	379	520	926	1128
531	143	172	327	357	689	739
532	69	97	219	260	524	570
533A	1	2	4	6	11	13
533B	54	69	132	160	320	377

TABLE 13

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

Sub-Basin	2-Year		10-Year		100-Year	
	6-Hr.	24-Hr.	6-Hr.	24-Hr.	6-Hr.	24-Hr.
533C	26	35	64	77	150	172
533D	19	21	41	43	98	102
533E	3	4	7	9	16	20
533F	13	17	32	41	77	92
533G	15	18	36	45	89	105
533H	12	15	24	29	47	56
533I	21	25	44	50	97	111
533J	13	16	25	31	49	58
533K	12	14	27	34	67	80
534	53	77	197	224	601	601
535	58	89	223	279	604	697
540	20	30	127	279	840	1015
541	0	0	12	43	173	231
542	1	1	31	77	252	329
550	17	23	1763	1980	3233	3700
551	2	2	14	82	362	542
552	27	31	97	237	755	932
553	10	33	185	343	768	1023
554	22	24	70	99	270	297
555	20	24	89	141	360	443
556	13	13	55	96	283	338
560	16	33	172	341	795	1080
571	32	70	212	311	798	920
581	132	131	257	352	602	639

Kb Estimation For New River Watershed

Sub Basin.	Type D	Type C	Type B	Type A	Weighted m %	Weighted b%	Area Acres	Kb
408	0.0%	51.0%	29.3%	19.7%	-0.01801	0.10782	688.64	0.0567
500	0.0%	72.7%	27.3%	0.0%	-0.02193	0.13089	262.53	0.0778
501	0.0%	100.0%	0.0%	0.0%	-0.02500	0.15000	335.49	0.0869
502	0.0%	100.0%	0.0%	0.0%	-0.02500	0.15000	353.73	0.0863
510	0.0%	72.3%	27.7%	0.0%	-0.02188	0.13061	400.19	0.0737
511	0.0%	94.5%	5.5%	0.0%	-0.02438	0.14615	279.42	0.0865
512	0.0%	100.0%	0.0%	0.0%	-0.02500	0.15000	299.84	0.0881
520	0.0%	68.3%	31.7%	0.0%	-0.02143	0.12781	431.87	0.0713
521	0.0%	0.0%	100.0%	0.0%	-0.01375	0.08000	394.88	0.0443
522	0.0%	74.3%	25.7%	0.0%	-0.02211	0.13201	325.12	0.0765
530	0.0%	25.7%	74.3%	0.0%	-0.01664	0.09799	525.12	0.0527
531	0.0%	40.0%	60.0%	0.0%	-0.01825	0.10800	418.82	0.0601
532	0.0%	41.1%	58.9%	0.0%	-0.01837	0.10877	333.63	0.0624
534	0.0%	65.6%	0.0%	34.4%	-0.01855	0.11216	573.44	0.0610
535	0.0%	13.1%	42.1%	44.8%	-0.01186	0.07125	410.88	0.0402
540	0.0%	100.0%	0.0%	0.0%	-0.02500	0.15000	1436.16	0.0711
541	0.0%	100.0%	0.0%	0.0%	-0.02500	0.15000	298.88	0.0881
542	0.0%	64.7%	35.3%	0.0%	-0.02103	0.12529	313.34	0.0728
550	0.0%	100.0%	0.0%	0.0%	-0.02500	0.15000	1245.44	0.0726
551	0.0%	98.6%	1.4%	0.0%	-0.02484	0.14902	926.72	0.0753
552	0.0%	93.1%	5.7%	1.2%	-0.02413	0.14469	1526.40	0.0679
553	0.0%	40.0%	54.8%	5.2%	-0.01786	0.10592	597.25	0.0563
554	0.0%	55.6%	22.7%	21.7%	-0.01838	0.11024	345.34	0.0636
555	0.0%	64.4%	16.3%	19.3%	-0.01955	0.11736	343.30	0.0678
556	0.0%	24.7%	66.0%	9.3%	-0.01583	0.09357	357.25	0.0532
560	0.0%	100.0%	0.0%	0.0%	-0.02500	0.15000	714.24	0.0787
571	0.0%	17.6%	67.7%	14.7%	-0.01463	0.08644	860.80	0.0435
581	0.0%	0.0%	52.6%	47.4%	-0.01020	0.06104	526.53	0.0333

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		Checked by	Date	Sheet No.
		For		

Time of Concentration, T_c Calculations

Compute T_c's for Sub-Basin Nos. 503 and 533A thru 533K for the following storm events: 10-year, 6-Hour; 10-year, 24-hour; and 100-year 24-hour.

The FCDMC study of the 91st Avenue Drain were developed for the 100-year, 6-Hour storm. This report did not contain the necessary hydrologic parameters (L, S & K_b) for the above basins to develop T_c's using the MCUHP1 program. Therefore, T_c's were developed for the above sub-basins by analyzing and extrapolating a relationship from the MCUHP1 results for Sub-Basin Nos. 512, 522, 532 and 554.

Based on this analysis, the following relationship was observed:

(1) For the 100-Year Storm Event,

$$T_{C,24Hr} = 1.075\, T_{C,6Hr}$$

(2) For the 10-Year Storm Event,

$$T_{C,6Hr} = 1.724\,(T_{C,6Hr})_{100\text{-}Yr}$$

$$T_{C,24Hr} = 1.563\,(T_{C,24Hr})_{100\text{-}Yr}$$

(3) For the 2-Year Storm Event,

Computations are the same as 10-Year storm.

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Time of Conc., T_c & Storage Coeff., R

#503 For $T_c = 1.00$ hr $\rightarrow$ $R = 0.85$ hr

$$R = K T_c^{1.11} \quad \text{where} \quad K = 0.37 A^{-0.57} L^{0.80}$$

$$K = \frac{R}{T_c^{1.11}} = \frac{0.85}{(1.00)^{1.11}} = 0.850$$

#533A For $T_c = 0.17$ hr $\rightarrow$ $R = 0.15$ hr

$$K = \frac{R}{T_c^{1.11}} = \frac{0.15}{(0.17)^{1.11}} = 1.072$$

#533B For $T_c = 0.29$ hr $\rightarrow$ $R = 0.25$ hr

$$K = \frac{0.25}{(0.29)^{1.11}} = 0.988$$

#533C For $T_c = 0.333$ hr $\rightarrow$ $R = 0.25$ hr

$$K = \frac{0.25}{(0.333)^{1.11}} = 0.847$$

#533D For $T_c = 0.680$ hr $\rightarrow$ $R = 0.50$ hr

$$K = \frac{0.50}{(0.68)^{1.11}} = 0.767$$

#533E For $T_c = 0.177$ hr $\rightarrow$ $R = 0.15$ hr

$$K = \frac{0.15}{(0.177)^{1.11}} = 1.025$$

#533F For $T_c = 0.241$ hr $\rightarrow$ $R = 0.200$ hr

$$K = \frac{0.200}{(0.241)^{1.11}} = 0.970$$

#533G For $T_c = 0.285$ hr $\rightarrow$ $R = 0.250$ hr

$$K = \frac{0.250}{(0.285)^{1.11}} = 1.007$$

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Time of Conc., T_c & Storage Coeff., R (Cont'd)

#533H For $T_c = 0.218$ hr → $R = 0.150$ hr

$$K = \frac{0.150}{(0.218)^{1.11}} = 0.813$$

#533I For $T_c = 0.433$ hr → $R = 0.300$ hr

$$K = \frac{0.300}{(0.433)^{1.11}} = 0.760$$

#533J For $T_c = 0.167$ hr → $R = 0.150$ hr

$$K = \frac{0.1500}{(0.167)^{1.11}} = 1.094$$

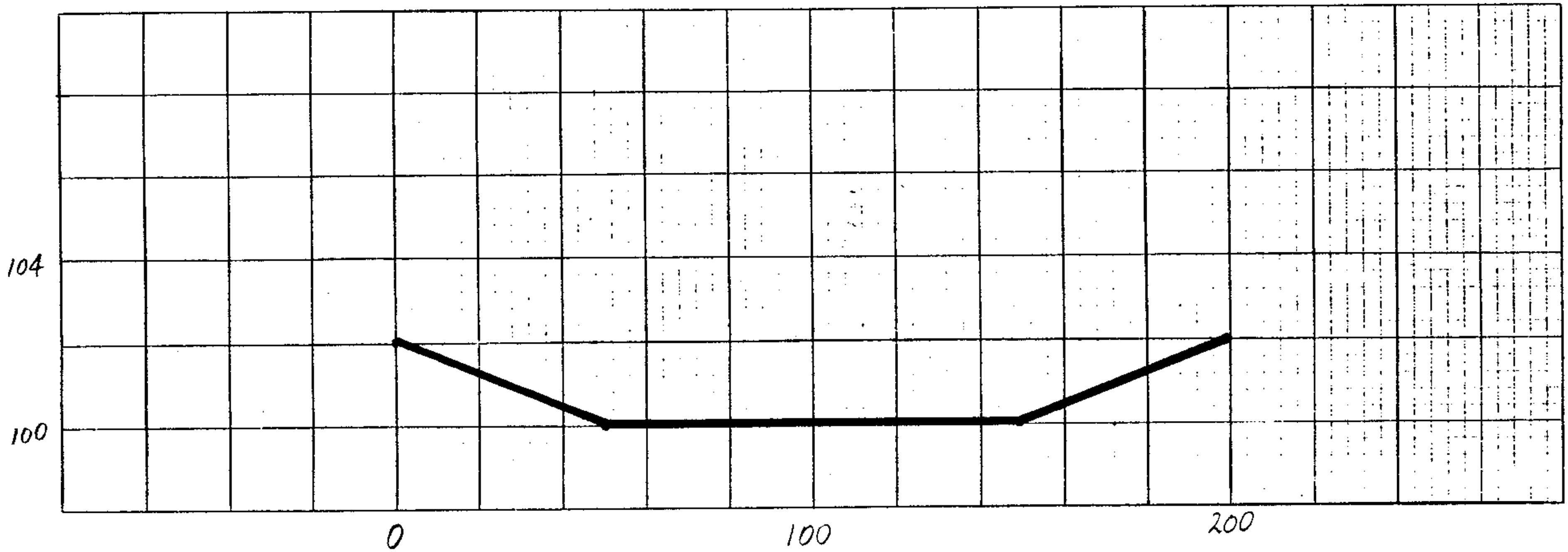
#533K For $T_c = 0.272$ hr → $R = 0.200$ hr

$$K = \frac{0.200}{(0.272)^{1.11}} = 0.848$$

SECTION IV
Hydrograph Routing Parameters

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM500



RS	7	FLOW	-1					
RC	0.040	0.030	0.040	5446	0.0060			
RX	0	25	50	80	120	150	175	200
RY	102	101	100	100	100	100	101	102

CALCULATED BY: Per FCDMC, Sept. 12, 1993

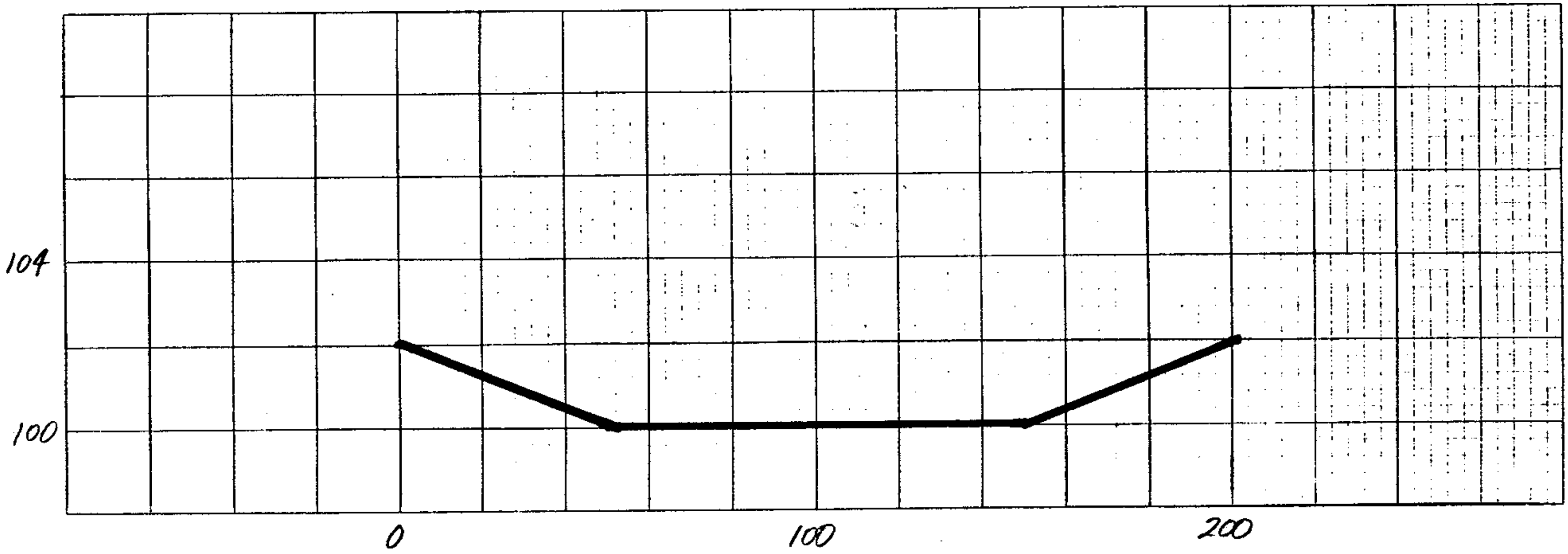
Avg V = 2.5 fps $d \approx 0.75'$

$NSTPS = \left(\frac{5446}{2.5}\right) \div 60 \div 4$

$= 9$

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM501



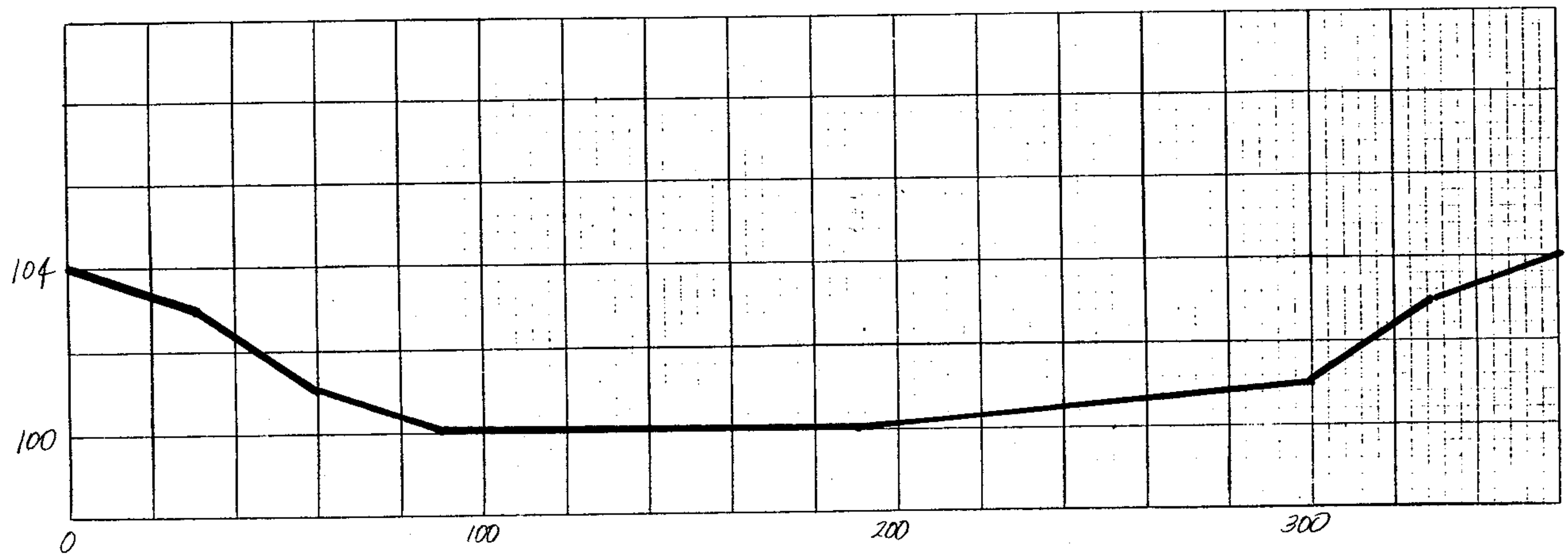
RS	12	FLOW	-1					
RC	0.040	0.030	0.040	7666	0.0044			
RX	0	25	50	80	120	150	175	200
RY	102	101	100	100	100	100	101	102

CALCULATED BY: Per FCDMC, Sept. 13, 1993

Avg. V: 2.7 fps d ≈ 1.2'
NSTPS = $\frac{7666}{2.7} \div 60 \div 4$
= 12

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM 502



RS	7	FLOW	-1					
RC	0.030	0.020	0.030	5280	0.0050			
RX	0	30	60	90	190	300	330	360
RY	104	103	101	100	100	101	103	104

CALCULATED BY: DLB

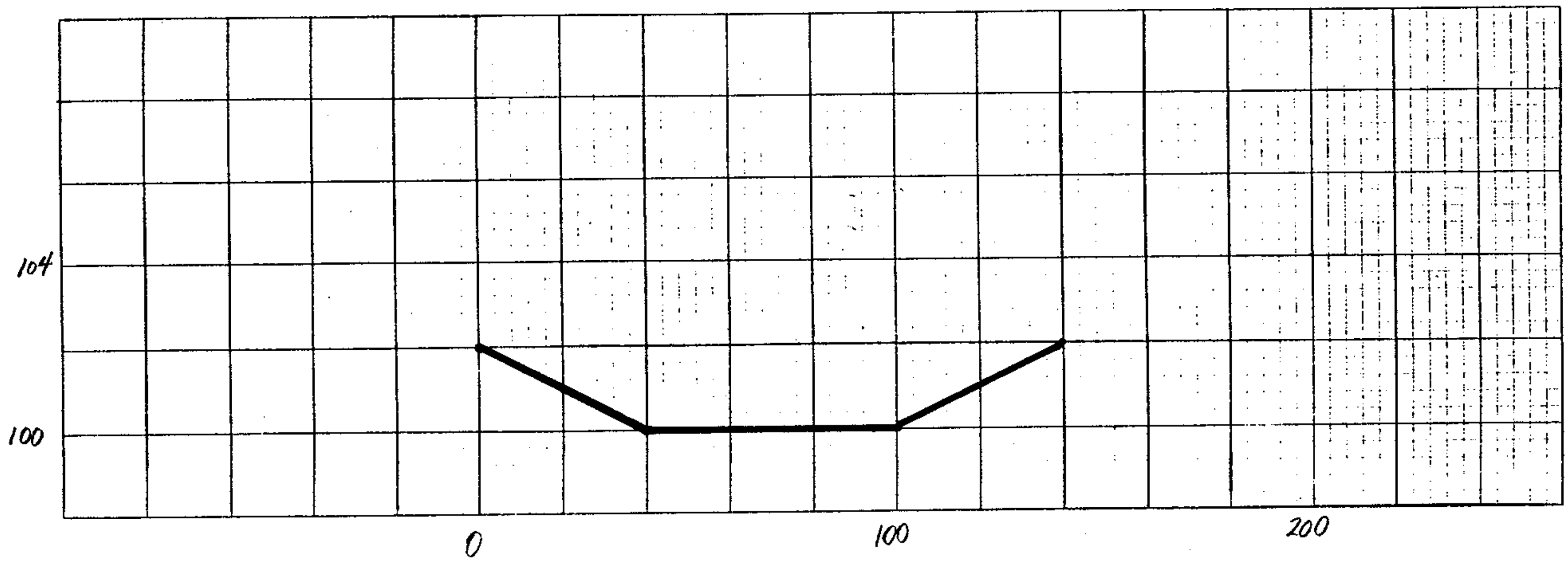
Avg V = 3.3 fps d = 1.0'

NSTEPS = $\frac{5280}{3.3} \div 60 \div 4$

= 7

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM503



RS	3	FLOW	-1					
RC	0.030	0.020	0.030	2080	0.0063			
RX	0	20	40	60	80	100	120	140
RY	102	101	100	100	100	100	101	102

CALCULATED BY: DLB

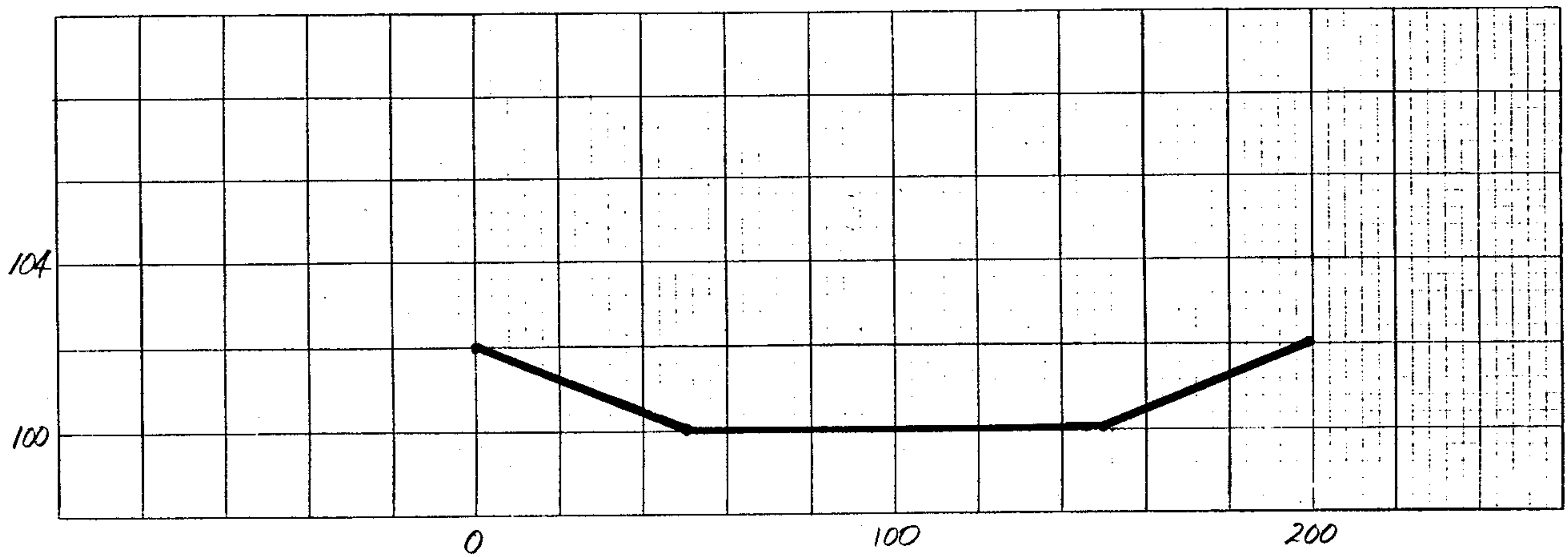
Avg. V = 2.5 fps d ≐ 0.40'

$NSTPS = \frac{2080}{2.5} \div 60 \div 4$

$= 3.4$

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM510



RD	7	FLOW	-1					
RC	0.040	0.030	0.040	5415	0.0065			
RX	0	25	50	80	120	150	175	200
RY	102	101	100	100	100	100	101	102

CALCULATED BY: Per FCDMC, Sept. 13, 1993

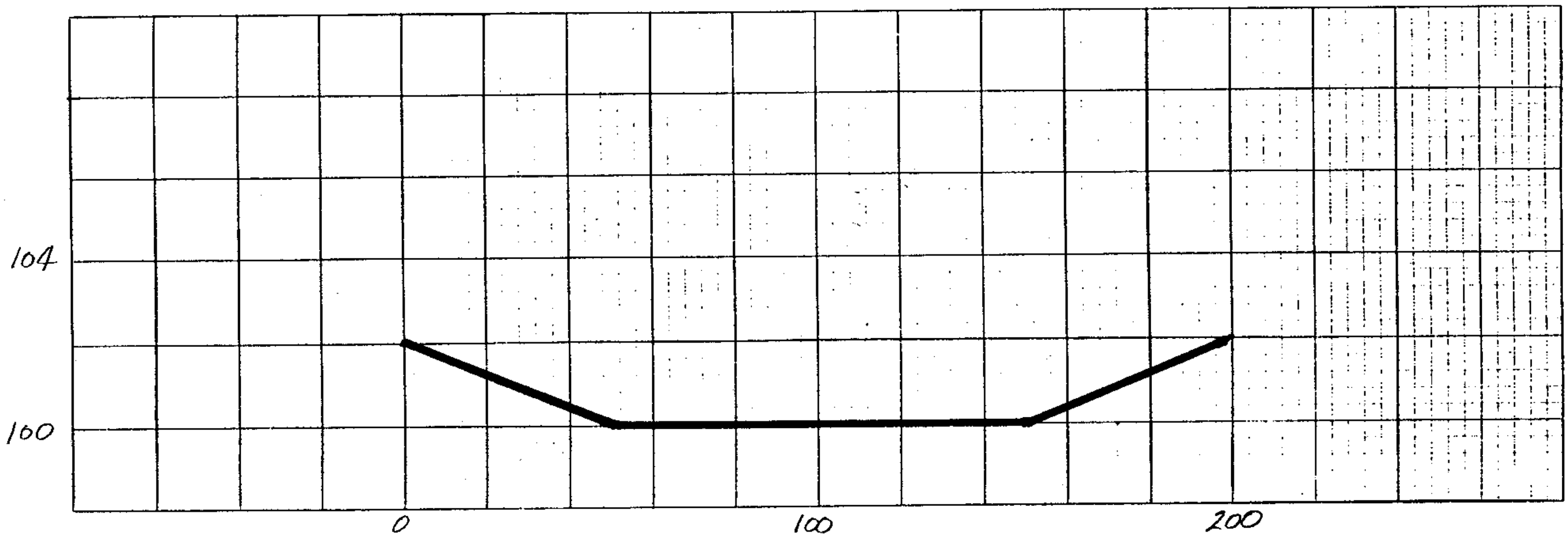
Avg. V = 3.2 fps d = 1.1'

NSTPS = $\frac{5415}{3.2} \div 60 \div 4$

= 7

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM511



RS	8	FLOW	-1					
RC	0.040	0.030	0.040	5909	0.0054			
RX	0	25	50	80	120	150	175	200
RY	102	101	100	100	100	100	101	102

CALCULATED BY: Per FCDMC, Sept. 13, 1993

Avg. V = 3.2 fps d = 1.2'

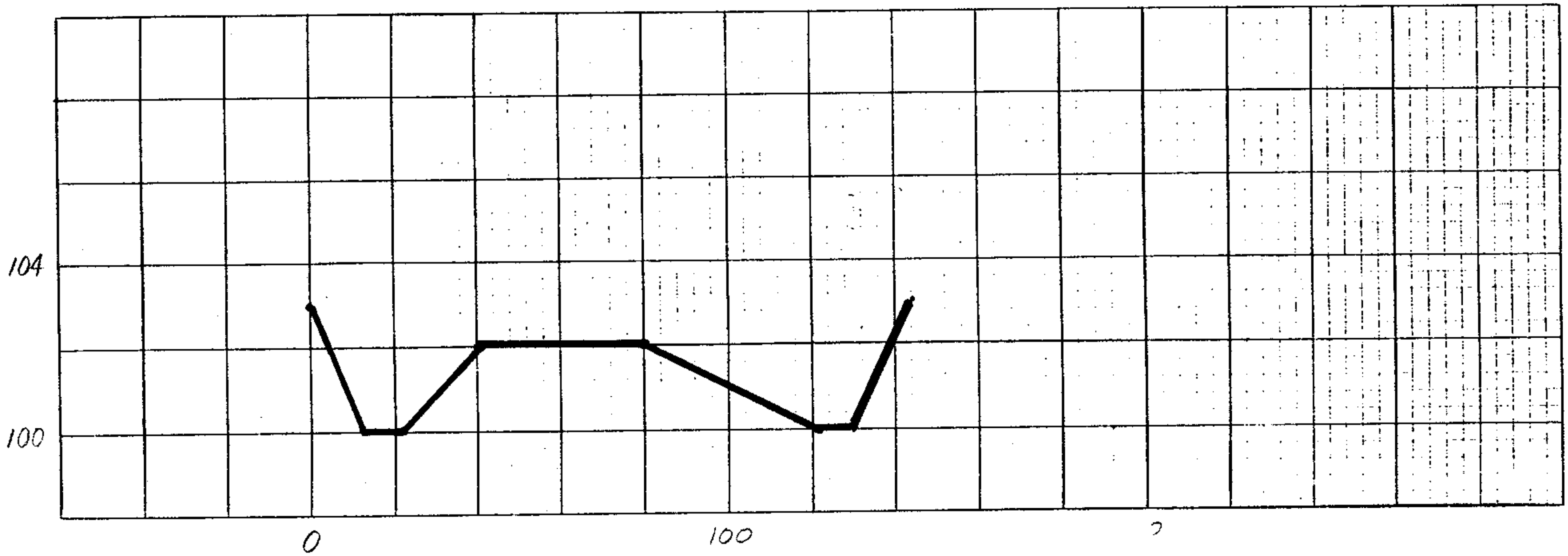
[illegible] = $\frac{5909}{3.2} \div 60 \div 4$

= 7.7

≈ 8

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM512



RS	2	FLOW	-1					
RC	0.020	0.015	0.020	2380	0.0045			
RX	0	12	22	40	80	121	131	143
RY	103	100	100	102	102	100	100	103

CALCULATED BY: DLB

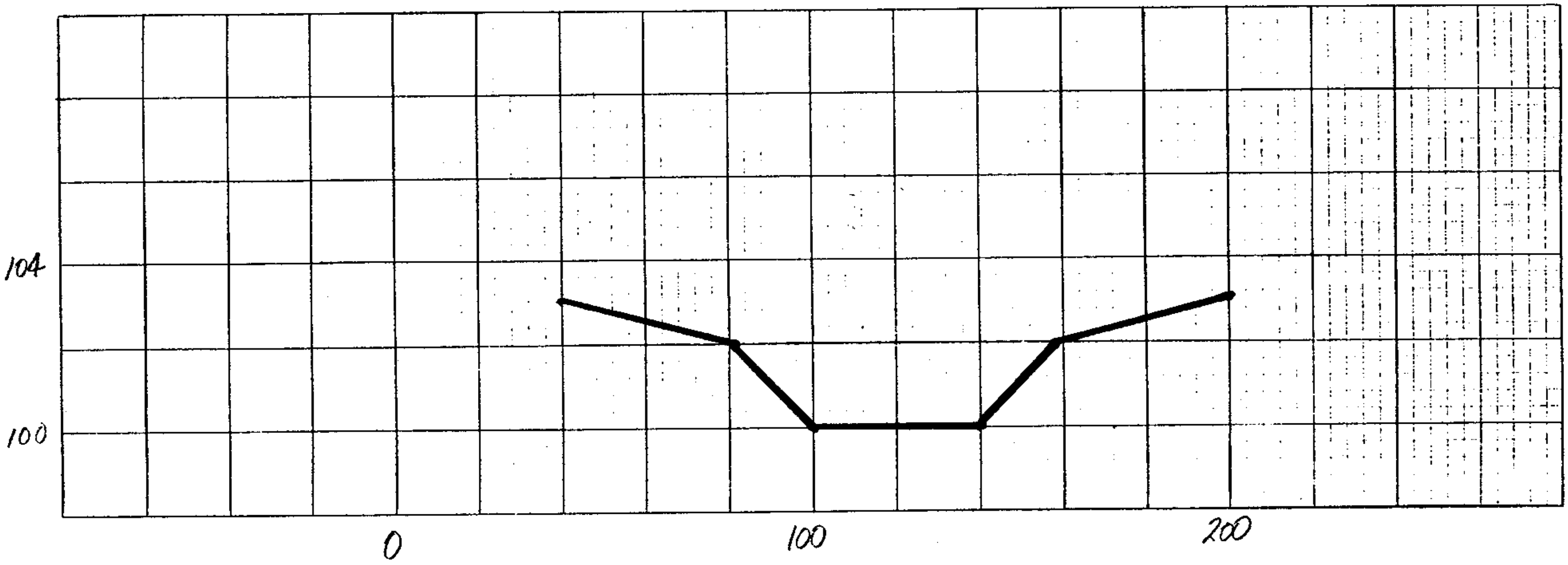
Avg. V = 5.7 fps d = 2.4'

NSTPS = $\left(\frac{2380}{5.7}\right) \div 60 \div 4$

= 2

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM520



RS	6	FLOW	-1					
RC	0.040	0.030	0.040	5886	0.0056			
RX	40	80	90	100	140	150	160	200
RY	103	102	101	100	100	101	102	103

CALCULATED BY: DLB 8-8-94

Avg. V = 4.2 fps d = 2'

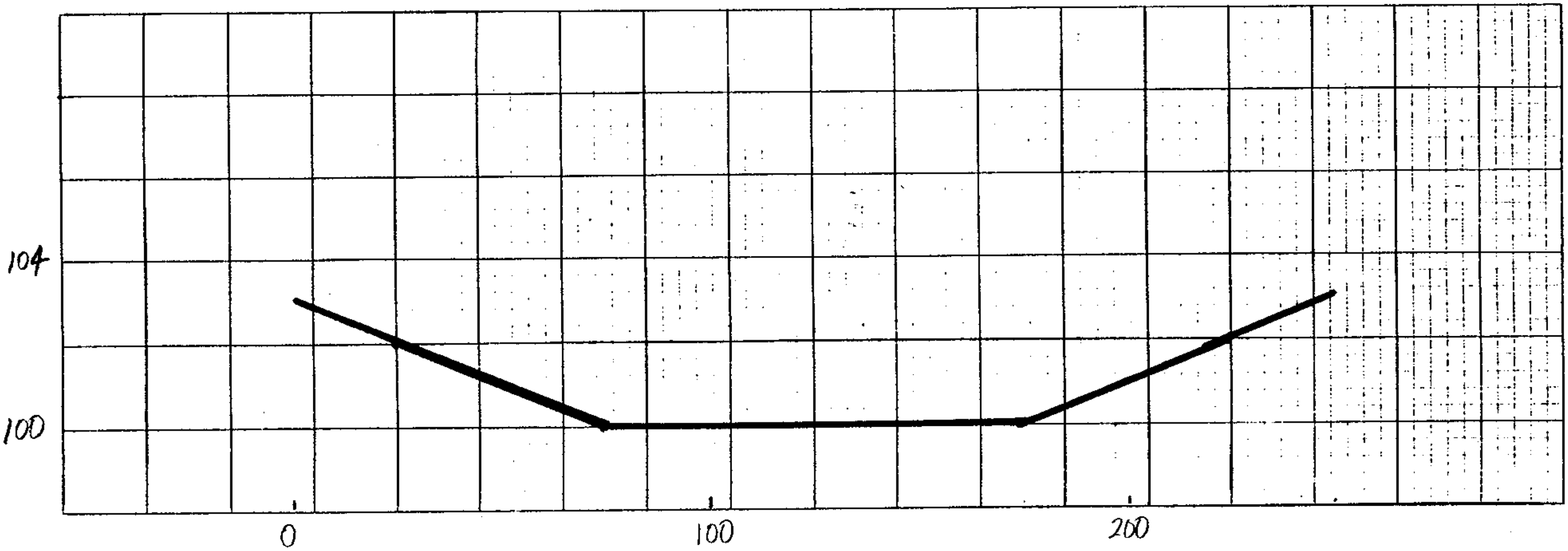
NSTPS = $\frac{5886}{4.2} \div 60 \div 4$

= 5.8

≈ 6

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM521



RS	7	FLOW	-1					
RC	0.040	0.030	0.040	6074	0.0049			
RX	0	50	75	105	145	175	200	250
RY	103	101	100	100	100	100	101	103

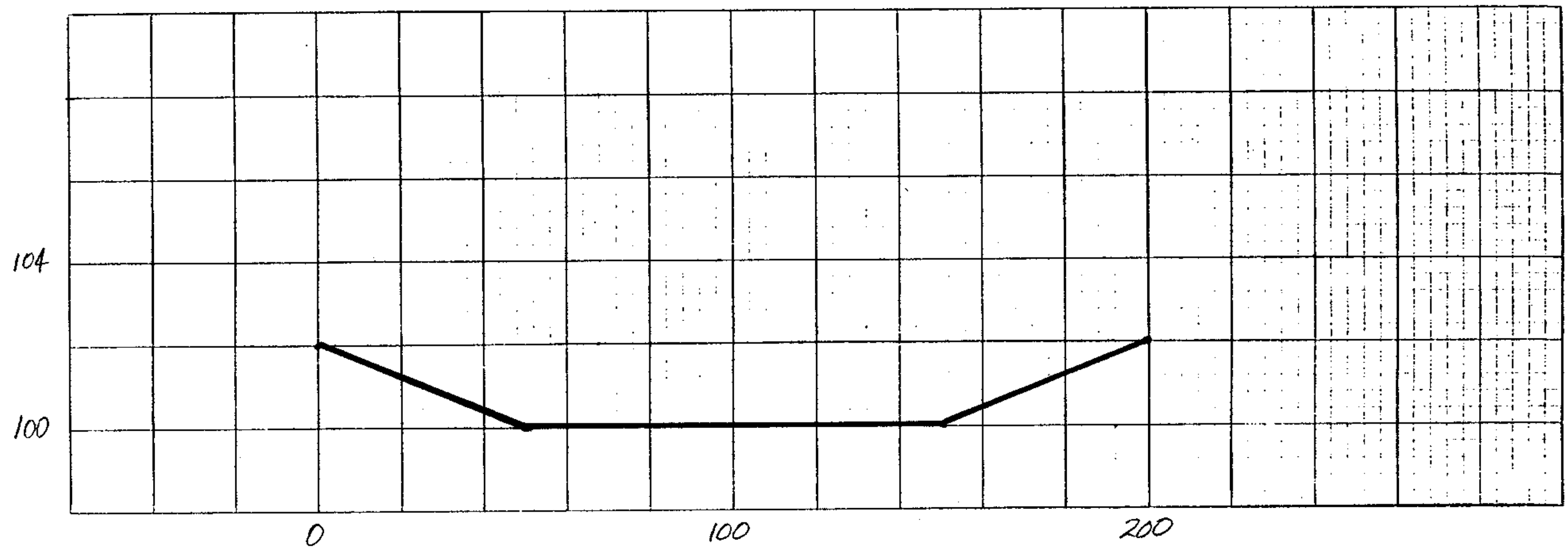
CALCULATED BY: Per FCDMC, Sept. 13, 1993

Avg. V = 3.8 fps d = 1.9'

NSTPS = $\frac{6074}{3.8} \div 60 \div 4$
≅ 7

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM530



RS	6	FLOW	-1					
RC	0.040	0.030	0.040	5688	0.0053			
RX	0	25	50	80	120	150	175	200
RY	102	101	100	100	100	100	101	102

CALCULATED BY: DLB

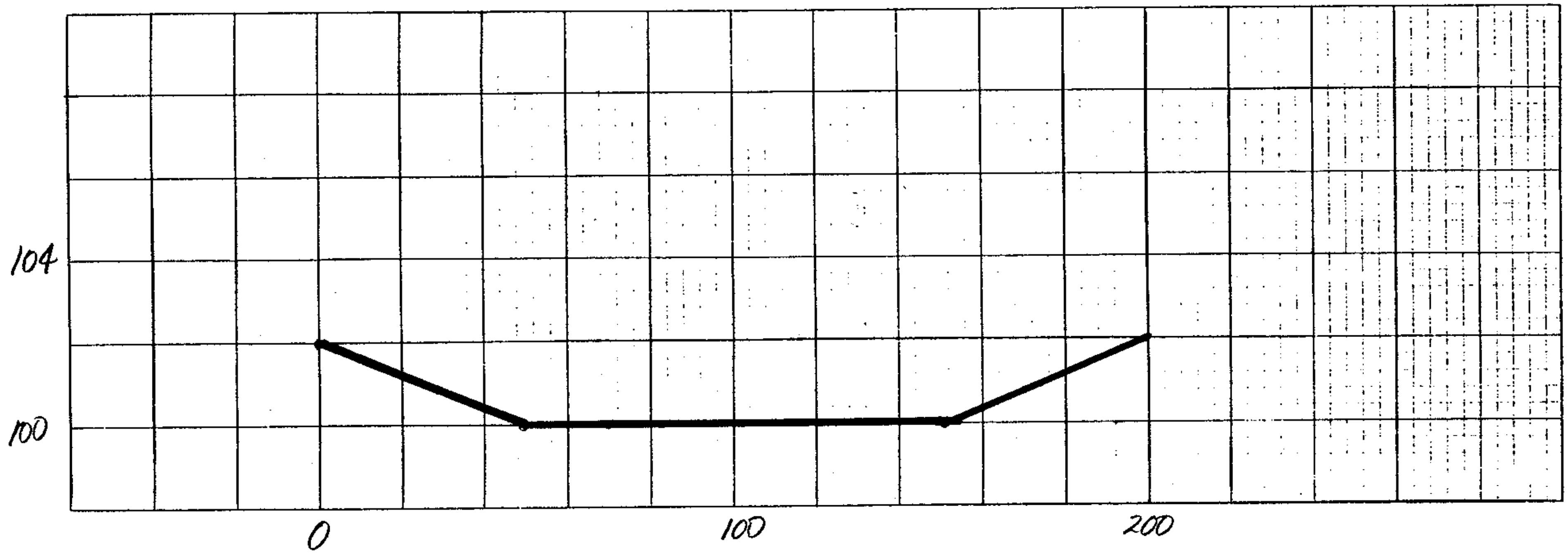
Avg. V= 3.9 fps d = 1.9'

NSTPS = $\frac{5688}{3.9}$ ÷ 60 ÷ 4

= 6

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM531



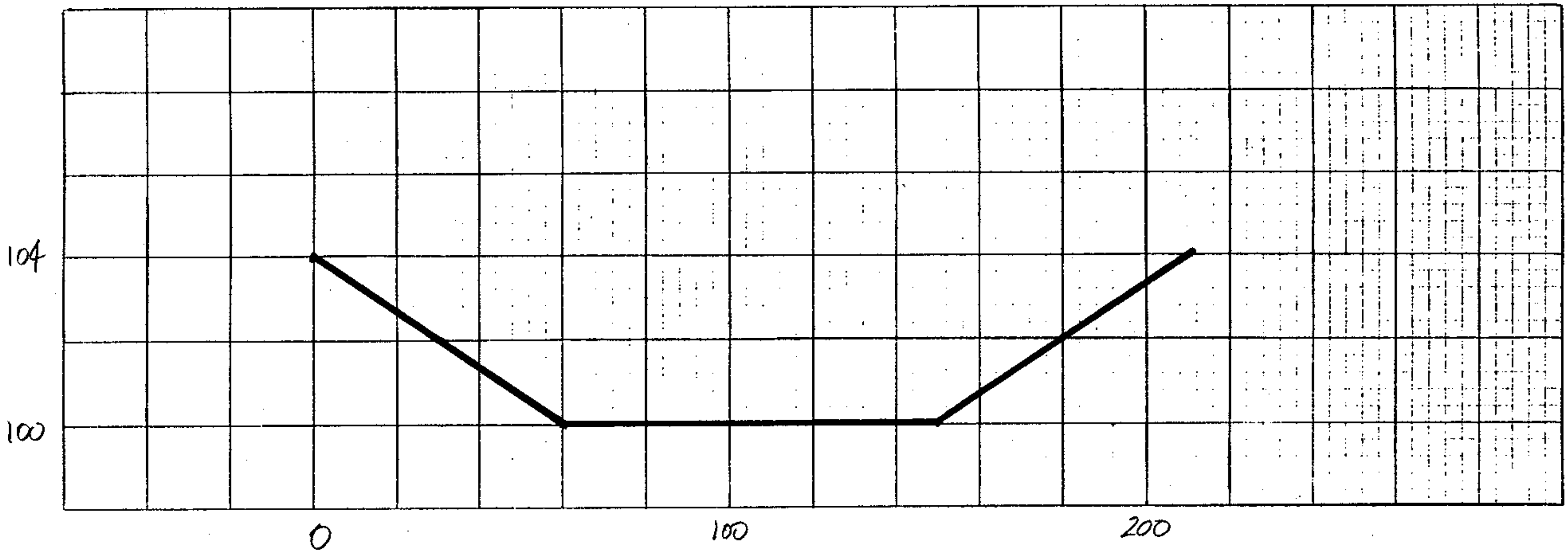
RS	7	FLOW	-1					
RC	0.040	0.030	0.040	6723	0.0043			
RX	0	50	75	105	145	175	200	250
RY	103	101	100	100	100	100	101	103

CALCULATED BY: Dov FOOMC, Sept. 13, 1993

Avg. V = 4.1 fps d = 2.5'
NSTPS = 7

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM522B



RS	2	FLOW	-1					
RC	0.040	0.030	0.040	1420	0.0018			
RX	0	30	60	90	120	150	180	210
RY	104	102	100	100	100	100	102	104

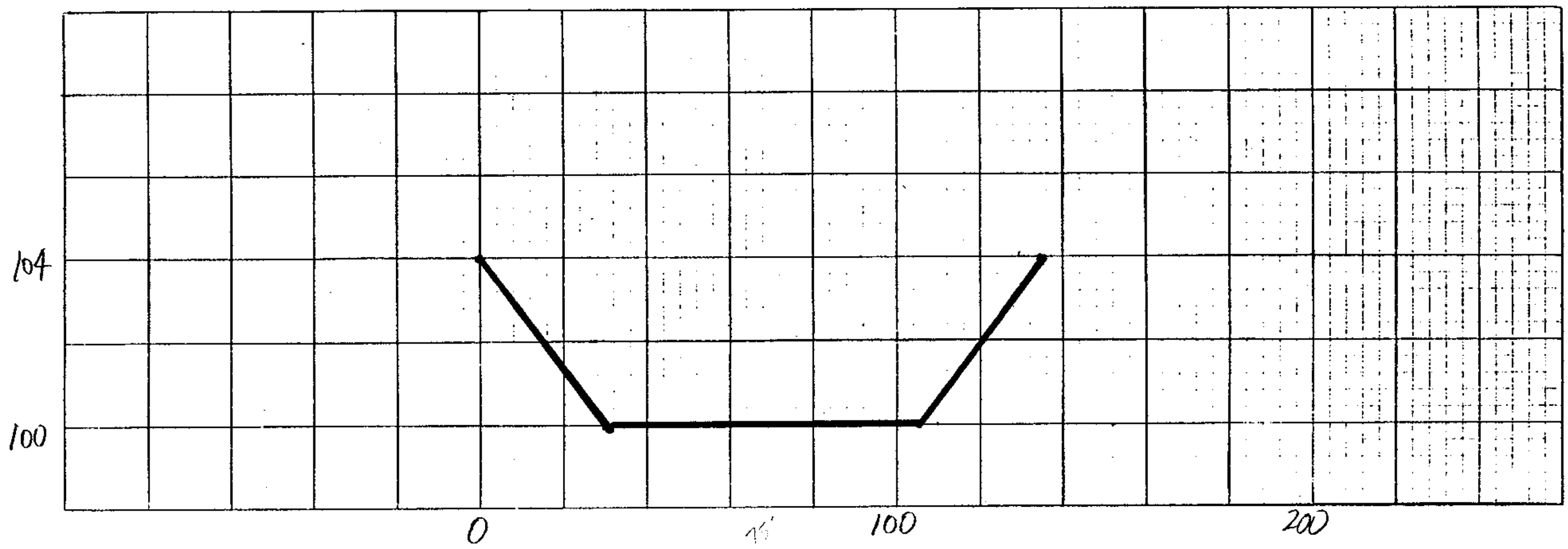
CALCULATED BY: DLB

Avg. V = 3.1 fps d = 3.0'

NSTPS = 2

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM522C



RS	1	FLOW	-1					
RC	0.030	0.020	0.030	1120	0.0032			
RX	0	15	30	60	80	105	120	135
RY	104	102	100	100	100	100	102	104

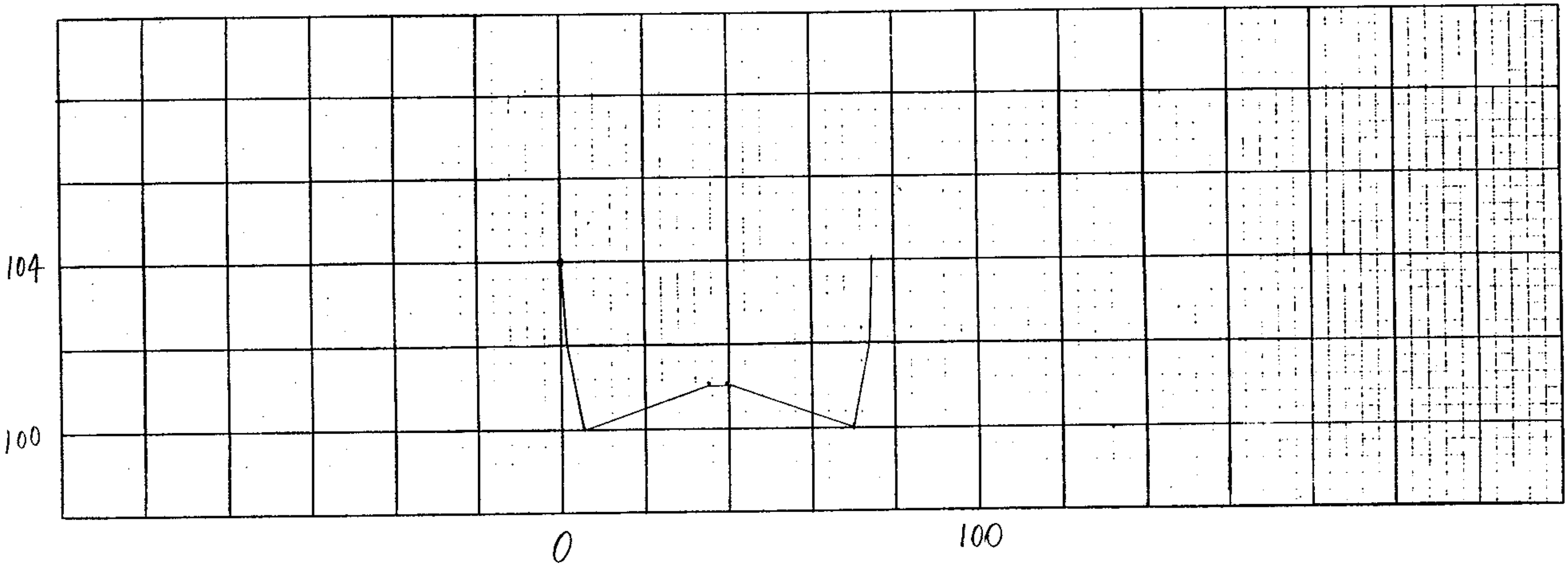
CALCULATED BY: DLB

Avg. V = 5.5 fps d = 2.5'

NSTPS = 10

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM533B

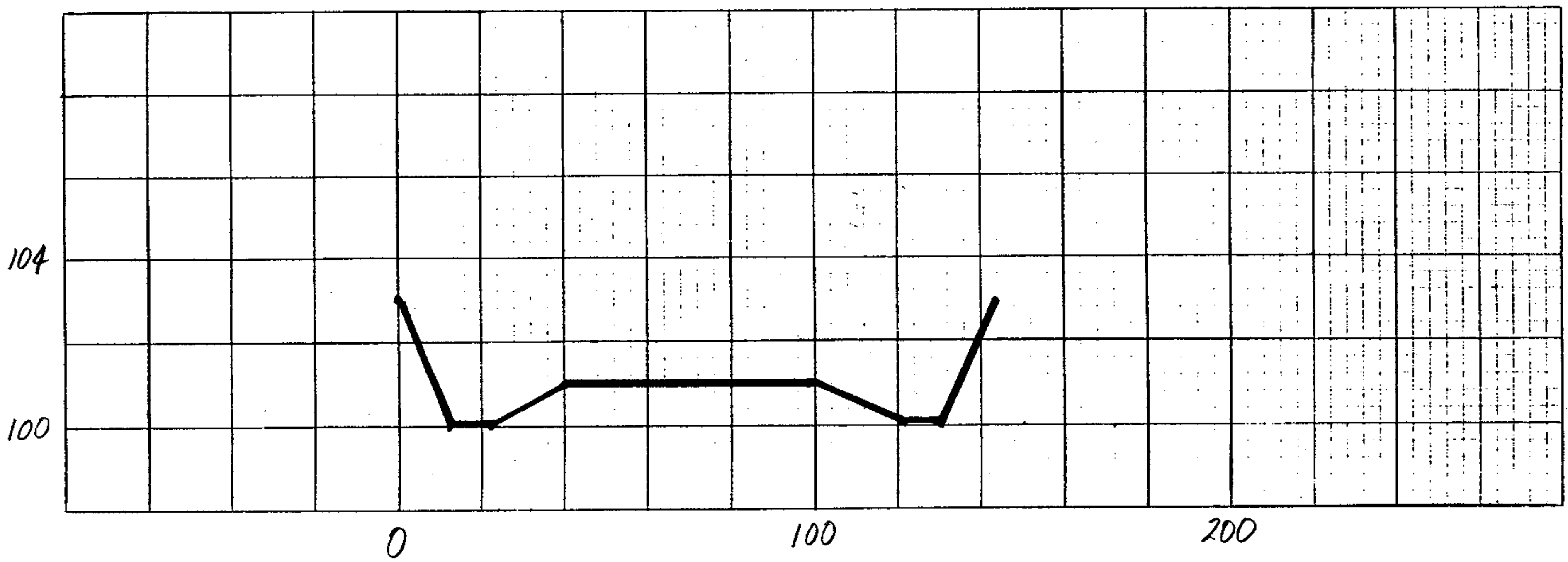


RS		FLOW	-1					
RC	0.015	0.015	0.015	1320	0.0037			
RX	0	1	5	35	40	70	74	75
RY	104	102	100	101	101	100	102	104

CALCULATED BY: DLB

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM533D



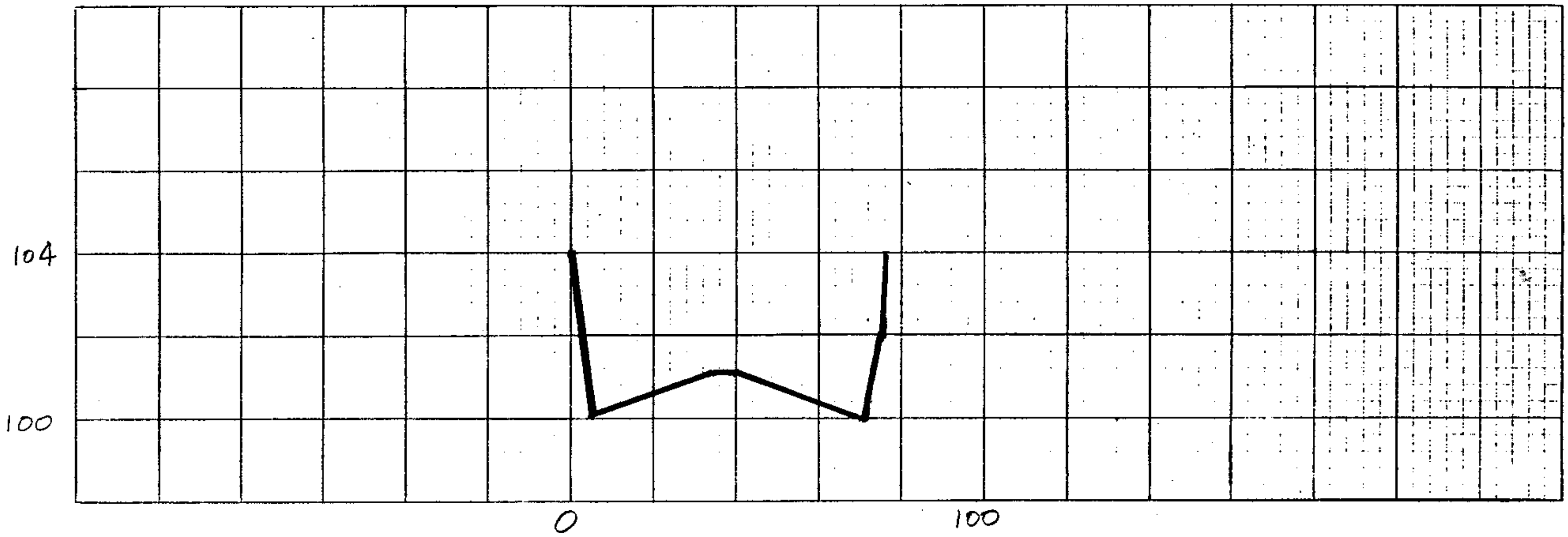
RS	4	FLOW	-1					
RC	0.025	0.020	0.025	5474	0.0044			
RX	0	12	22	40	100	121	131	143
RY	103	100	100	101	101	100	100	103

CALCULATED BY: DLB

Avg. V = 5.2fps d = 2'
NSTPS = 4

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM533E



RS	5	FLOW	-1					
RC	0.020	0.015	0.020	5560	0.0042			
RX	0	1	5	35	40	70	74	75
RY	104	102	100	101	101	100	102	104

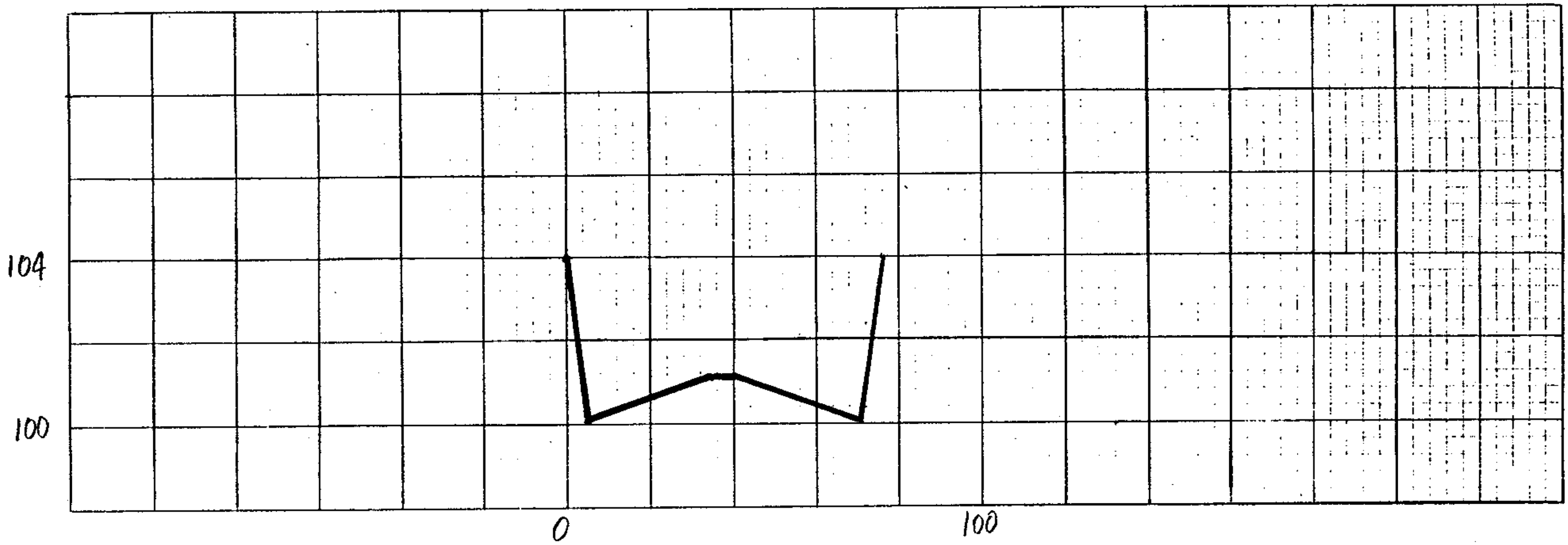
CALCULATED BY: Per FCDMC

Avg. V = 4.6 fps d = 1.5'

NSTPS = 5

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM533G



RS	4	FLOW	-1					
RC	0.020	0.015	0.020	5280	0.0049			
RX	0	1	5	35	40	70	74	75
RY	104	102	100	101	101	100	102	104

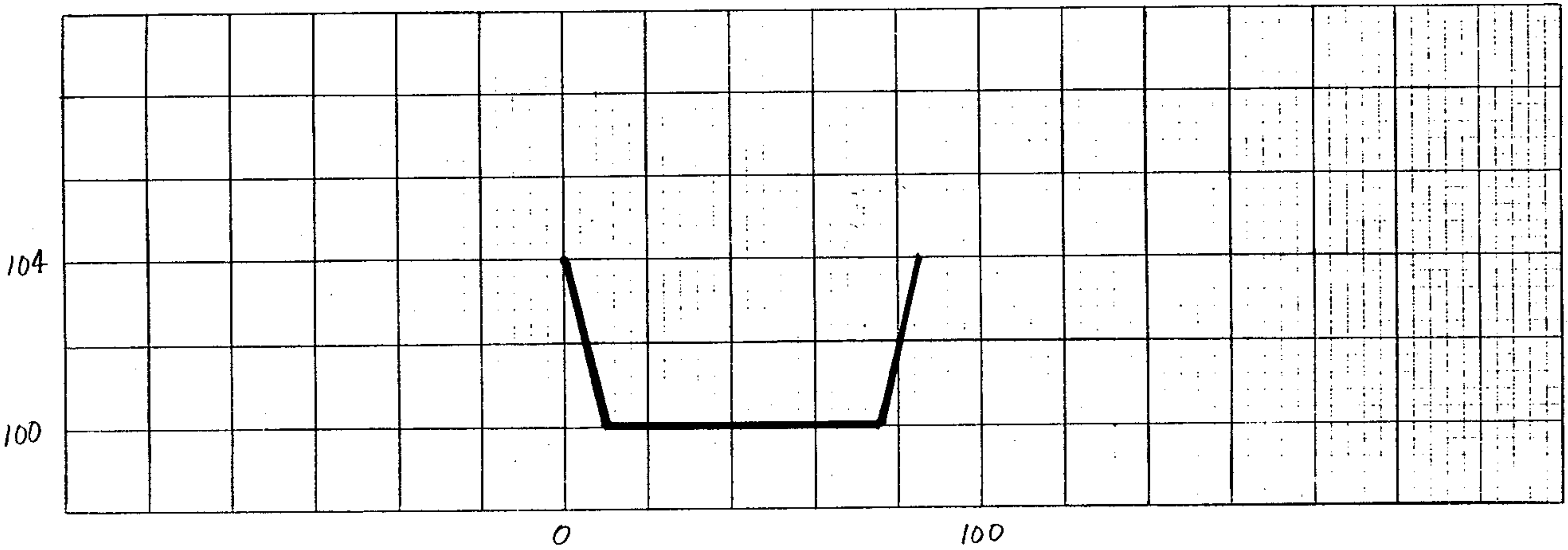
CALCULATED BY: Per FCDMC

Avg. V = 5.0 fps d = 1.5'

NSTPS = 4

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM534A



RS	3	FLOW	-1					
RC	0.030	0.020	0.030	5114	0.0041			
RX	0	5	10	40	65	75	80	85
RY	104	102	100	100	100	100	102	104

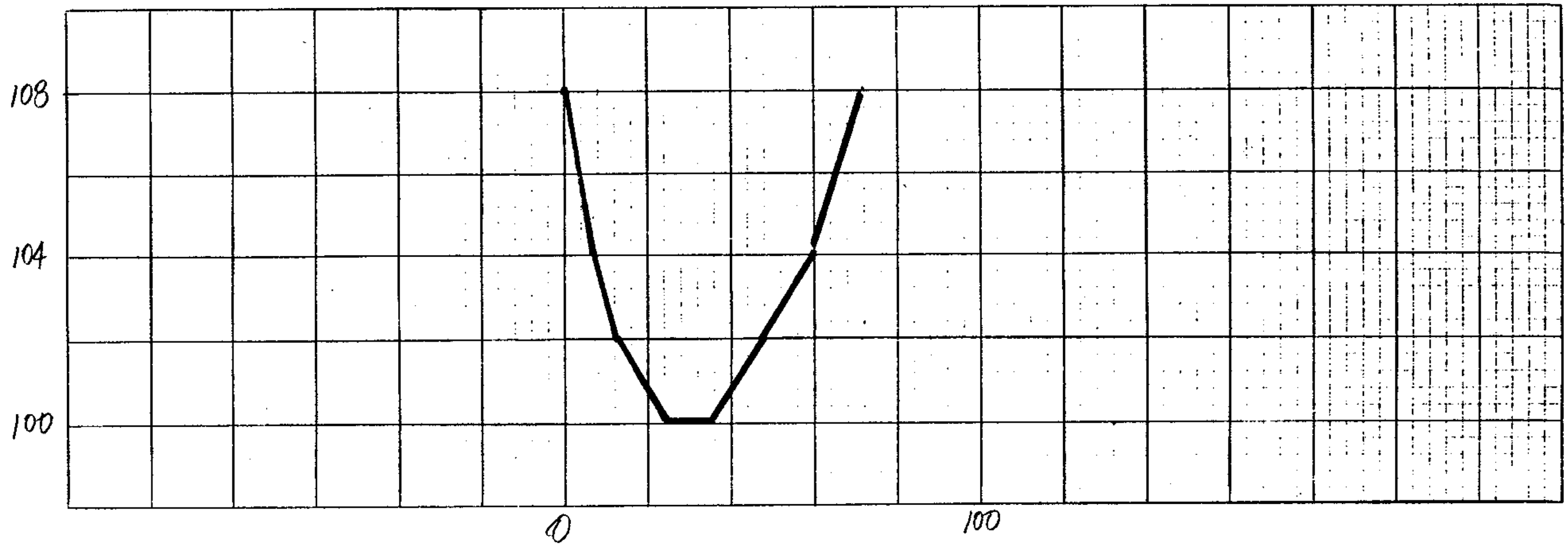
CALCULATED BY: Per FCDMC, Sept. 13, 1993

Avg. V = 7.1 d = 2.8'

NSTPS = 3

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM534E



RS	2	FLOW	-1					
RC	0.030	0.020	0.030	1250	0.0042			
RX	0	6	12	24	36	48	60	72
RY	108	104	102	100	100	102	104	108

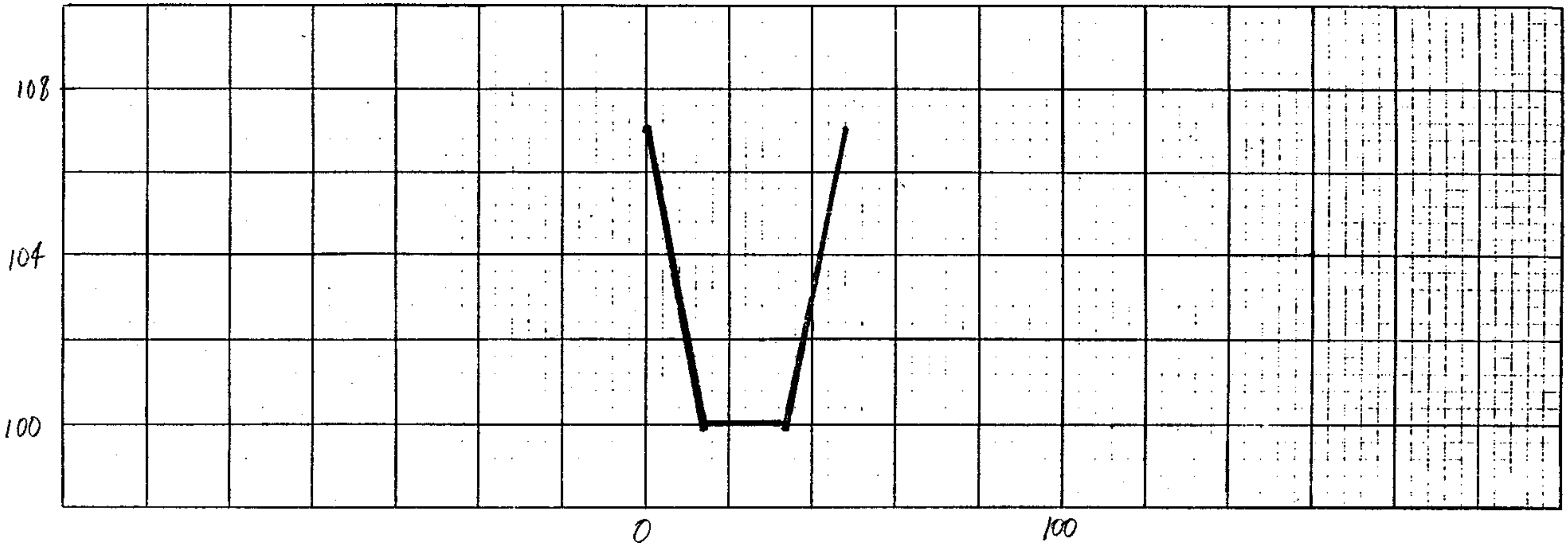
CALCULATED BY: DLB

Avg. V = 2.7 fps d = 0.5'

NSTPS = 2

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM535



RS	1	FLOW	-1					
RC	0.020	0.015	0.020	1720	0.0008			
RX	0	7	14	20	28	34	41	48
RY	107	103.5	100	100	100	100	103.5	107

CALCULATED BY: DLB

Avg. V= 6.3 fps d= 5.8'

NSTPS = 1

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM540

RS	5	FLOW	-1					
RC	0.040	0.040	0.040	5708	0.0058			
RX	40	80	180	200	225	245	260	300
RY	24	24	22	18	18	22	24	24

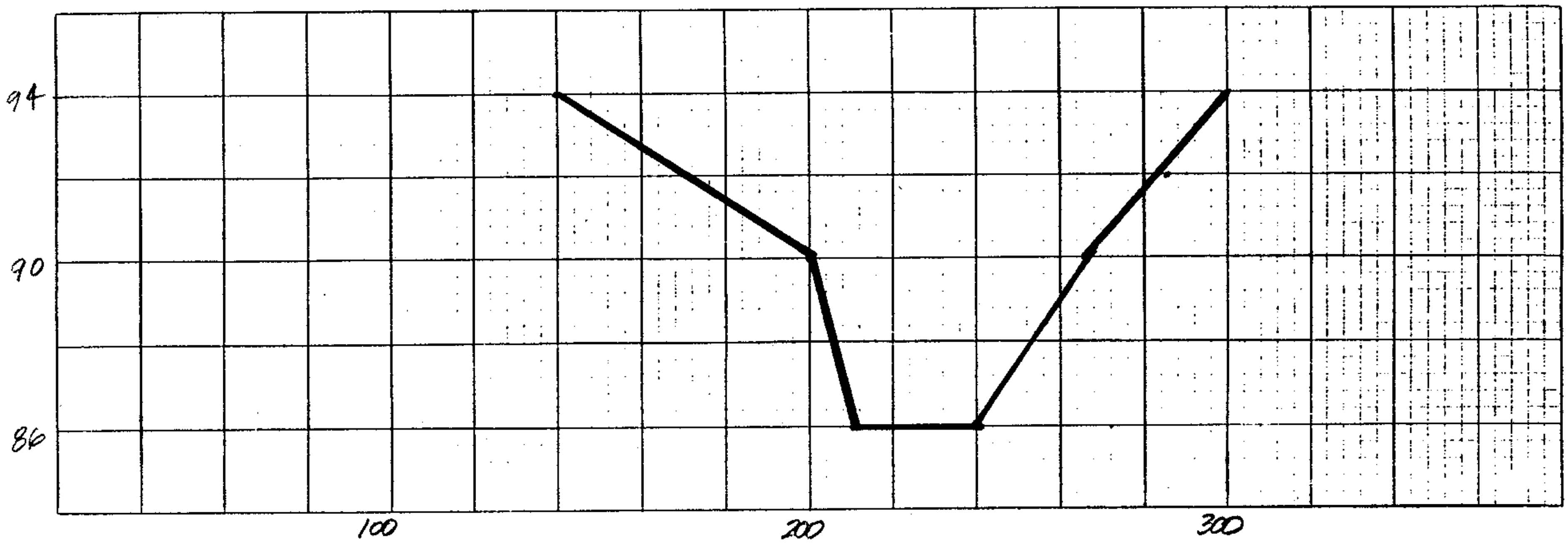
CALCULATED BY: DLB

Avg V = 4.8 fps d = 3'

NSTPS = 5 (4 hr)
= 7 (6 hr)

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM541



RS	5	FLOW	-1					
RC	0.040	0.040	0.040	5535	0.0054			
RX	140	170	200	210	240	265	285	300
RY	94	92	90	86	86	90	92	94

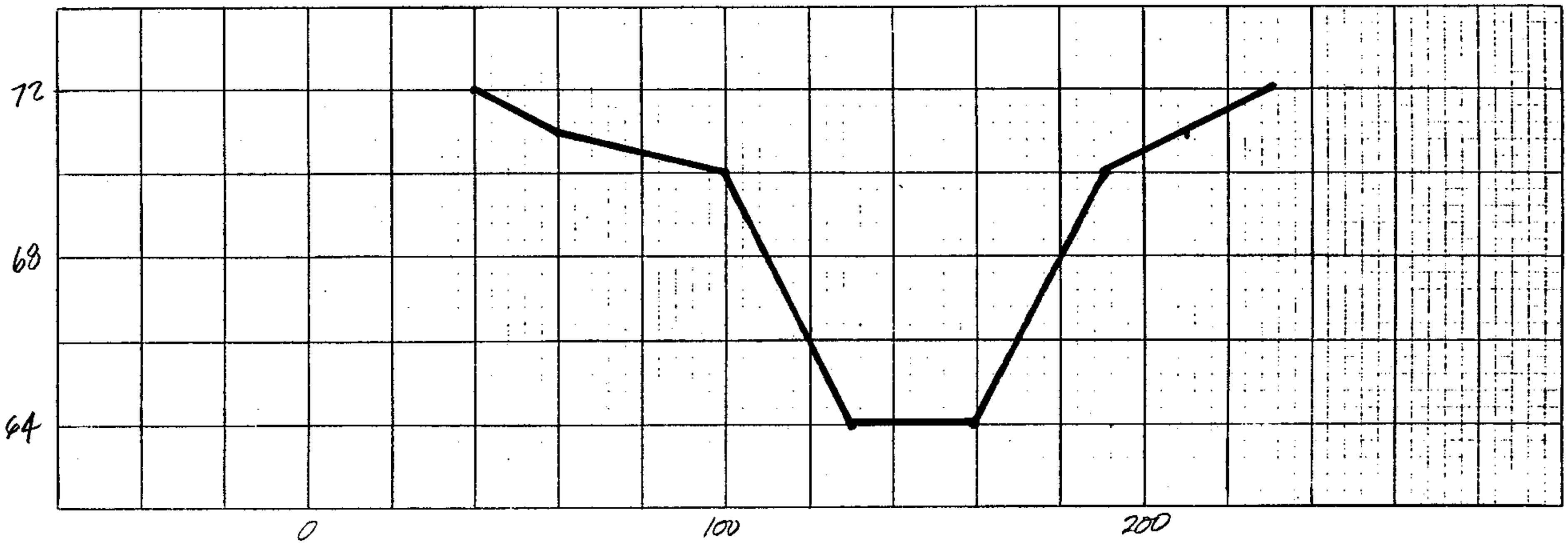
CALCULATED BY: DLB 8-10-94

Avg. V = 4.7 fps d = 3'

NSTPS = 5

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM542



RS	5	FLOW	-1					
RC	0.040	0.040	0.040	5557	0.0061			
RX	40	60	100	130	160	190	210	230
RY	72	71	70	64	64	70	71	72

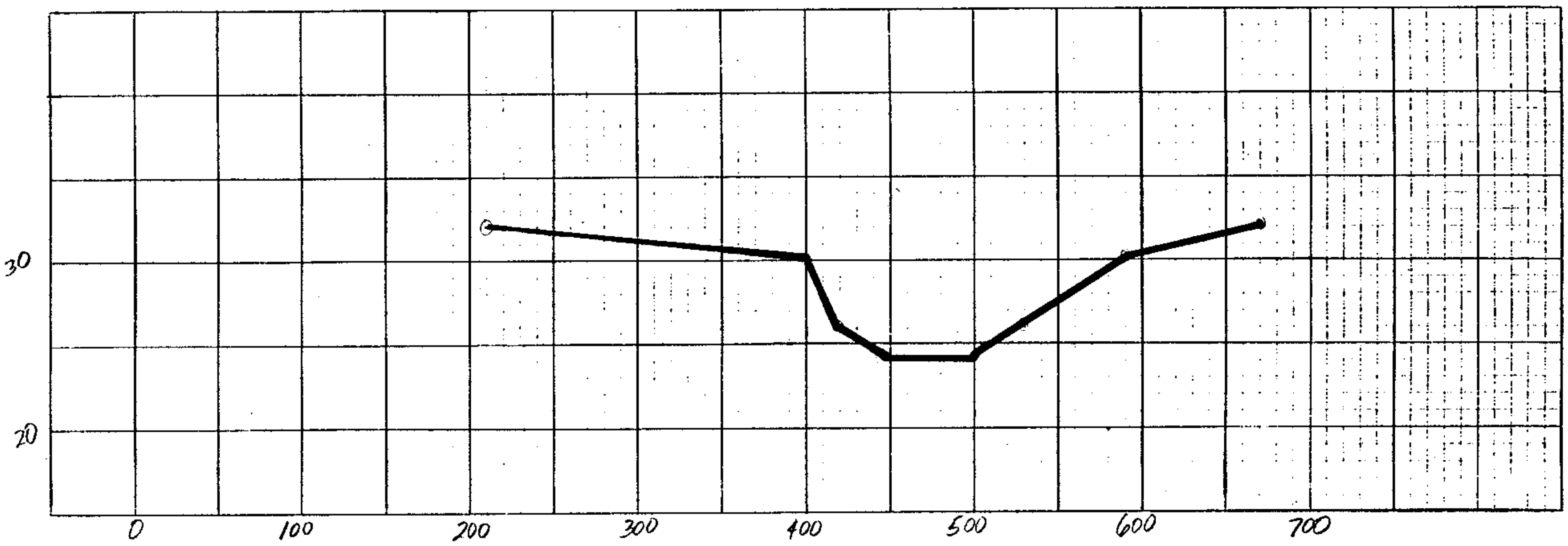
CALCULATED BY: DLB 8-10-94

Avg. V = 5.0 fps d = 3'

NSTPS = 5

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM550



RS	6	FLOW	-1					
RC	0.040	0.040	0.040	8432	0.0044			
RX	210	400	420	445	500	525	590	670
RY	32	30	26	24	24	26	30	32

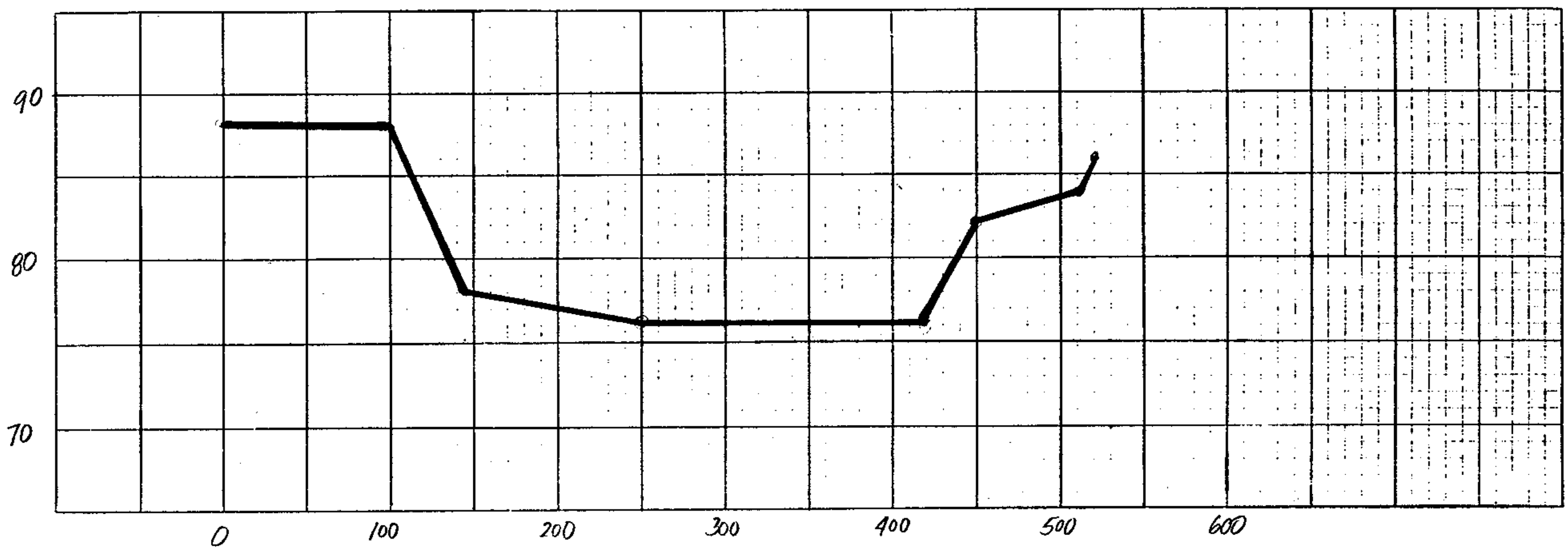
CALCULATED BY: DLB 8-10-94

Avg. V = 5.6 fps d = 5'

NSTPS = 6

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM551



RS	4	FLOW	-1					
RC	0.040	0.040	0.040	5663	0.0056			
RX	0	100	145	250	420	450	510	520
RY	88	88	78	76	76	82	84	86

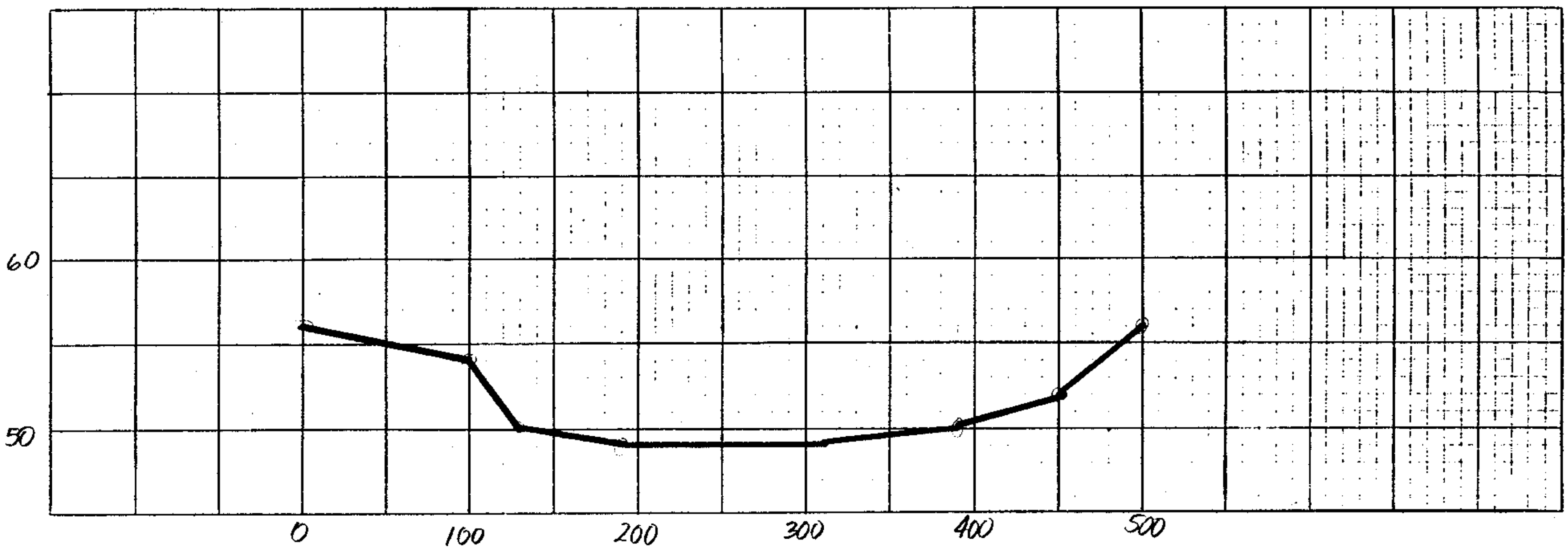
CALCULATED BY: DLB 8-10-94

Avg. V = 5.4 fps d = 3.2'

NSTPS = 4

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM552



RG	5	FLOW	-1					
RC	0.040	0.040	0.040	5971	0.0055			
RX	0	100	130	190	310	390	450	500
RY	56	54	50	48	48	50	52	56

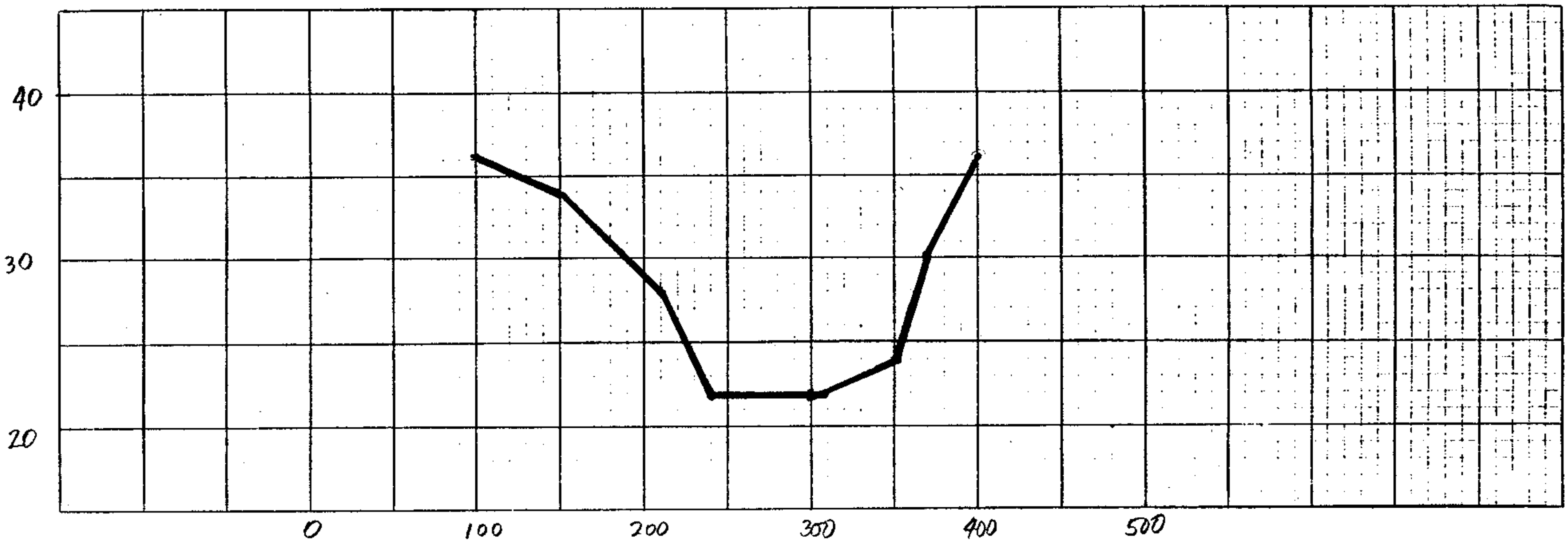
CALCULATED BY: DLB 8-10-94

Avg. V = 5.4 fps d = 3.8'

NSTPS = 5 ✓

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM553



RS	4	FLOW	-1					
RC	0.040	0.040	0.040	5660	0.0041			
RX	100	150	210	240	300	350	370	400
RY	36	34	28	22	22	24	30	36

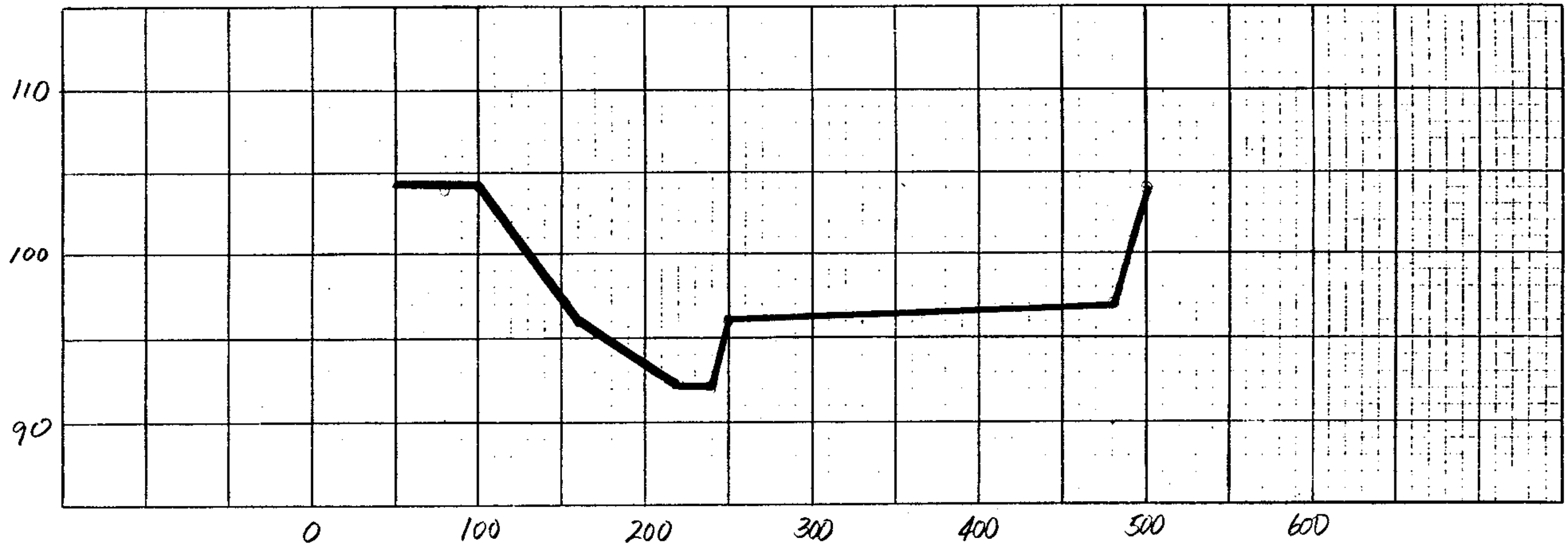
CALCULATED BY: DLB 8-11-94

Avg. V = 7.0 fps   d = 6.5

NSTPS ≅ 4

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM554



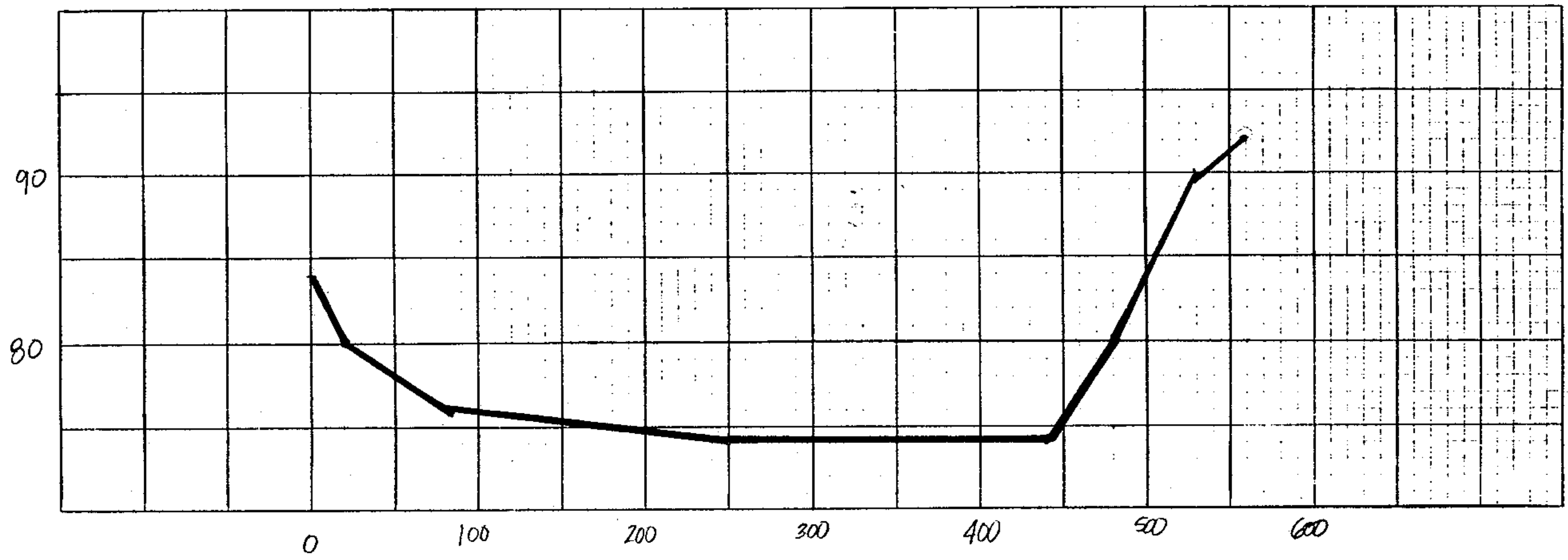
RS	4	FLOW	-1					
RC	0.040	0.040	0.040	5771	0.0047			
RX	80	100	160	220	240	250	480	500
RY	104	104	96	92	92	96	97	104

CALCULATED BY: DLB 8-11-94

Avg. V = 5.7 fps d = 7.2'
NSTPS ≦ 4

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM555



RS	5	FLOW	-1					
RC	0.040	0.040	0.040	7336	0.0054			
RX	0	20	80	250	440	480	530	560
RY	84	80	76	74	74	80	90	92

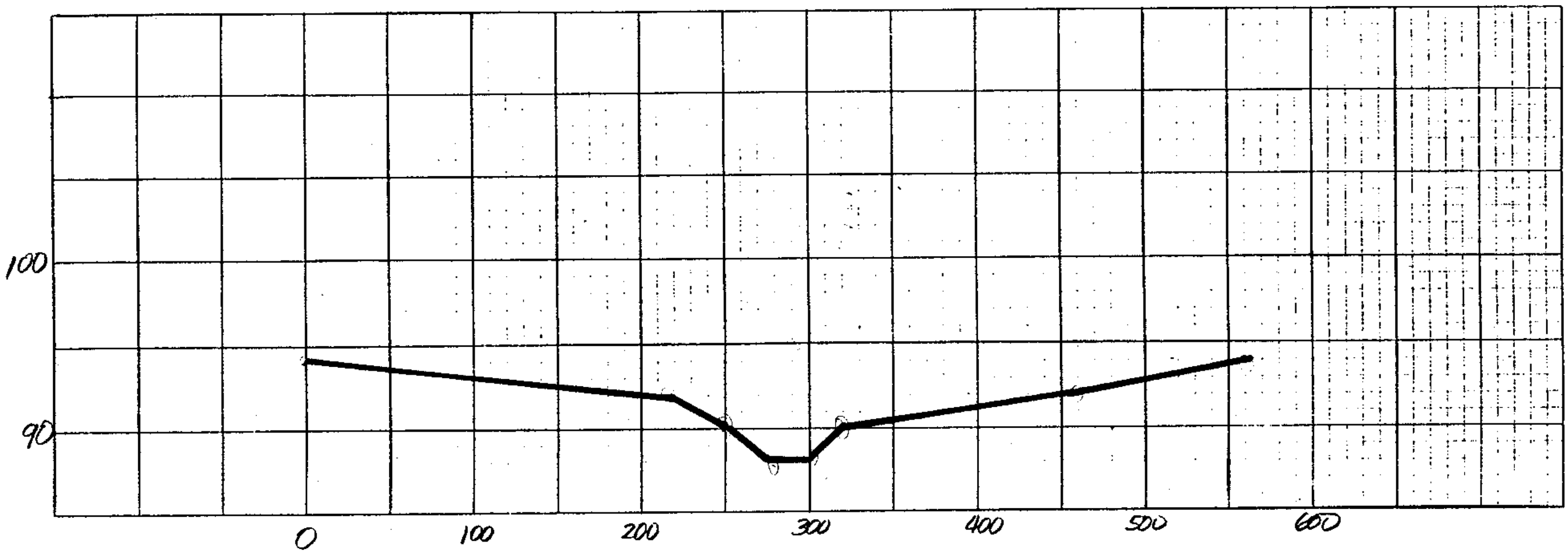
CALCULATED BY: DLB 8-10-94

Avg. V = 5.7 fps

NSTPS = 5

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM560



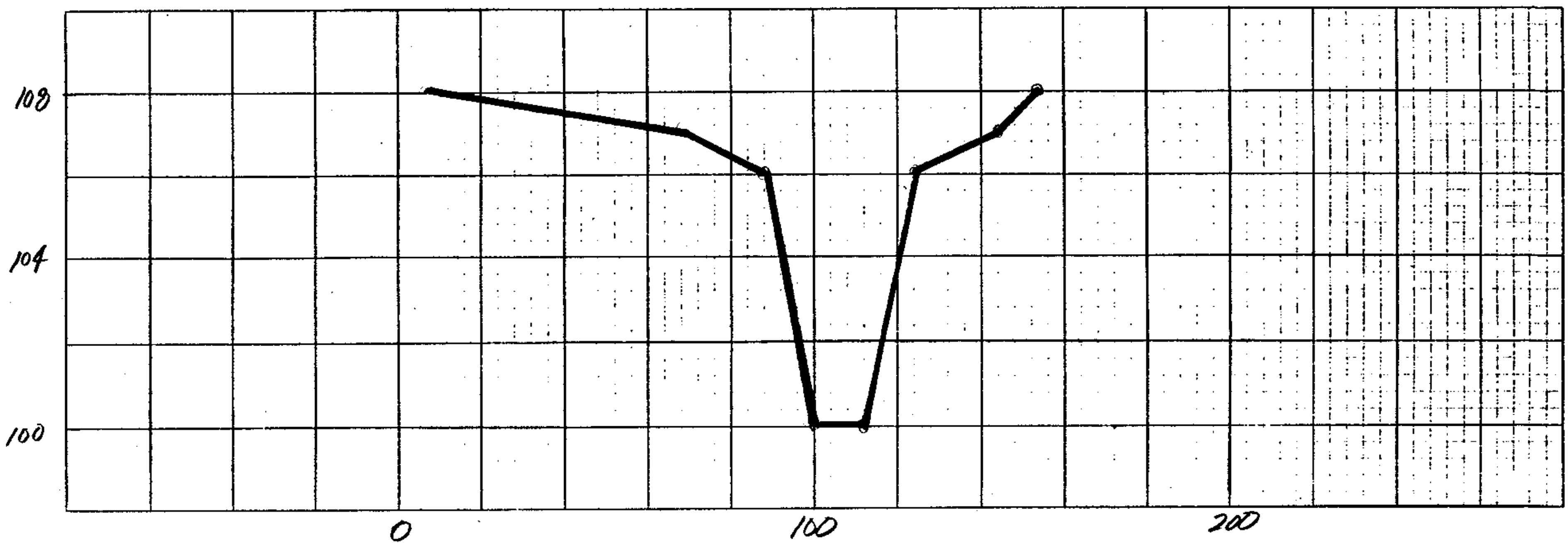
RS	12	FLOW	-1					
RC	0.030	0.040	0.030	14,187	0.0088			
RX	0	215	250	280	300	320	460	560
RY	94	92	90	88	88	90	92	94

CALCULATED BY: DLB 8-10-94

Avg. V = 4.7 fps   d = 3'
NSTPS = 12

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM570



RS	6	FLOW	-1					
RC	0.030	0.020	0.030	5301	0.0009			
RX	28	68	88	100	112	124	144	154
RY	108	107	106	100	100	106	107	108

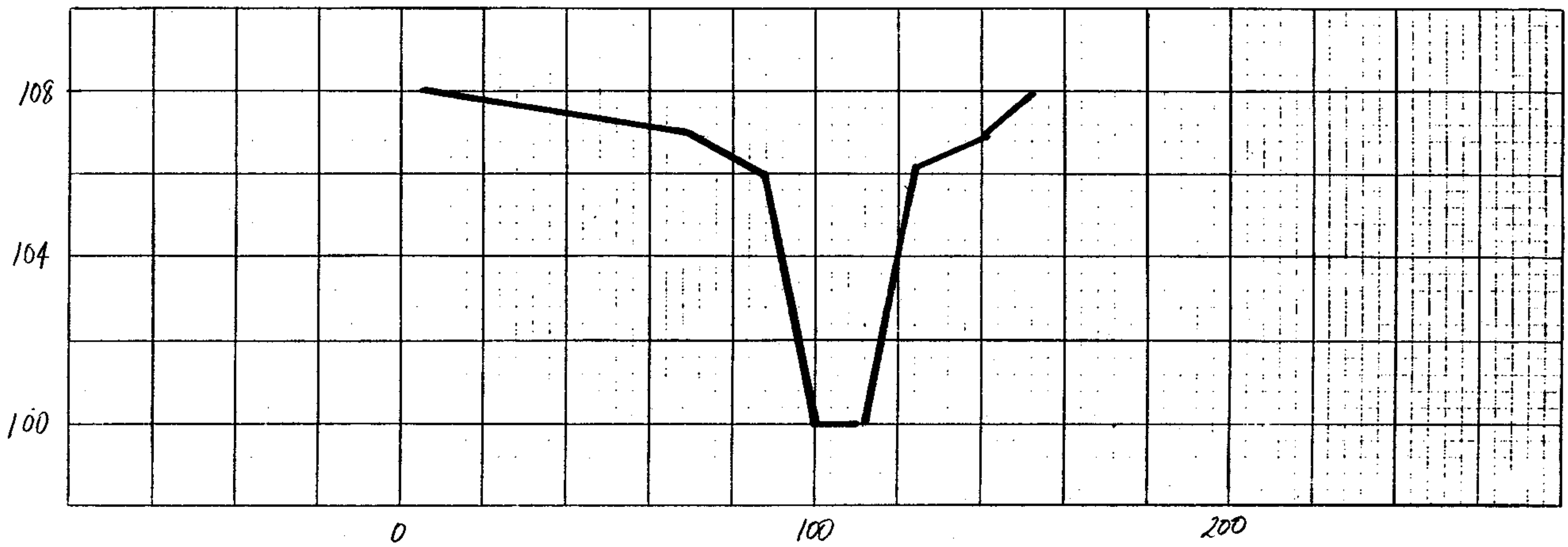
CALCULATED BY: DLB 8-10-94

Avg. V = 4.0 fps d = 3.5'

NSTPS ≅ 6

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM571



RS	3	FLOW	-1					
RC	0.030	0.020	0.030	3194	0.0009			
RX	28	68	88	100	112	124	144	154
RY	108	107	106	100	100	106	107	108

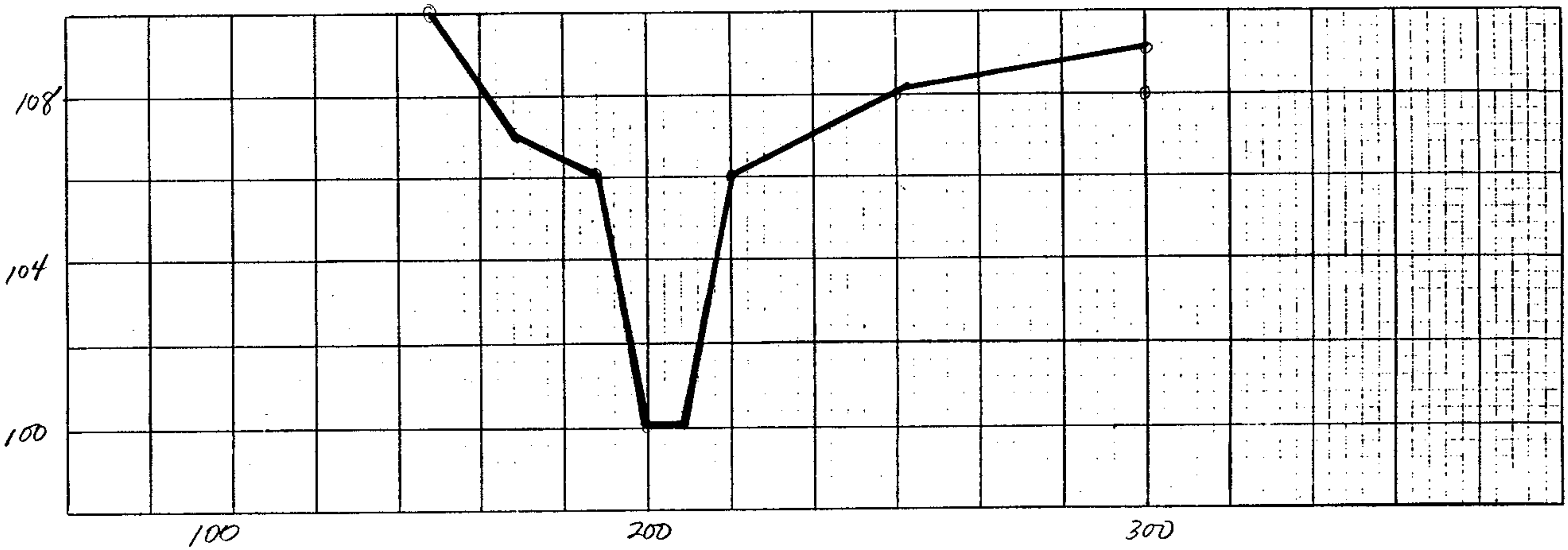
CALCULATED BY: DLB 8-10-94

Avg. V = 5.3 fps

NSTPS ≅ 3

COMPUTATION SHEET

ROUTE IDENTIFICATION NUMBER RM580



RS	6	FLOW	-1					
RC	0.030	0.020	0.030	5515	0.0047			
RX	148	168	188	200	208	220	260	300
RY	110	107	106	100	100	106	108	109

CALCULATED BY: DLB 8-11-94

Avg. V = 3.7 fps d = 1'

NSTPS ≅ 6

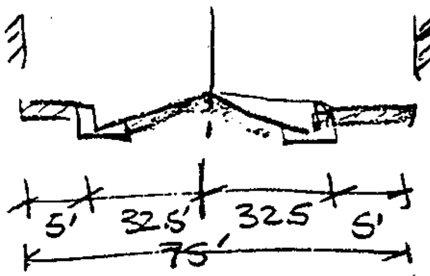
SECTION V
Divert Parameters

ERIE & ASSOCIATES, INC.
CONSULTING ENGINEERS

APPENDIX I

JOB NO. 4163 SHEET 1/6
PROJECT Tonkyelm S/OBELL W/O 91st CALC. LE DATE JUN94
SUBJECT Drainage - RATING CURVES FOR FLOW SPLITS IN HEC-1 CHKD. ____ DATE ____

TYPICAL ROAD X-SECS and Hydraulic properties
- Assume all cross slopes at 2%±, and n = .015 on roads
- UNION HILLS – 5 LANES NO MEDIAN



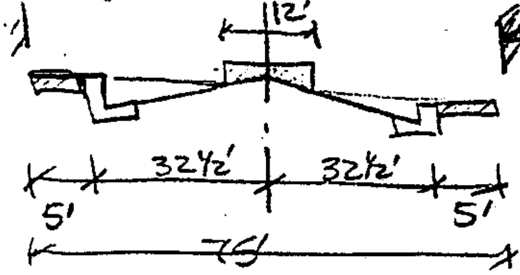
$S \cong \frac{259-19.2}{4400} \cong 0.0015'/1$

86th AVE to 92nd AVE

FULL ST capacity

D	A	WP	R	V	Q
0	0 SF	0'	0	0 FPS	0 CFS
0.5	16	32	0.5	2.7	43.
1.0	53.5	75	0.71	3.2	170.
2.0	128.5	75	1.7	5.5	710.
3.0	203.5	75	2.7	8.0	1630
4.0	278.5	75	3.7	9.0	2500

- COUNTRY club
- (86th AVE): 4 lanes with raised median (south extension of Westbrook Parkway)



$S = .008'/1$ per Mike Smith - Cypress

FULL ST. CAPACITY

D (ft)	A (SF)	WP (ft)	R	V (fps)	Q (CFS)
0	0	0	0	0	0
0.5	13.25	53	0.25	3.5	46.
1.0	44.75	63.	0.71	7.0	310
2.0	113.75	75	1.51	12.0	1365.
3.0	188.75	75	2.5	17.0	3200.
4.0	263.75	75	3.5	19.0	5000.

91V-6399

ERIE & ASSOCIATES, INC.
CONSULTING ENGINEERS

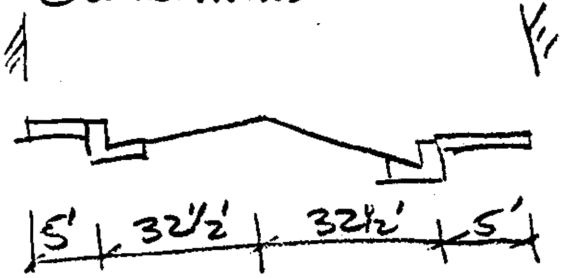
JOB NO. 1446.3 SHEET 2/6

PROJECT CALC. CE DATE JUN94

SUBJECT CHKD. DATE

• 87th Ave: 5 Lanes No median
@ Union Hills

$S \cong \frac{2}{100} = .02'/1$

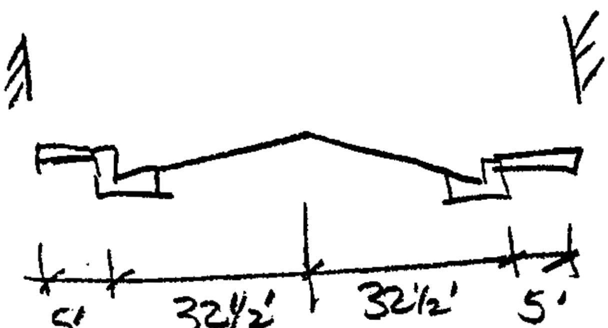


FULL ST. CAPACITY

D	A	wp	R	V	Q
0	0	0	0	0	0
0.5	16	32	0.5	9.0	145
1.0	53.5	75	0.7	12.0	640.
2.0	128.5	75	1.7	20.0	2570.
3.0	203.5	75	2.7	25.0	5090.
4.0	278.5	75	3.7	32.0	8920.

• 91st Ave: 4 lanes no median
@ Union Hills

$S \cong \frac{2}{150} = 0.0133$



FULL ST. CAPACITY

D	A	wp	R	V	Q
0	0	0	0	0	0
0.5	16	32	0.5	7.1	115.
1.0	53.5	75	0.7	9.0	480.
2.0	128.5	75	1.7	17.0	2180.
3.0	203.5	75	2.7	22.0	4480
4.0	278.5	75	3.7	25.0	6960.

ERIE & ASSOCIATES, INC.
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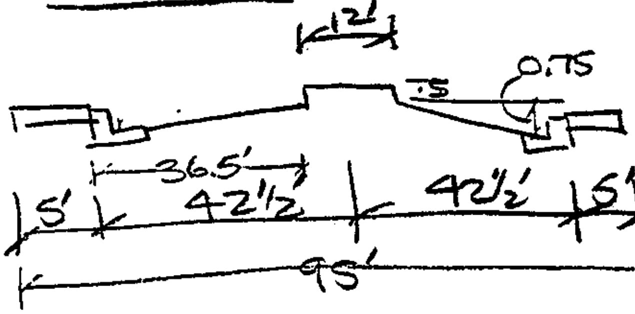
JOB NO. 1416.3 SHEET 3/6

PROJECT ______ CALC. LB DATE JUN 94

SUBJECT ______ CHKD. ______ DATE ______

• BELL ROAD – 6 lanes with median



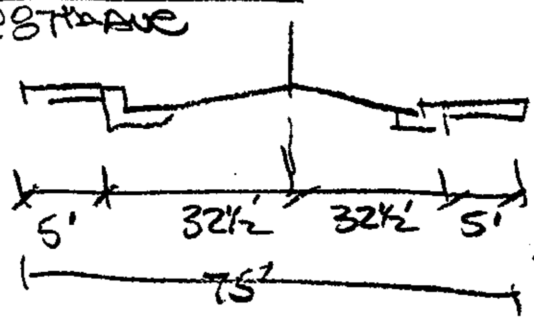
$S = \frac{1200.56 - 1196.}{2500} =$

$= 0.0018$ ⅟₁

FULL ST. CAPACITY

D	A	WP	R	V	Q
0	0	0	0	0	0
0.5	12.5	50.	0.25	1.7	21.
1.0	58.1	47.5	1.22	5.0	290
2.0	150.	95	1.58	5.8	870.
3.0	245.	95	2.58	7.9	1935.
4.0	340	95	3.58	9.5	3230.

• Paradise Lane – @ 87th Ave



$S = \frac{1}{260} = 0.0038$

FULL ST. CAPACITY

D	A	WP	R	V	Q
0	0	0	0	0	0
.5	16	32	.5	4.0	64.
1.0	53.5	75	.7	4.8	260
2.0	128.5	75	1.7	8.5	1090.
3.0	203.5	75	2.7	12.0	2440.
4.0	278.5	75	3.7	16.0	4460.

ERIE & ASSOCIATES, INC.
CONSULTING ENGINEERS

JOB NO. 14613 SHEET 4/6
PROJECT ______ CALC. CE DATE JUNE94
SUBJECT ______ CHKD. ______ DATE ______

<u>Arrowhead Shores channel!</u>

The channel is depressed 4' below the street and sidewalk along paradise lane will act as a weir taking water off paradise lane into channel/ pond.

Assume a 50' weir length that will begin to take water at ½' depth in paradise lane: By broadcrested weir equation $Q = CLH^{3/2}$ where C = 2.6, L = 50'

D=H	Q
0	0
1.0'	130 cfs
2.0	370.
3.0	675.
3.5	850.

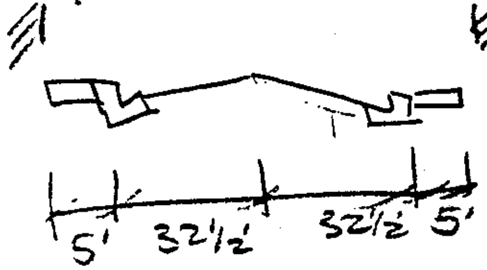
Assume will will start when flow in paradise is 1' at gutter

ERIE & ASSOCIATES, INC.
CONSULTING ENGINEERS

JOB NO. 14163 SHEET 5/6
PROJECT ______ CALC. LE DATE JUN 98
SUBJECT ______ CHKD. ______ DATE ______

• 8TH AVE : Slumes no median
@ S/O Bell

$s = 0.0057'/'$
per Mike Smith c/peoria.

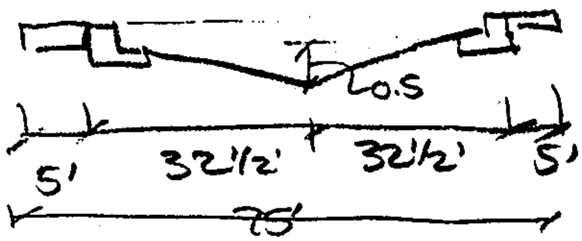


FULL ST. CAPACITY

D	A	wp	R	V	Q
0	0	0	0	0	0
0.5	16	32	0.5	5.0	80.
1.0	53.5	75	0.7	5.8	310.
2.0	128.5	75	1.7	12.0	1540.
3.0	203.5	75	2.7	15.0	3050.
4.0	278.5	75	3.7	18.0	5080.

• 91ST AVE : Slumes no median
S/O Bell inverted crown

$s \approx \frac{2}{400} = 0.005$



FULL ST. CAPACITY

D*	A	wp	R	V	Q
0	0	0	0	0	0
0.5	16.25	65.	0.25	2.8	40.
1.0	81.25	65	1.25	9.0	730.
2.0	156.25	75	2.08	12.0	1875.
3.0	231.25	75	3.08	16.0	3700.
4.0	306.25	75	4.08	18.0	5510.

* From street ℄ invert

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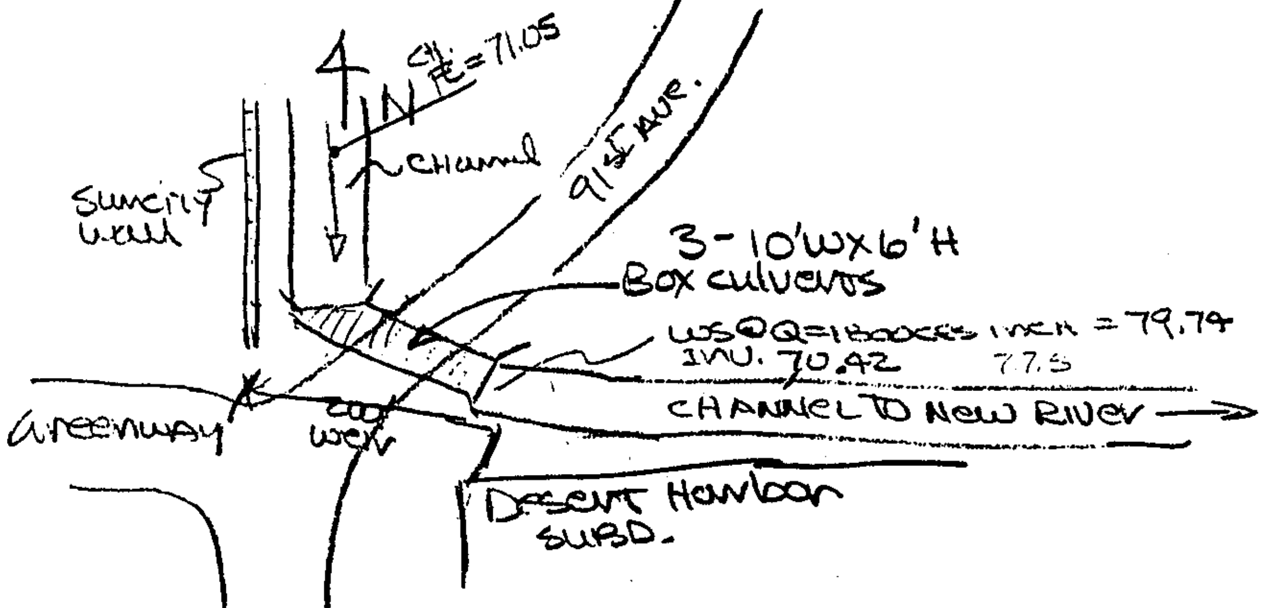
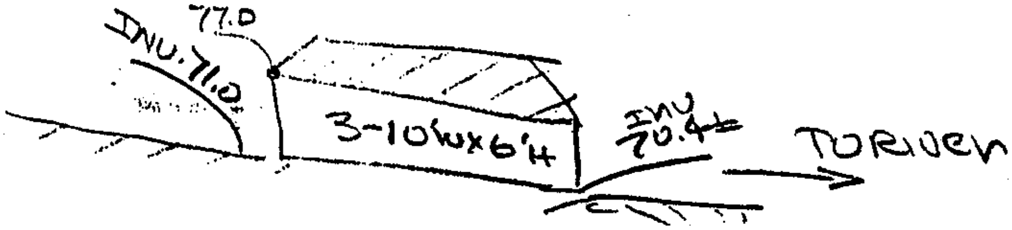
CONSULTING ENGINEERS

JOB NO. 14163 SHEET 6/6
PROJECT JDVhydm S/OBell W/O 91st CALC. CE DATE JAN 94
SUBJECT 91st & Greenway rating curve CHKD. ______ DATE ______



At Box culvert at Greenway and 91st Ave have a combination of



Assume box is in inlet control, Let weir length be 200' at elev 77.5 (top of box)

ELEV.	HW/D	Q/B	Q@B=26'*	Hweir	Qweir	Qtot
71.0	0	0	0	0	0	0
77.0	1.0	45	1170.	0	0	1170.
78.0	1.17	53.	1380.	1.0	520	1,900.
79.0	1.33	60.	1560.	2.0	1,470.	3,000.
80.0	1.5	78.	2030	3.0	2,700	4,700

where $Q_{weir} = CLH^{3/2}$; $C = 2.6$ & $L = 200'$.

*Assume 4' of debris on Box piers (1 pier width on each side of each pier.)

For hypothetical routing reaches, the assumed cross section has the following RC, RX and RY records:

RC	.04	.03	.04	Length	slope			
RX	0	25	50	80	120	150	175	200
RY	102	101	100	100	100	100	101	102

Available cross-sections of 91st Avenue, Union Hill Road, Beardsley Road and Westbrook Village East channels are used in the routing. All of the flow in the Westbrook Village East is routed through 10 detention basins as given in the drainage plan for the area. The storage characteristics are those given in the model formulated by Carter Associates, Inc. report as revised by IMC Consultants Ltd. Drainage area contributing to each basin is as shown in the layout. Approximate length of each routing reach is measured from the drainage plan.

Flow diversion southward of intersection of 87th Avenue and Paradise Lane is routed directly to the existing drainage along Greenway Road alignment.

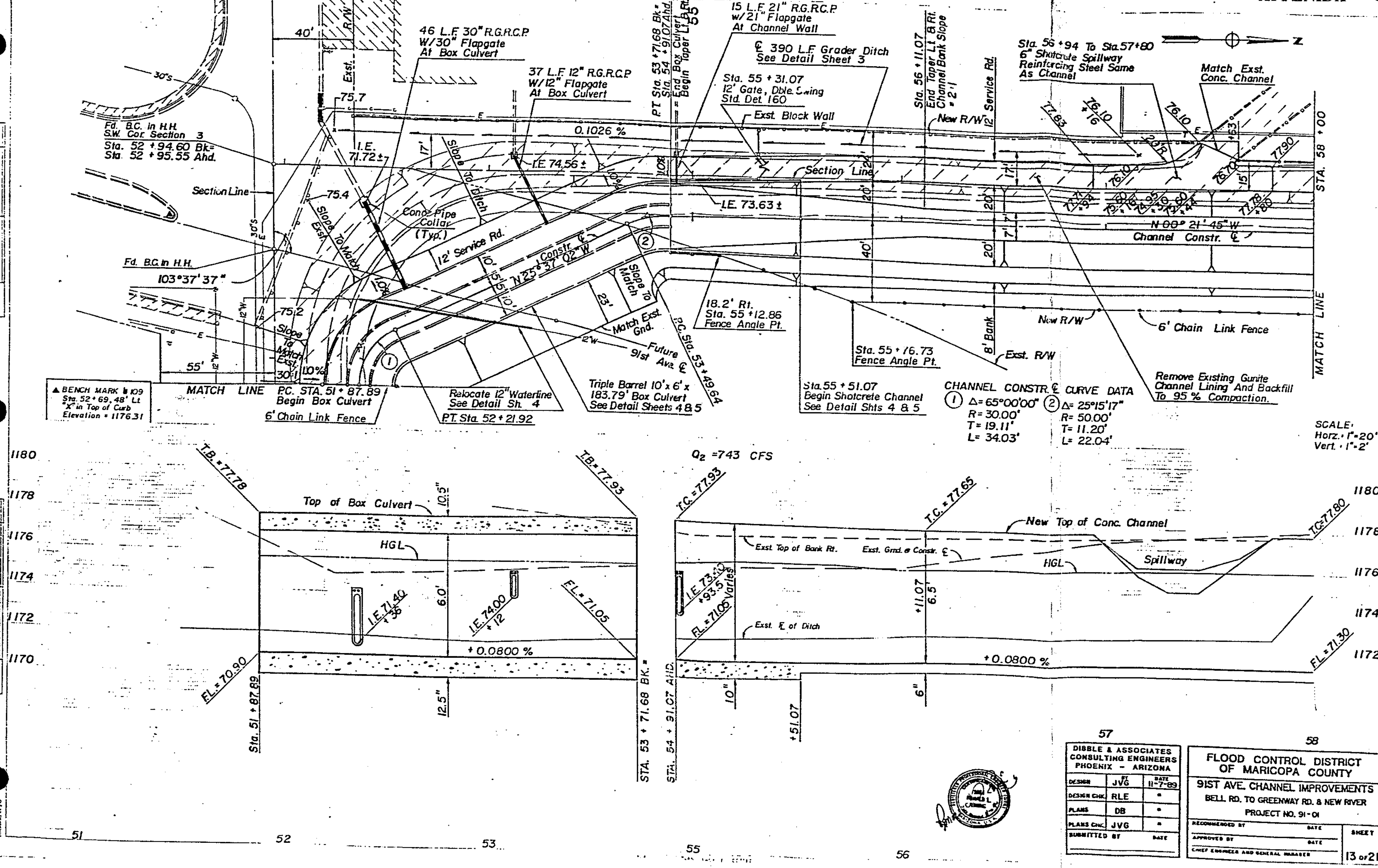
Table 3 shows summary of routing parameters.

9. SPLIT FLOW CONSIDERATIONS

The watershed has very few well defined drainage channels. Thus, in general, the runoff is basically sheet flow. At road intersections split flows occur and certain percentage distribution has been assumed. For some of the intersections south of Union Hills Road, data on flow rating have been provided by Erie and Associates for split flows as shown in Appendix H. While these are rough estimates they have been incorporated into the model as there are no other data available.

As per drainage master plan of Westbrook Village East a channel along the southern boundary north of Union Hills has a slope towards New River in which a maximum flow diversion of 100cfs is assumed. Weir flow occurs over street crown over a reach length of 2660 ft of Union Hills Road. Using broad crested weir formula: $Q = CLH^{**}1.5$ where $C = 2.6$, L = crest length and H = head over street crown, the flow distribution is as follows:

Head(ft) (abv.crown)	91st Avenue	CClub Rd L=660'	87th Ave L=680'	89the Ave L=1320'	Total Q
0.0	80	0	0	0	80
0.25	115	214	221	429	979
0.50	225	607	625	1213	2670
1.00	545	1716	1768	3432	7461
1.50	750	3152	3248	6304	13454


46 L.F. 30" R.G.R.C.P W/30" Flapgate At Box Culvert
37 L.F. 12" R.G.R.C.P W/12" Flapgate At Box Culvert
15 L.F. 21" R.G.R.C.P w/21" Flapgate At Channel Wall
℄ 390 L.F. Grader Ditch See Detail Sheet 3
Sta. 55 + 31.07 12' Gate, Dble. Swing Std. Det. 160
Exst. Block Wall
P.T. Sta. 53 + 71.68 Bk = Sta. 54 + 91.07 Ahd. End Box Culvert Begin Taper Lt. & Rt.
Sta. 56 + 11.07 End Taper Lt. & Rt. Channel Bank Slope = 2:1
12' Service Rd.
Sta. 56 + 94 To Sta. 57 + 80 6" Shotcrete Spillway Reinforcing Steel Same As Channel
Match Exst. Conc. Channel
Fd. B.C. in H.H. S.W. Cor. Section 3 Sta. 52 + 94.60 Bk = Sta. 52 + 95.55 Ahd.
Section Line
Fd. B.C. in H.H.
103°37'37"
0.1026 %
I.E. 71.72 ±
I.E. 74.56 ±
I.E. 73.63 ±
Conc. Pipe Collar (Typ.)
Slope To Ditch
Slope To Match Exst.
N 25° 37' 02" W Constr. ℄
N 00° 21' 45" W Channel Constr. ℄
18.2' Rt. Sta. 55 + 12.86 Fence Angle Pt.
Sta. 55 + 76.73 Fence Angle Pt.
New R/W
Exst. R/W
6' Chain Link Fence
Match Exst. Gnd.
Future 91st Ave. ℄
P.C. Sta. 53 + 49.64
MATCH LINE
MATCH LINE STA. 58 + 00
▲ BENCH MARK № 109 Sta. 52 + 69.48' Lt "X" in Top of Curb Elevation = 1176.31
P.C. STA. 51 + 87.89 Begin Box Culvert
6' Chain Link Fence
Relocate 12" Waterline See Detail Sh. 4
P.T. Sta. 52 + 21.92
Triple Barrel 10' x 6' x 183.79' Box Culvert See Detail Sheets 4 & 5
Sta. 55 + 51.07 Begin Shotcrete Channel See Detail Shts 4 & 5
CHANNEL CONSTR. ℄ CURVE DATA
(1) Δ = 65°00'00" R = 30.00' T = 19.11' L = 34.03'
(2) Δ = 25°15'17" R = 50.00' T = 11.20' L = 22.04'
Remove Existing Gunite Channel Lining And Backfill To 95 % Compaction.
SCALE: Horz. 1" = 20' Vert. 1" = 2'
Q_2 = 743 CFS
T.B. = 77.78
T.B. = 77.93
T.C. = 77.93
T.C. = 77.65
T.C. = 77.80
Top of Box Culvert
HGL
New Top of Conc. Channel
Exst. Top of Bank Rt.
Exst. Grnd. @ Constr. ℄
Spillway
Exst. ℄ of Ditch
I.E. 71.40 ± 36
I.E. 74.00 ± 12
I.E. 73.40 ± 93.5
FL = 71.05
FL = 70.90
FL = 71.30
+ 0.0800 %
Sta. 51 + 87.89
STA. 53 + 71.68 BK. =
STA. 54 + 91.07 AHD.
+51.07
+11.07
DIBBLE & ASSOCIATES CONSULTING ENGINEERS PHOENIX - ARIZONA
DESIGN JVG 11-7-89
DESIGN CHK. RLE
PLANS DB
PLANS CHK. JVG
SUBMITTED BY
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
91ST AVE. CHANNEL IMPROVEMENTS
BELL RD. TO GREENWAY RD. & NEW RIVER
PROJECT NO. 91-01
RECOMMENDED BY
APPROVED BY
CHIEF ENGINEER AND GENERAL MANAGER
SHEET 13 of 21

SECTION VI

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

```
*****************************************                    *****************************************
*                                       *                    *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *   U.S. ARMY CORPS OF ENGINEERS        *
*              MAY   1991               *                    *   HYDROLOGIC ENGINEERING CENTER       *
*           VERSION 4.0.1E              *                    *          609 SECOND STREET            *
*                                       *                    *        DAVIS, CALIFORNIA 95616        *
* RUN DATE  01/25/95  TIME  12:03:17    *                    *           (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:  NR324B.DAT          KHE JOB NO. 0146
   3          ID    WATERSHED CONTRIBUTING TO NEW RIVER UP TO ITS CONFLUENCE WITH
   4          ID    SKUNK CREEK
   5          ID
   6          ID    100-YEAR 24-HOUR DURATION STORM FOR EXISTING CONDITIONS
   7          ID
              *
              *        CREATED:  AUGUST 4, 1994
              *        REVISED:  SEPTEMBER 12, 1994
              *                  Revised to reflect the FCDMC's Hydrology for the
              *                  91st Avenue Drain as presented in a DRAFT Copy
              *                  dated June 20, 1994.
              *
              *        REVISED:  JANUARY 4, 1994
              *                  Revised to reflect the FCDMC's Hydrology Review
              *                  Comments dated October 14, 1994.
              *
              *     *DIAGRAM
   8          IT      4                   800
   9          IO      5
              *    *     *     *     *     *     *     *     *     *     *     *     *
              *                                                                      *
              *          SUBAREA GROUPING CONTRIBUTING TO 91ST AVENUE DRAIN          *
              *            SUB-BASINS 500-503, 510-512, 520-522, & 530-535           *
              *               TOTAL CONTRIBUTING AREA = 10.18 SQ. MI.                *
              *                                                                      *
              *    *     *     *     *     *     *     *     *     *     *     *     *

  10          KK    500S
  11          KM   RUNOFF GENERATED ON SUB-BASIN 500
  12          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
  13          KM   L= 1.455 mi  S= 50 ft/mi  Kb= 0.078
  14          KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
  15          BA    .410
  16          IN      30
  17          KM   RAINFALL DEPTH OF 4.00 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
  18          KM   AN AREAL REDUCTION COEFFICIENT OF .959 WAS USED FOR THIS BASIN
  19          PB   3.836
  20          KM   THE FOLLOWING PC RECORD USED A 24-HR SCS TYPE II STORM
  21          PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
  22          PC    .063    .071    .080    .089    .098    .109    .120    .133    .147    .163
  23          PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
  24          PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
  25          PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
  26          LG    .282    .323   4.080    .419   5.530
  27          UC    .983    .815
  28          UA       0       3       5       8      12      20      43      75      90      96
  29          UA     100
```

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

         KK   RM500
         KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 500 THROUGH 501
         KM             1) Reach Length = 5446 ft
         RS       9    FLOW      -1
         RC    .040    .030    .040    5446   .0060
         RX       0      25      50      80     120     150     175     200
         RY     102     101     100     100     100     100     101     102

         KK    501S
         KM   RUNOFF GENERATED ON SUB-BASIN 501
         KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
         KM   L= 1.031 mi  S= 32 ft/mi  Kb= 0.087
         KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
         BA    .524
         LG    .350    .350   3.920    .384    .000
         UC   1.033    .568
         UA       0       3       5       8      12      20      43      75      90      96
         UA     100

         KK   HC501
         KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 501 WITH ROUTED FLOW FROM 500
         HC       2

         KK   RM501
         KM   NORMAL DEPTH STORAGE ROUTE FROM SUB-BASIN 501 THROUGH 502
         KM             1) Reach Length = 7666 ft
         RS      12    FLOW      -1
         RC    .040    .030    .040    7666   .0044
         RX       0      25      50      80     120     150     175     200
         RY     102     101     100     100     100     100     101     102

         KK    502S
         KM   RUNOFF GENERATED ON SUB-BASIN 502
         KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
         KM   L= 1.452 mi  S= 23 ft/mi  Kb= 0.086
         KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
         BA    .553
         LG    .350    .350   3.820    .361    .000
         UC   1.729   1.283
         UA       0       3       5       8      12      20      43      75      90      96
         UA     100

         KK    510S
         KM   RUNOFF GENERATED ON SUB-BASIN 510
         KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
         KM   L= 1.577 mi  S= 93 ft/mi  Kb= 0.074
         KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
         BA    .625
         LG    .209    .322   3.980    .396   8.130
         UC    .721    .484
         UA       0       3       5       8      12      20      43      75      90      96
         UA     100
```

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

KK   RM510
KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 510 THROUGH 511
KM            1) Reach Length = 5415 ft
RS       7    FLOW      -1
RC    .040    .030    .040    5415   .0065
RX       0      25      50      80     120     150     175     200
RY     102     101     100      99      99     100     101     102

KK    511S
KM   RUNOFF GENERATED ON SUB-BASIN 511
KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM   L= 1.025 mi  S= 34 ft/mi  Kb= 0.087
KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
BA    .437
LG    .336    .345   3.770    .350    .820
UC    .971    .585
UA       0       3       5       8      12      20      43      75      90      96
UA     100

KK   HC511
KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 511 WITH ROUTED FLOW FROM 510
HC       2

KK   RM511
KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 511 THROUGH 512
KM            1) Reach Length = 5909 ft
RS       8    FLOW      -1
RC    .040    .030    .040    5909   .0054
RX       0      25      50      80     120     150     175     200
RY     102     101     100      99      99     100     101     102

KK    512S
KM   RUNOFF GENERATED ON SUB-BASIN 512
KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM   L= 1.210 mi  S= 26 ft/mi  Kb= 0.088
KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
BA    .469
LG    .350    .350   3.610    .315    .000
UC   1.263    .859
UA       0       3       5       8      12      20      43      75      90      96
UA     100

KK  HC512A
KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 512 WITH ROUTED FLOW FROM 511
HC       2

KK   502RE
KM   DIVERT 50% WESTERLY ALONG BEARDSLEY RD. TO WESTBROOK VILLAGE WEST INLET
DT    533D
DI       0    1000    2000    3000
DQ       0     500    1000    1500
```

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

 122          KK   HC502
 123          KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 502 WITH ROUTED FLOW FROM 501 AND
 124          KM   REMAINING FLOW FROM SUBBASIN NO. 512 AT INLET TO WESTBROOK VILLAGE WEST
 125          HC       3
              *
              *     INFLOW TO WESTBROOK VILLAGE WEST
              *
              *     This section of the model was developed by the FCDMC and was obtained
              *     from a Draft Copy of their June 20, 1994 report, "91st Avenue Drain
              *     Hydrology Update, Flood Control District of Maricopa County, Watershed
              *     Management Branch."
              *

 126          KK   RM502
 127          KM   NORMAL DEPTH STORAGE ROUTE FROM SUB-BASIN 502 THROUGH 503
 128          RS       7    FLOW      -1
 129          RC    .030    .020    .030    5280   .0050
 130          RX       0      30      60      90     190     300     330     360
 131          RY     104     103     101     100     100     101     103     104

 132          KK    503S
 133          KM   RUNOFF GENERATED ON SUB-BASIN 503 (FCDMC SUB-BASIN I.D. WBW)
 134          KM   TOTAL OF PARCELS 1 TO 27 IN WESTBROOK VILLAGE WEST (1983 PROJECT)
 135          KM   PLUS PARCELS 28 (GOLF COURSES) ABOUT 23% OF AREA
 136          KM   AREA REVISED FROM 1.00 SQ.MI. TO 0.952 SQ.MI. PARCEL IN SOUTHWEST CORNER OF
 137          KM   SUBDIVISION DOES NOT CONTRIBUTE;  FLOWS PROCEED WESTWARD ON UNION HILLS DR.
 138          BA    .952
 139          LG     .35     .25   3.500    .280      30
 140          UC   1.075    .921
 141          UA       0       3       5       8      12      20      43      75      90      96
 142          UA     100

 143          KK   HC503
 144          KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 503 WITH ROUTED FLOW FROM 502
 145          HC       2

 146          KK   503RR
 147          KM   PER 1983 UDC REPORT AVAILABLE STORAGE IS 472 AC-FT IN GOLF COURSES
 148          KM   A MAXIMUM OF 350 AC-FT IS ASSUMED AS PER ERIE'S QU ESTIMATE
 149          KM   PER MEETING ON MAY 9, 1994 25 CFS IS ASSUMED AS BLEED OFF THRU 2' DIA PIPE
 150          KM   CULVERT CROSSING UNION HILLS DRIVE AT ABOUT 93RD ALIGNMENT
 151          RS       1    STOR       0
 152          SV       0      50     100     150     200     300     350     400     500
 153          SE      26      27      28      29      30      32      34      36      38
 154          SQ       0      25      25      25      25      25      25     300     400

 155          KK   RM503
 156          KM   ROUTE ALONG UNION HILLS DR. EASTWARD TOWARDS 93RD AVE
 157          RS       3    FLOW      -1
 158          RC     .03     .02     .03    2080   .0019
 159          RX       0      20      40      60      80     100     120     140
 160          RY     102     101     100     100     100     100     101     102
              *
              *
              *     THIS CONCLUDES PORTION OF HEC-1 FILE OBTAINED FROM THE FCDMC HYDROLOGY
```

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

 161          KK    533R
 162          KM    RETRIEVE FLOWS GOING SOUTH ALONG 91ST AVE.
 163          DR    533D
              *
              *
              *   BEGIN PORTION OF HEC-1 FILE OBTAINED FROM THE FCDMC HYDROLOGY
              *

 164          KK    533A
 165          KM   WESTBROOK VILLAGE PARCEL B8
 166          KM   THIS PARCEL DISCHARGES DIRECTLY INTO 91ST AVE
 167          BA   .0085
 168          LG     .25     .25     3.5     .28      30
 169          UC    .183    .163
 170          UA       0       5      16      30      65      77      84      90      94      96
 171          UA     100

 172          KK  HC512B
 173          KM   COMBINE HYDROGRAPHS SOUTH OF BEARDSLEY ROAD ALONG 91ST AVENUE
 174          HC       2

 175          KK   RM512
 176          KM   ROUTE FLOWS ON 91ST AVENUE, BEARDSLY RD. TO UNION HILLS DR.
 177          KM   ROUTE THRU 91ST AVE. SOUTHWARD, X-SECTION GIVEN IN 1983 WB REPORT
 178          RS       2    FLOW      -1
 179          RC     .02    .015     .02    2380   .0045
 180          RX       0      12      22      40      80     121     131     143
 181          RY     103     100     100     102     102     100     100     103

 182          KK    533B
 183          KM    COMBINE PARCELS 8A, 10B, 7, 6, 5, G10, 2B, 3B
 184          BA   .2814
 185          LG     .25     .25     3.5     .28      45
 186          UC    .312    .271
 187          UA       0       5      16      30      65      77      84      90      94      96
 188          UA     100

 189          KK  533RR1
 190          KM   ROUTE FLOWS THROUGH RESERVOIR 10, WESTBROOK VILLAGE EAST
 191          KM   THE RESERVOIR BLEEDS INTO 91ST AVENUE
 192          RS       1    STOR      -1       0
 193          SV       0     .35    2.28     6.4   12.82    24.0
 194          SE    27.5    28.5    29.5    30.5    31.5    32.5
 195          SQ       0       2      12      19      22      44

 196          KK  HC533A
 197          KM   91ST AVENUE AT INTERSECTION WITH UNION HILL DR.
 198          HC       2
              *
              *   CONCLUDE PORTION OF HEC-1 FILE OBTAINED FROM THE FCDMC HYDROLOGY
              *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 199          KK   520S
 200          KM   RUNOFF GENERATED ON SUB-BASIN 520
 201          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 202          KM   L= 1.569 mi  S= 238 ft/mi  Kb= 0.071
 203          KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 204          BA    .675
 205          LG    .202    .318   3.920    .384  11.030
 206          UC    .454    .276
 207          UA       0       3       5       8      12      20      43      75      90      96
 208          UA     100

 209          KK   520RE
 210          KM   DIVERT MAX. OF 136 CFS EAST ALONG CALLE LEJOS TO 83RD AVENUE AS
 211          KM   PER AM. ENGINEERING CO. REPORT DEC. 1993
 212          DT    530D
 213          DI       0      50     100     137     200     400    1000
 214          DQ       0      50     100     137     137     137     137

 215          KK   RM520
 216          KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 520 THROUGH 521
 217          KM             1) Reach Length = 5886 ft
 218          RS       6    FLOW      -1
 219          RC    .040    .030    .040    5886   .0056
 220          RX      40      80      90     100     140     150     160     200
 221          RY     103     102     101     100     100     101     102     103

 222          KK    521S
 223          KM   RUNOFF GENERATED ON SUB-BASIN 521
 224          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 225          KM   L= 1.176 mi  S= 30 ft/mi  Kb= 0.044
 226          KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 227          BA    .617
 228          LG    .100    .250   6.290    .186  15.530
 229          UC    .592    .310
 230          UA       0       3       5       8      12      20      43      75      90      96
 231          UA     100

 232          KK   HC521
 233          KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 521 WITH ROUTED FLOW FROM 520
 234          HC       2

 235          KK   RM521
 236          KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 521 THROUGH 522
 237          KM             1) Reach Length = 6074 ft
 238          RS       7    FLOW      -1
 239          RC    .040    .030    .040    6074   .0049
 240          RX       0      50      75     105     145     175     200     250
 241          RY     103     101     100     100     100     100     101     103
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 242          KK    522S
 243          KM   RUNOFF GENERATED ON SUB-BASIN 522
 244          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 245          KM   L= 1.186 mi  S= 24 ft/mi  Kb= 0.077
 246          KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 247          BA    .508
 248          LG    .388    .290   6.780    .185    .000
 249          UC   1.104    .696
 250          UA       0       3       5       8      12      20      43      75      90      96
 251          UA     100

 252          KK   HC522
 253          KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 522 WITH ROUTED FLOW FROM 521
 254          KM   WEST INLET FOR WESTBROOK VILLAGE EAST
 255          HC       2
              *
              *   BEGIN PORTION OF HEC-1 FILE OBTAINED FROM THE FCDMC HYDROLOGY
              *
              *  ROUTING COMMAND REMOVED FROM MODEL.  REACH LENGTH IS TOO SHORT FOR PEAK
              *  DISCHARGE ATTENUATION.
              *
              * KKRM522A
              * KM ROUTE OFFSITE INFLOWS, W.B. EAST INLET TO FIRST DETENTION
              * RS       1    FLOW      -1
              * RC     .03     .02     .03     260  .00192
              * RX       0      12    17.5    22.5    33.5    37.5      43      55
              * RY      45      42      40      40      40      40      42      45

 256          KK    533C
 257          KM   COMBINE PARCELS 9, 10A, 11, 12, GC3
 258          KM   HIGHEST SCS LAG TIME USED BY CONSULTANT WAS CONVERTED TO TC: TLAG/0.60
 259          BA    .123
 260          LG     .35     .25     8.4     .06      35
 261          UC    .358    .271
 262          UA       0       3       5       8      12      20      43      75      90      96
 263          UA     100

 264          KK  HC533B
 265          KM   COMBINE HYDROGRAPHS WITHIN EAST WESTBROOK VILLAGE
 266          HC       2

 267          KK  533RR2
 268          KM   ROUTE FLOW THROUGH WESTBROOK VILLAGE EAST RESERVOIR 3
 269          RS       1    STOR      -1       0
 270          SV       0     .19    1.23    3.71    7.87    12.1    24.0
 271          SE      32      33      34      35      36      37      38
 272          SQ       0       2      12      19     195     811    1200

 273          KK    533D
 274          KM   COMBINE PARCELS 19, 18B, GC4-5
 275          BA    .101
 276          LG     .35     .15     8.4     .06      45
 277          UC    .731    .542
 278          UA       0       3       5       8      12      20      43      75      90      96
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 279          UA     100

 280          KK  HC533C
 281          KM   COMBINE HYDROGRAPHS WITHIN EAST WESTBROOK VILLAGE
 282          HC       2

 283          KK  533RR3
 284          KM   ROUTE FLOW THROUGH WESTBROOK VILLAGE EAST RESERVOIR 4 & 5
 285          RS       1    STOR      -1       0
 286          SV       0    2.57    7.19   13.71    22.4      32      37      42      47      52
 287          SE      27      28      29      30      31      33      34      35      36      37
 288          SQ       0       2      12      19      21      21      21      21     386    1207

 289          KK    533E
 290          KM   GOLF COURSE AT DRIVING RANGE
 291          BA   .0126
 292          LG     .35     .25     3.5     .29      45
 293          UC    .190    .162
 294          UA       0       3       5       8      12      20      43      75      90      96
 295          UA     100

 296          KK  HC533D
 297          KM   COMBINE HYDROGRAPHS WITH IN EAST WESTBROOK VILLAGE
 298          HC       2

 299          KK  533RR4
 300          KM   ROUTE FLOW THROUGH WESTBROOK VILLAGE EAST RESERVOIR 6
 301          RS       1    STOR      -1       0
 302          SV       0       2       4       6       8
 303          SE      33      34      35      36      37
 304          SQ       0       0     227     811    1200
              *
              *   CONCLUDE PORTION OF HEC-1 FILE OBTAINED FROM THE FCDMC HYDROLOGY
              *

 305          KK    530S
 306          KM   RUNOFF GENERATED ON SUB-BASIN 530
 307          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 308          KM   L= 1.452 mi  S= 280 ft/mi  Kb= 0.053
 309          KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 310          BA    .821
 311          LG    .139    .276   3.550    .303  13.320
 312          UC    .346    .172
 313          UA       0       3       5       8      12      20      43      75      90      96
 314          UA     100

 315          KK    R530
 316          KM   RETRIEVE DIVERTED FLOW FROM SUB-BASIN 520
 317          DR    530D
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ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK   HC530
KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 530 WITH DIVERTED FLOW FROM 520
HC       2

KK   RM530
KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 530 THROUGH 531
KM             1) Reach Length = 5688 ft
RS       6    FLOW      -1
RC    .040    .030    .040    5688   .0053
RX       0      25      50      80     120     150     175     200
RY     102     101     100     100     100     100     101     102

KK    531S
KM   RUNOFF GENERATED ON SUB-BASIN 531
KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM   L= 1.193 mi  S= 25 ft/mi  Kb= 0.060
KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
BA    .654
LG    .225    .170  10.100    .036   9.530
UC    .775    .409
UA       0       3       5       8      12      20      43      75      90      96
UA     100

KK   HC531
KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 531 WITH ROUTED FLOW FROM 530
HC       2

KK   RM531
KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 531 THROUGH 532
KM             1) Reach Length = 6723 ft
RS       7    FLOW      -1
RC    .040    .030    .040    6723   .0043
RX       0      50      75     105     145     175     200     250
RY     103     101     100     100     100     100     101     103

KK    532S
KM   RUNOFF GENERATED ON SUB-BASIN 532
KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM   L= 1.109 mi  S= 25 ft/mi  Kb= 0.062
KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
BA    .521
LG    .438    .103  10.100    .046    .000
UC    .758    .429
UA       0       3       5       8      12      20      43      75      90      96
UA     100

KK   HC532
KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 532 WITH ROUTED FLOW FROM 531
HC       2
*
*    BEGIN PORTION OF HEC-1 FILE OBTAINED FROM THE FCDMC HYDROLOGY
*
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 361          KK   532RE
 362          KM   DIVERT 70% SOUTHWARD THRU 83RD AVENUE
 363          DT   554D1
 364          DI       0     200     400     800    1200    1500    2000    2500
 365          DQ       0     140     280     560     840    1050    1400    1750

 366          KK    533F
 367          KM   COMBINE PARCELS 13, 14, G1
 368          BA   .0644
 369          LG     .35     .25     3.5     .29      45
 370          UC    .259    .217
 371          UA       0       3       5       8      12      20      43      75      90      96
 372          UA     100

 373          KK   HC533E
 374          KM    COMBINE HYDROGRAPHS WITHIN EAST WESTBROOK VILLAGE
 375          HC       2
              *    *    *    *    *    *    *    *    *    *    *    *
              *                                                       *
              *     RESERVOIR ROUTING OPTION WAS REMOVED FROM THE MODEL.   *
              *     ROUTED FLOWS WERE INCREASING AND/OR NO DIFFERENCE IN   *
              *     TIMING FROM THE INFLOW HYDROGRAPH WERE OBSERVED.       *
              *                                                       *
              *    *    *    *    *    *    *    *    *    *    *    *
              * KK533RR5
              * KM ROUTE FLOW THROUGH WESTBROOK VILLAGE EAST RESERVOIR 1
              * KM
              * RS     1    STOR       0
              * SV     0     .11     .63    1.43     3.3     5.5     6.5     6.9     7.5      10
              * SE    36      37      38      39      40      41      42      43      44      45
              * SQ     0       2      12      19    21.8    23.1    24.1      25     750      13

 376          KK    533G
 377          KM    COMBINE PARCELS 15, 16, 17, 18A, 23A, GC2
 378          BA    .079
 379          LG     .35     .25     3.5     .29      45
 380          UC    .306    .271
 381          UA       0       3       5       8      12      20      43      75      90      96
 382          UA     100

 383          KK   HC533F
 384          KM    COMBINE HYDROGRAPHS WITHIN EAST WESTBROOK VILLAGE
 385          HC       2

 386          KK   533RR6
 387          KM    ROUTE FLOW THROUGH WESTBROOK VILLAGE EAST RESERVOIR 2
 388          KM
 389          RS       1    STOR      -1       0
 390          SV       0    1.97    4.86    9.02   14.99      20      25      30      34      38
 391          SE      26      27      28      29      30      31      32      33      34      35
 392          SQ       0       2      12      19      21      21      21      21     930    1200
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 393          KK  HC533G
 394          KM   COMBINE 533RR4 AND 533RR6
 395          HC       2

 396          KK  RM522B
 397          RS       2    FLOW      -1
 398          RC     .04     .03     .04    1420   .0018
 399          RX       0      30      60      90     120     150     180     210
 400          RY     104     102     100     100     100     100     102     104

 401          KK    533H
 402          KM   COMBINE PARCELS 23B, 21A, G7
 403          BA    .033
 404          LG     .35     .15     8.4     .06      60
 405          UC    .234    .162
 406          UA       0       3       5       8      12      20      43      75      90      96
 407          UA     100

 408          KK  HC533H
 409          HC       2
              *     *     *     *     *     *     *     *     *     *     *     *
              *                                                                *
              *     RESERVOIR ROUTING OPTION WAS REMOVED FROM THE MODEL.       *
              *     ROUTED FLOWS WERE INCREASING AND/OR NO DIFFERENCE IN       *
              *     TIMING FROM THE INFLOW HYDROGRAPH WERE OBSERVED.           *
              *                                                                *
              *     *     *     *     *     *     *     *     *     *     *     *
              * KK533RR7
              * KM ROUTE FLOWS THROUGH RESERVOIR 7, WESTBROOK VILLAGE EAST
              * RS     1    STOR      -1       0
              * SV     0     .15     .85    2.26    4.71     6.0     7.0     9.0
              * SE    27      28      29      30      31      32      33      34
              * SQ     0      11      23      35      46     526    1391    2500

 410          KK    533I
 411          KM   COMBINE PARCELS 25, 24, GC8, 27A, 26A
 412          BA   .0839
 413          LG     .35     .15     8.4     .06      45
 414          UC    .466    .326
 415          UA       0       3       5       8      12      20      43      75      90      96
 416          UA     100

 417          KK  533RR8
 418          KM   ROUTE FLOWS THROUGH RESERVOIR 8, WESTBROOK VILLAGE EAST
 419          RS       1    STOR      -1       0
 420          SV       0     .36    2.13    5.54   10.63   15.29    16.0
 421          SE      27      28      29      30      31      32      33
 422          SQ       0       2      12      19      22      30     100
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ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK  HC533I
KM   COMBINE OUTFLOW FROM RESERVOIRS 7 AND 8
HC       2

KK  RM522C
KM   ROUTE HYDROGRAPHS THRU MAIN SOUTH STREET WITHIN EAST WESTBROOK VILLAGE
RS       1    FLOW      -1
RC     .03     .02     .03    1120   .0032
RX       0      15      30      60      80     105     120     135
RY     104     102     100     100     100     100     102     104

KK    533J
KM   COMBINE R/C, 1B, 26B
BA   .0342
LG     .35     .15     8.4     .06      60
UC    .180    .163
UA       0       3       5       8      12      20      43      75      90      96
UA     100

KK  HC533J
HC       2

KK    533K
KM   COMBINE PARCELS 1A, 20, 21B, G9A, G9B, 2A, 3A
BA   .0572
LG     .35     .25     5.0     .28      45
UC    .292    .216
UA       0       3       5       8      12      20      43      75      90      96
UA     100

KK  533RR9
KM   ROUTE THROUGH RESERVOIR 9, WESTBROOK VILLAGE EAST
RS       1    STOR      -1       0
SV       0     .03    .376   1.698   4.517   9.114  12.000
SE      25      26      27      28      29      30      31
SQ       0       2      11      18      24     128     200

KK  HC533K
KM   OUTFLOW FROM WESTBROOK VILLAGE EAST INTO UNION HILLS DR. AT 86TH AVE.
KM   ALIGNMENT AT INTERSECTION OF OUTLET WITH UNION HILLS RD., MAIN ENTRANCE
HC       2

KK  533RE1
KM   DIVERT 100 CFS TO NEW RIVER:  50 CFS THRU 42" CMP AND 50 CFS OVERLAND
DT   554D2
DI       0      50     100     150     300     600     900
DQ       0       0       0     100     100     100     100

KK  533RE2
KM   DIVERT TO COUNTRY CLUB ROAD AND EVENTUALLY TO NEW RIVER.  RATING CURVE
KM   AS PER ERIE'S REPORT, ASSUMES OVERFLOW PROPORTIONAL TO WEIR LENGTH
DT   555D1
DI       0      50      80     982    2670    7461   13454
DQ       0       0       0     214     607    1716    3152
*
```

```
*  ROUTING COMMAND REMOVED FROM MODEL.  REACH LENGTH IS TOO SHORT FOR PEAK
*  DISCHARGE ATTENUATION.
*
* KK RM533A
* KM ROUTE REMAINING TO INTERSECTION OF UNION HILLS DR. & 87TH AVENUE
* RS     1    FLOW     -1
* RC   .02    .015    .02     660   .0015
* RX     0       1      5      35      40      70      74      75
* RY   104     102    100     101     101     100     102     104
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LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 469           KK  533RE3
 470           KM   DIVERT SOUTH THRU 87TH AVE., PORTION GOES TO 91ST AVE. AT UNION HILLS DR.
 471           KM   USING RATING CURVE DEVELOPED BY ERIE & ASSOCIATES
 472           KM   INFLOW IS ASSUMED SUM OF RATED Q AT ROAD INTERSECTION
 473           KM   THIS APPLIES TO SUCCEDING DIVERSIONS USING ERIE'S DATA
 474           DT   534D1
 475           DI       0      50      80     762    2067    5745
 476           DQ       0       0       0     221     625    1768
               *
               *  ROUTING COMMAND REMOVED FROM MODEL.  REACH LENGTH IS TOO SHORT FOR PEAK
               *  DISCHARGE ATTENUATION.
               *
               * KKRM533B
               * KM ROUTE REMAINING FLOW TO 89TH AVE. THRU NORTH SIDE OF UNION HILLS RD.
               * RS     1    FLOW      -1
               * RC  .015    .015    .015    1320   .0037
               * RX     0       1       5      35      40      70      74      75
               * RY   104     102     100     101     101     100     102     104

 477           KK  533RE4
 478           KM   ASSUME SPLIT OCCURS WHEN DEPTH IS 0.5 FT ABOVE 91ST AVE CROWN AT INTERSECTION
 479           KM   PER ERIE'S RATING Q=145 CFS ABOVE WHICH FLOW WILL HAVE 50-50 SPLIT
 480           KM   FLOW LESS THAN OR EQUAL TO 145 CFS WILL CONTINUE WESTWARD TO 91ST AVE.
 481           DT   534D2
 482           DI       0      80     145     300     500     800    1200
 483           DQ       0       0       0     150     250     400     600

 484           KK  RM533C
 485           RS       1    FLOW      -1
 486           RC     .02    .015     .02    1320   .0015
 487           RX       0       1       5      35      40      70      74      75
 488           RY     104     102     100     101     101     100     102     104

 489           KK  HC533L
 490           KM   UNION HILLS DR. AT 91ST AVENUE
 491           HC       3

 492           KK  RM533D
 493           KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 533 THROUGH 534
 494           KM            1) Reach Length = 5474 ft
 495           RS       4    FLOW      -1
 496           RC    .025    .020    .025    5474   .0044
 497           RX       0      12      22      40     100     121     131     143
 498           RY     103     100     100     101     101     100     100     103

 499           KK   534R1
 500           KM   RETRIEVE FLOWS GOING SOUTH OF 87TH AVE. SOUTH OF UNION HILLS DR.
 501           DR   534D1
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ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK  RM533E
KM   ROUTE SOUTHWARD THRU 87TH AVE
RS       5    FLOW      -1
RC     .02    .015     .02    5560   .0042
RX       0       1       5      35      40      70      74      75
RY     104     102     100     101     101     100     102     104

KK  533RE6
KM   DIVERT 50% UP TO MAXIMUM OF 150 CFS EASTWARD ALONG BELL RD. TO NEW RIVER
DT   555D2
DI       0      20      50     150     200     300
DQ       0       6      50     150     150     150

KK  533RE7
KM   DIVERT SOUTHWARD ALONG 87TH AVE., SOUTH OF BELL RD. USING ERIE'S RATING
KM   VALUES
DT    535D
DI       0     101     600    2410    4905
DQ       0      80     310    1540    3050

KK  RM533F
KM   ROUTE WESTWARD ALONG BELL RD.
RS       2    FLOW      -1
RC     .02    .015     .02    1320   .0015
RX       0       1       5      45      50      90      94      95
RY     104     102     100     101     101     100     102     104

KK   534R2
KM   RETRIEVE FLOWS GOING SOUTH ON 89TH AVE. SOUTH OF UNION HILL DR.
DR   534D2

KK  RM533G
RS       4    FLOW      -1
RC     .02    .015     .02    5280   .0049
RX       0       1       5      35      40      70      74      75
RY     104     102     100     101     101     100     102     104
*
*  ROUTING COMMAND REMOVED FROM MODEL.  REACH LENGTH IS TOO SHORT FOR PEAK
*  DISCHARGE ATTENUATION.
*
* KKRM533H
* RS     1    FLOW      -1
* RC   .02    .015     .02     680   .0015
* RX     0       1       5      35      40      70      74      75
* RY   104     102     100     101     101     100     102     104
*
*   CONCLUDE PORTION OF HEC-1 FILE OBTAINED FROM THE FCDMC HYDROLOGY
*
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 533         KK    534S
 534         KM   RUNOFF GENERATED ON SUB-BASIN 534
 535         KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 536         KM   L= 1.571 mi  S= 18 ft/mi  Kb= 0.061
 537         KM   CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
 538         BA    .896
 539         LG    .264    .281   7.500    .116  18.180
 540         UC   1.183    .682
 541         UA       0       5      16      30      65      77      84      90      94      97
 542         UA     100

 543         KK   HC534
 544         KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 534 WITH ROUTED FLOW FROM SUB-BASIN 533
 545         HC       4

 546         KK  RM534A
 547         KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 534 THROUGH 535
 548         KM            1) Reach Length = 5114 ft
 549         RS       3    FLOW      -1
 550         RC    .030    .020    .030    5114   .0041
 551         RX       0       0       5      10      75      80      85      85
 552         RY     108     104     102     100     100     102     104     108

 553         KK    535R
 554         DR    535D

 555         KK   535RE
 556         KM   DIVERT THROUGH PARADISE LANE WESTWARD USING ERIE'S RATING VALUES
 557         DT    556D
 558         DI       0     144     570    2530    5490
 559         DQ       0      80     310    1540    3050

 560         KK  RM534C
 561         RS       1    FLOW      -1
 562         RC     .02    .015     .02     720   .0038
 563         RX       0       1       5      35      40      70      74      75
 564         RY     104     102     100     101     101     100     102     104
             *
             *  ROUTING COMMAND REMOVED FROM MODEL.  REACH LENGTH IS TOO SHORT FOR PEAK
             *  DISCHARGE ATTENUATION.  INCLUDE REACH LENGTH IN HEC-1 COMMAND RM534E.
             *
             * KKRM534D
             * KM ROUTE TO EXISTING 91ST AVE. CHANNEL WESTWARD
             * RS     1    FLOW      -1
             * RC   .03     .02     .03     560   .0036
             * RX     0      10      20      35      45      60      70      80
             * RY   108     104     102     100     100     102     104     108

 565         KK  RM534E
 566         KM    ROUTE THRU EXISTING DRAIN
 567         RS       3    FLOW      -1
 568         RC    .030    .020    .030    1810   .0042
 569         RX       0       6      12      24      36      48      60      72
 570         RY     108     104     102     100     100     102     104     108
```

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

       KK    535S
       KM   RUNOFF GENERATED ON SUB-BASIN 535
       KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
       KM   L= 1.176 mi  S= 22 ft/mi  Kb= 0.040
       KM   CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
       BA    .642
       LG    .301    .164   6.290    .227  20.750
       UC    .633    .327
       UA       0       5      16      30      65      77      84      90      94      97
       UA     100

       KK   HC535
       KM   COMBINE HYDROGRAPHS AT 91ST AVE. DRAIN AND ALIGNMENT OF GREENWAY RD.
       HC       3

       KK   535RE
       KM   DIVERT THRU EXISTING 91ST AVE. CHANNEL SPILLWAY PER DESIGN DRAWINGS
       KM   DESIGN CAPACITY OF TRIPLE BARREL CULVERT = 743 CFS PLUS FB CAPACITY
       KM   FLOW SOUTHWARD ALONG 91ST AVE. TOWARDS DESERT HARBOR MPC
       DT   DV91S
       DI       0     100     743    1170    1900    3000    4700
       DQ       0       0       0       0     520    1470    2700

       KK   RM535
       KM   ROUTE REMAINING FLOW THRU 91ST AVE. CHANNEL TO OUTLET
       KM   EXISTING GUNITE CHANNEL WITH 2:1 SS AS PER FCD CONSULTANT DESIGN
       RS       1    FLOW      -1
       RC     .02    .015     .02    1720   .0008
       RX       0       7      14      20      28      34      41      48
       RY     107   103.5     100     100     100     100   103.5     107
       *    *    *    *    *    *    *    *    *    *    *    *
       *                                                         *
       *      SUBAREA GROUPING CONTRIBUTING TO NEW RIVER ABOVE   *
       *             CONFLUENCE WITH SKUNK CREEK.                *
       *      SUB-BASINS 540-542, 550-556, 560, 570-571 & 580-581 *
       *         TOTAL CONTRIBUTING AREA = 16.84 SQ. MI.         *
       *                                                         *
       *    *    *    *    *    *    *    *    *    *    *    *

       KK    540S
       KM   RUNOFF GENERATED ON SUB-BASIN 540
       KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
       KM   L= 2.367 mi  S= 28 ft/mi  Kb= 0.071
       KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
       BA   2.244
       KM   RAINFALL DEPTH OF 4.00 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
       KM   AN AREAL REDUCTION COEFFICIENT OF .933 WAS USED
       PB   3.732
       LG    .250    .350   3.610    .315   5.020
       UC   1.718    .848
       UA       0       3       5       8      12      20      43      75      90      96
       UA     100
```

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

 611          KK   RM540
 612          KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 540 THROUGH 541
 613          KM            1) Reach Length = 5708 ft
 614          RS      5    FLOW     -1
 615          RC   .040    .040   .040    5708   .0058
 616          RX     40      80    180     200     225     245     260     300
 617          RY     24      24     22      18      18      22      24      24

 618          KK    541S
 619          KM   RUNOFF GENERATED ON SUB-BASIN 541
 620          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 621          KM   L= 1.081 mi  S= 31 ft/mi  Kb= 0.088
 622          KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 623          BA   .467
 624          LG   .250    .350  4.030    .408    .000
 625          UC  1.108    .681
 626          UA      0       3      5       8      12      20      43      75      90      96
 627          UA    100

 628          KK   HC541
 629          KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 541 WITH ROUTED FLOW FROM 540
 630          HC      2

 631          KK   RM541
 632          KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 541 THROUGH 542
 633          KM            1) Reach Length = 5535 ft
 634          RS      5    FLOW     -1
 635          RC   .040    .040   .040    5535   .0054
 636          RX    140     170    200     210     240     265     285     300
 637          RY     94      92     90      86      86      90      92      94

 638          KK    542S
 639          KM   RUNOFF GENERATED ON SUB-BASIN 542
 640          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 641          KM   L= 1.059 mi  S= 33 ft/mi  Kb= 0.073
 642          KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 643          BA   .490
 644          LG   .383    .239  3.770    .405    .740
 645          UC   .871    .499
 646          UA      0       3      5       8      12      20      43      75      90      96
 647          UA    100

 648          KK   HC542
 649          KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 542 WITH ROUTED FLOW FROM 541
 650          HC      2

 651          KK   RM542
 652          KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 542 THROUGH 553
 653          KM            1) Reach Length = 5557 ft
 654          RS      5    FLOW     -1
 655          RC   .040    .040   .040    5557   .0061
 656          RX     40      60    100     130     160     190     210     230
 657          RY     72      71     70      64      64      70      71      72
              *      *       *       *       *       *       *       *       *       *       *       *       *
              *                                                                                           *
```

```
*      BREAK SEQUENCE - JUMP TO SUB-BASIN 550                          *
*                                                                      *
*      SUB-BASIN 550 IS LOCATED DOWNSTREAM OF NEW RIVER DAM.  THE      *
*      BF(BASE FLOW) RECORD OF HEC-1 WAS INCLUDED IN THIS SUB-BASIN    *
*      TO MODEL THE NEW RIVER DAM LOW LEVEL OUTFLOW.                   *
*      ASSUMED CONSTANT OUTFLOW OF 2350 CFS FOR 100-YEAR STORM.        *
*      SOURCE:  F.I.S., MARICOPA COUNTY, ARIZONA AND INCORPORATED      *
*               AREAS, FEMA.                                           *
*                                                                      *
*     *     *     *     *     *     *     *     *     *     *     *    *
```

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

658            KK    550S
659            KM   RUNOFF GENERATED ON SUB-BASIN 550
660            KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
661            KM   L= 1.701 mi  S= 63 ft/mi  Kb= 0.073
662            KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
663            BA   1.946
664            BF    2350
665            LG    .250    .350   4.140    .431   3.600
666            UC    .958    .369
667            UA       0       3       5       8      12      20      43      75      90      96
668            UA     100

669            KK   RM550
670            KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 550 THROUGH 551
671            KM            1) Reach Length = 8432 ft
672            RS       6    FLOW      -1
673            RC    .040    .040    .040    8432   .0044
674            RX     210     400     420     445     500     525     590     670
675            RY      32      30      26      24      24      26      30      32
               *     *     *     *     *     *     *     *     *     *     *     *     *
               *                                                                     *
               *     FOR BF RECORD IN SUB-BASIN 560, USE STRTQ=0 TO RETURN BASE FLOW *
               *     CONDITIONS BACK TO NORMAL.  THIS RECORD PREVENTS SUBSEQUENT     *
               *     SUB-BASINS FROM HAVING A BASE FLOW VALUE OF 2350 CFS.           *
               *                                                                     *
               *     *     *     *     *     *     *     *     *     *     *     *     *

676            KK    560S
677            KM   RUNOFF GENERATED ON SUB-BASIN 560
678            KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
679            KM   L= 1.866 mi  S= 192 ft/mi  Kb= 0.079
680            KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
681            BA   1.116
682            BF       0
683            LG    .250    .360   4.120    .268   4.150
684            UC    .587    .317
685            UA       0       3       5       8      12      20      43      75      90      96
686            UA     100

687            KK   RM560
688            KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 560 THROUGH 551
689            KM            1) Reach Length = 14187 ft
690            RS      12    FLOW      -1
691            RC    .030    .040    .030   14187   .0088
692            RX       0     215     250     280     300     320     460     560
693            RY      94      92      90      88      88      90      92      94

694            KK    551S
695            KM   RUNOFF GENERATED ON SUB-BASIN 551
696            KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
697            KM   L= 2.280 mi  S= 46 ft/mi  Kb= 0.075
698            KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
699            BA   1.448
700            LG    .248    .349   4.190    .443    .680
```

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

 701           UC   1.473    .890
 702           UA       0       3       5       8      12      20      43      75      90      96
 703           UA     100

 704           KK   HC551
 705           KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 551 WITH ROUTED FLOWS FROM 550 & 560
 706           HC       3

 707           KK   RM551
 708           KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 551 THROUGH 552
 709           KM           1) Reach Length = 5663 ft
 710           RS       4    FLOW      -1
 711           RC    .040    .040    .040    5663   .0056
 712           RX     100     100     145     250     420     450     510     520
 713           RY      92      88      78      76      76      82      84      92

 714           KK    552S
 715           KM   RUNOFF GENERATED ON SUB-BASIN 552
 716           KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 717           KM   L= 3.216 mi  S= 46 ft/mi  Kb= 0.068
 718           KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
 719           BA   2.385
 720           LG    .244    .340   3.820    .363   7.320
 721           UC   1.695   1.031
 722           UA       0       3       5       8      12      20      43      75      90      96
 723           UA     100

 724           KK   HC552
 725           KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 552 WITH ROUTED FLOW FROM 551
 726           HC       2

 727           KK   RM552
 728           KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 552 THROUGH 553
 729           KM           1) Reach Length = 5971 ft
 730           RS       5    FLOW      -1
 731           RC    .040    .040    .040    5971   .0055
 732           RX       0     100     130     190     310     390     450     500
 733           RY      56      54      50      48      48      50      52      56
               *
               *    ARROWHEAD RANCH DEVELOPMENT
               *
               *    This section of the model was developed by Dibble and Associates
               *    Consulting Engineers for the City of Glendale to address the Storm
               *    Drainage Plan for the Arrowhead Ranch Development.  The drainage
               *    report was titled, "Specific Area Plan, Storm Drainage Plan for the
               *    Arrowhead Ranch Development" and was prepared on April 20, 1992.
               *
               *    ARROWHEAD RANCH - SECTION 18/19 - SYSTEM II
               *
```

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

 734            KK     21S
 735            KM    SUB-BASIN 21
 736            BA    .035
 737            LS                82
 738            UD    .167

 739            KK    21RR
 740            KM    LAKE NO. 1
 741            RS         1    ELEV  1277.0
 742            SV       0.0     3.6     4.5     5.4     6.3     7.2
 743            SE    1277.0  1279.0  1279.5  1280.0  1280.5  1281.0
 744            SQ         0       0     5.4     8.5    10.4    12.0

 745            KK     22S
 746            KM    SUB-BASIN 22
 747            BA    .027
 748            LS                92
 749            UD    .167

 750            KK    HC22
 751            HC         2

 752            KK    22RR
 753            KM    LAKE NO. 2
 754            RS         1    ELEV  1276.5
 755            SV       0.0     0.3     0.7     1.2     1.6     2.2     2.7     3.3
 756            SE    1276.5  1277.0  1277.5  1278.0  1278.5  1279.0  1279.5  1280.0
 757            SQ         0     7.1    14.1    19.7    42.4    92.7   164.8   200.0

 758            KK     23S
 759            KM    SUB-BASIN 23
 760            BA    .009
 761            LS                86
 762            UD    .167

 763            KK    HC23
 764            HC         2

 765            KK    23RR
 766            KM    LAKE NO. 3
 767            RS         1    ELEV  1275.0
 768            SV       0.0      .3      .7     1.1     1.5    2.00     2.5
 769            SE    1275.0  1275.5  1276.0  1276.5  1277.0  1277.5  1278.0
 770            SQ         0     8.7    15.3    22.3    49.6   106.0   180.4

 771            KK     24S
 772            KM    SUB-BASIN 24
 773            BA    .006
 774            LS                87
 775            UD    .167
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 776          KK    HC24
 777          HC       2

 778          KK    24RR
 779          KM    LAKE NO. 4
 780          RS       1    ELEV  1272.0
 781          SV       0      .3      .7     1.1     1.6     2.0     2.5
 782          SE  1272.0  1272.5  1273.0  1273.5  1274.0  1274.5  1275.0
 783          SQ       0     8.7    15.3    22.3    49.6   106.0   180.4

 784          KK     25S
 785          KM    SUB-BASIN 25
 786          BA    .051
 787          LS              85
 788          UD    .167

 789          KK    HC25
 790          HC       2

 791          KK    25RR
 792          KM    LAKE NO. 5
 793          RS       1    ELEV  1268.0
 794          SV       0    1.75     3.5    5.31     7.2    9.15    11.2    13.3
 795          SE  1267.5  1268.0  1268.5  1269.0  1269.5  1270.0  1270.5  1271.0
 796          SQ       0     0.8     4.1    8.16     9.5    13.4    16.4    19.0

 797          KK     27S
 798          KM    SUB-BASIN 27
 799          BA    .123
 800          LS              82
 801          UD    .167

 802          KK    27RR
 803          KM    DETENTION BASIN NO. 7
 804          RS       1    ELEV  1278.0
 805          SV       0     1.9     3.9     5.9     7.9     9.9    12.1
 806          SE  1278.0  1278.5  1279.0  1279.5  1280.0  1280.5  1281.5
 807          SQ       0     5.4     7.6     9.2    10.6    12.0    13.2

 808          KK     29S
 809          KM    COMBINE SUB-BASIN 28 & 29
 810          BA    .063
 811          LS              77
 812          UD    .167

 813          KK    HC29
 814          HC       2

 815          KK     30S
 816          KM    SUB-BASIN 30
 817          BA    .056
 818          LS              84
 819          UD    .167
```

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

 820          KK    30RR
 821          KM    DETENTION BASIN 10
 822          RS       1    ELEV  1265.0
 823          SV       0     .78    1.58    2.40    3.25    4.13    5.03
 824          SE  1265.0  1265.5  1266.0  1266.5  1267.0  1267.5  1268.0
 825          SQ       0     5.4     8.5    10.4    12.0    13.5    14.7

 826          KK    HC30
 827          HC       2

 828          KK     31S
 829          KM    SUB-BASIN 31
 830          BA    .053
 831          LS              77
 832          UD    .167

 833          KK    HC31
 834          HC       3

 835          KK     32S
 836          KM    COMBINE SUB-BASIN 26 & 32
 837          BA    .053
 838          LS              77
 839          UD    .167

 840          KK    HC32
 841          HC       2

 842          KK     34S
 843          KM    COMBINE SUB-BASIN 33 & 34
 844          BA    .076
 845          LS              77
 846          UD    .167

 847          KK    HC34
 848          KM    OUTFLOW FROM SYSTEM II
 849          HC       2
              *
              *    ARROWHEAD RANCH - SECTION 18 - SYSTEM III
              *

 850          KK     41S
 851          KM    SUB-BASIN 41
 852          BA    .023
 853          LS              86
 854          UD    .167

 855          KK     42S
 856          KM    SUB-BASIN 42
 857          BA    .070
 858          LS              80
 859          UD    .167
```

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

 860          KK    HC42
 861          HC       2

 862          KK    42RR
 863          KM    LAKE NO. 1
 864          RS       1    ELEV  1303.0
 865          SV       0    1.32    2.66    4.05    5.49
 866          SE  1303.0  1303.5  1304.0  1304.5  1305.0
 867          SQ       0    12.0    13.5    15.4    29.6

 868          KK     43S
 869          KM    SUB-BASIN 43
 870          BA    .007
 871          LS              68
 872          UD    .167

 873          KK    HC43
 874          HC       2

 875          KK     44S
 876          KM    SUB-BASIN 44
 877          BA    .034
 878          LS              81
 879          UD    .167

 880          KK    HC44
 881          HC       2

 882          KK     45S
 883          KM    SUB-BASIN 45
 884          BA    .017
 885          LS              92
 886          UD    .167

 887          KK     46S
 888          KM    SUB-BASIN 46
 889          BA    .057
 890          LS              85
 891          UD    .167

 892          KK    HC46
 893          HC       2

 894          KK    46RR
 895          KM    LAKE NO. 3
 896          RS       1    ELEV  1300.0
 897          SV       0    1.39    2.81    4.30    5.86    7.44    9.19   10.97   12.81
 898          SE  1300.0  1300.5  1301.0  1301.5  1302.0  1302.5  1303.0  1303.5  1304.0
 899          SQ       0   11.32   18.50   24.75   68.41  175.58  515.84  478.47  662.59
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 900          KK     47S
 901          KM     SUB-BASIN 47
 902          BA     .034
 903          LS                84
 904          UD     .167

 905          KK   HC47A
 906          HC       2

 907          KK   HC47B
 908          HC       2

 909          KK    47RR
 910          KM     LAKE NO. 2
 911          RS       1    ELEV  1289.0
 912          SV       0     1.2    2.42    3.67    4.95
 913          SE  1289.0  1289.5  1290.0  1290.5  1291.0
 914          SQ       0     6.5    17.2    51.0   118.5

 915          KK     48S
 916          KM     SUB-BASIN 48
 917          BA     .057
 918          LS                83
 919          UD     .167

 920          KK    HC48
 921          HC       2

 922          KK    48RR
 923          KM     LAKE NO. 4
 924          RS       1    ELEV  1287.0
 925          SV       0     .45     .90    1.37    1.85
 926          SE  1287.0  1287.5  1288.0  1288.5  1289.0
 927          SQ       0   34.65   79.50  127.20  170.70

 928          KK     49S
 929          KM     SUB-BASIN 49
 930          BA     .037
 931          LS                61
 932          UD     .167

 933          KK    HC49
 934          HC       2

 935          KK     50S
 936          KM     SUB-BASIN 50
 937          BA     .022
 938          LS                84
 939          UD     .167
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 940          KK    HC50
 941          HC       2

 942          KK     52S
 943          KM    SUB-BASIN 52
 944          BA    .010
 945          LS              92
 946          UD    .167

 947          KK     53S
 948          KM    SUB-BASIN 53
 949          BA    .030
 950          LS              87
 951          UD    .167

 952          KK    HC53
 953          HC       2

 954          KK    53RR
 955          KM    LAKE NO. 5
 956          RS       1    ELEV  1297.0
 957          SV       0     .44     .89    1.38    1.89    2.43    3.00    3.60    4.23
 958          SE  1297.0  1297.5  1298.0  1298.5  1299.0  1299.5  1300.0  1300.5  1301.0
 959          SQ       0    8.15   14.50   28.24   64.15  117.14  178.85  250.28  329.60

 960          KK     54S
 961          KM    SUB-BASIN 54
 962          BA    .027
 963          LS              92
 964          UD    .167

 965          KK     55S
 966          KM    SUB-BASIN 55
 967          BA    .020
 968          LS              88
 969          UD    .167

 970          KK   HC55A
 971          HC       2

 972          KK   HC55B
 973          HC       2

 974          KK    55RR
 975          KM    LAKE NO. 6
 976          RS       1    ELEV  1294.0
 977          SV       0     .62    1.25    1.90    2.60    3.33    4.99    5.70
 978          SE  1294.0  1294.5  1295.0  1295.5  1296.0  1296.5  1297.5  1298.0
 979          SQ       0    8.15   21.60   59.15  110.62  172.74  323.46  410.25
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 980          KK     56S
 981          KM    SUB-BASIN 56
 982          BA    .040
 983          LS               83
 984          UD    .167

 985          KK     57S
 986          KM    SUB-BASIN 57
 987          BA    .104
 988          LS               82
 989          UD    .167

 990          KK   HC57A
 991          HC       2

 992          KK   HC57B
 993          HC       2

 994          KK    57RR
 995          KM    LAKE NO. 7
 996          RS       1     ELEV  1290.0
 997          SV       0      .42     .85    1.32    1.81    2.35
 998          SE  1290.0   1290.5  1291.0  1291.5  1292.0  1292.5
 999          SQ       0    55.37  139.73  246.52  361.01  489.63

1000          KK     58S
1001          KM    SUB-BASIN 58
1002          BA    .006
1003          LS               79
1004          UD    .167

1005          KK    HC58
1006          HC       2

1007          KK     51S
1008          KM    SUB-BASIN 51
1009          BA    .128
1010          LS               85
1011          UD    .167

1012          KK    HC51
1013          HC       3

1014          KK   51RR1
1015          KM    LAKE NO.8
1016          RS       1     ELEV  1277.0
1017          SV       0     3.63    7.31   11.10   14.99    19.0   27.29
1018          SE  1277.5   1278.0  1278.5  1279.0  1279.5  1280.0  1280.5
1019          SQ       0    47.73  149.77  274.47  422.96  590.56  776.30
```

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

KK   51RR2
KM     LAKE NO. 9
RS       1    ELEV  1273.0
SV       0     .79    1.58    2.41    3.26
SE  1273.0  1273.5  1274.0  1274.5  1275.0
SQ       0   72.24  202.66  372.95  558.36

KK      61S
KM     COMBINE SUB-BASINS 59, 60 & 61
BA     .124
LS              77
UD     .167

KK     HC61
HC        2

KK     61RR
KM     LAKE NO. 10
RS        1    ELEV  1265.0
SV        0     4.1    9.60   12.50    15.5    21.6    24.7    28.0    31.2    34.6
SE   1265.0  1265.5  1266.5  1267.0  1267.5  1268.0  1268.5  1269.0  1269.5  1270.0
SQ        0       0    36.0    54.0    72.0   105.0   204.4   359.2   539.2   746.9

KK    HC570
KM     COMBINE OUTFLOW FROM SYSTEM III WITH SYSTEM II
HC        2
*
*
*   CONCLUDE PORTION OF HEC-1 MODEL INPUT OBTAINED FROM ARROWHEAD RANCH
*   DEVELOPMENT REPORT BY DIBBLE & ASSOCIATES.
*
*

KK    RM570
KM    NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 570 THROUGH 571
KM              1) Reach Length = 5301 ft
RS        6    FLOW     -1
RC     .030    .020    .030    5301   .0009
RX       28      68      88     100     112     124     144     154
RY      108     107     106     100     100     106     107     108

KK     571S
KM    RUNOFF GENERATED ON SUB-BASIN 571
KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM    L= 2.272 mi   S= 26 ft/mi   Kb= 0.044
KM    CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
BA    1.345
LG     .409    .109   5.980    .266   9.130
UC    1.058    .642
UA        0       3       5       8      12      20      43      75      90      96
UA      100
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LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1059           KK   HC571
1060           KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 571 WITH ROUTED FLOW FROM 570
1061           HC       2

1062           KK   RM571
1063           KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 571 THROUGH 553
1064           KM           1) Reach Length = 3194 ft
1065           RS       3    FLOW      -1
1066           RC    .030    .020    .030    3194   .0009
1067           RX      28      68      88     100     112     124     144     154
1068           RY     108     107     106     100     100     106     107     108

1069           KK    553S
1070           KM   RUNOFF GENERATED ON SUB-BASIN 553
1071           KM   THE FOLLOWING PARAMETERS WERE USED FOR THIS BASIN
1072           KM   L= 1.052 mi  S= 38 ft/mi  Kb= 0.056
1073           KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
1074           BA    .933
1075           LG    .419    .165   5.360    .284   2.760
1076           UC    .613    .233
1077           UA       0       3       5       8      12      20      43      75      90      96
1078           UA     100

1079           KK   HC553
1080           KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 553 WITH ROUTED FLOWS FROM 541, 552
1081           KM   AND 571
1082           HC       4

1083           KK   RM553
1084           KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 553 THROUGH 554
1085           KM           1) Reach Length = 5660 ft
1086           RS       4    FLOW      -1
1087           RC    .040    .040    .040    5660   .0041
1088           RX     100     150     210     240     300     350     370     400
1089           RY      36      34      28      22      22      24      30      36

1090           KK   554R1
1091           DR   554D1

1092           KK   554R2
1093           DR   554D2

1094           KK    554S
1095           KM   RUNOFF GENERATED ON SUB-BASIN 554
1096           KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1097           KM   L= 1.531 mi  S= 25 ft/mi  Kb= 0.064
1098           KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
1099           BA    .540
1100           LG    .326    .248   3.610    .347  17.170
1101           UC   1.121    .839
1102           UA       0       3       5       8      12      20      43      75      90      96
1103           UA     100
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LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1104           KK   HC554
1105           KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 554 WITH ROUTED FLOWS FROM 553
1106           KM   AND DIVERTED FLOWS FROM 532 & 533
1107           HC       4

1108           KK   RM554
1109           KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 554 THROUGH 555
1110           KM            1) Reach Length = 5771 ft
1111           RS       4    FLOW      -1
1112           RC    .040    .040    .040    5771   .0047
1113           RX      80     100     160     220     240     250     480     500
1114           RY     104     104      96      92      92      96      97     104

1115           KK   555R1
1116           DR   555D1

1117           KK   555R2
1118           DR   555D2

1119           KK    555S
1120           KM   RUNOFF GENERATED ON SUB-BASIN 555
1121           KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1122           KM   L= 1.108 mi  S= 34 ft/mi  Kb= 0.068
1123           KM   CLARK UNIT HYDROGRAPH FOR NATURAL WATERSHEDS WAS USED FOR THIS BASIN
1124           BA    .536
1125           LG    .326    .293   5.050    .252  11.750
1126           UC    .788    .440
1127           UA       0       3       5       8      12      20      43      75      90      96
1128           UA     100

1129           KK  HC555A
1130           KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 555 WITH ROUTED FLOW FROM 554
1131           KM   AND DIVERTED FLOWS FROM 533 & 534
1132           HC       4
               *
               *
               *   BEGIN PORTION OF HEC-1 MODEL INPUT OBTAINED FROM ARROWHEAD RANCH
               *   DEVELOPMENT REPORT BY DIBBLE & ASSOCIATES.
               *
               *
               *    ARROWHEAD RANCH - SECTION 25/26 - SYSTEM VI
               *

1133           KK     91S
1134           KM    SUB-BASIN 91
1135           BA    .069
1136           LS              77
1137           UD     .20
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1138          KK     92S
1139          KM    SUB-BASIN 92
1140          BA    .033
1141          LS               84
1142          UD    .167

1143          KK    HC92
1144          HC       2

1145          KK    92RR
1146          KM    LAKE NO. 2
1147          RS       1    ELEV  1242.0
1148          SV     0.0     2.9     4.4     5.9     7.4     9.0    10.6    18.5    20.3    22.1
1149          SE  1242.0  1243.0  1243.5  1244.0  1244.5  1245.0  1245.5  1247.8  1248.3  1248.8
1150          SQ       0     .02     .03     .04     .05     .06     .07     .08    49.0   140.0

1151          KK     93S
1152          KM    SUB-BASIN 93
1153          BA    .061
1154          LS               71
1155          UD     .20

1156          KK    HC93
1157          HC       2

1158          KK    93RR
1159          KM    LAKE NO. 3
1160          RS       1    ELEV  1236.0
1161          SV     0.0     2.3     4.6     6.9     9.3    11.7    14.2
1162          SE  1236.0  1236.5  1237.0  1237.5  1238.0  1238.5  1239.0
1163          SQ       0     5.4     8.5    10.4    12.0    13.5    14.7

1164          KK     94S
1165          KM    SUB-BASIN 94
1166          BA    .077
1167          LS               76
1168          UD     .20

1169          KK    HC94
1170          HC       2

1171          KK     95S
1172          KM    SUB-BASIN 95
1173          BA    .068
1174          LS               75
1175          UD    .167

1176          KK    HC95
1177          HC       2
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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1178        KK     96S
1179        KM    SUB-BASIN 96
1180        BA    .086
1181        LS              84
1182        UD    .300

1183        KK    96RR
1184        KM    LAKE NO. 4
1185        RS       1    ELEV  1237.0
1186        SV     0.0     1.7     3.4     5.2     7.0     8.8    10.7
1187        SE  1237.0  1237.5  1238.0  1238.5  1239.0  1239.5  1240.0
1188        SQ     0.0     7.2    15.1    18.5    21.4    23.9    26.2

1189        KK     97S
1190        KM    SUB-BASIN 97
1191        BA    .071
1192        LS              71
1193        UD    .800

1194        KK    HC97
1195        HC       3

1196        KK    97RR
1197        KM    LAKE NO. 5
1198        RS       1    ELEV  1230.0
1199        SV     0.0     1.8     3.7     5.6     7.5     9.4    11.4    14.7    16.8    19.0
1200        SE  1230.0  1230.5  1231.0  1231.5  1232.0  1232.5  1233.0  1233.8  1234.3  1234.8
1201        SQ     0.0    0.01    0.02    0.03    0.04    0.05    0.06    0.08   124.0   350.0

1202        KK     98S
1203        KM    SUB-BASIN 98
1204        BA    .018
1205        LS              84
1206        UD    .167

1207        KK    98RR
1208        KM    LAKE NO. 6
1209        RS       1    ELEV  1230.0
1210        SV     0.0     0.5     1.1     1.7     2.3     2.9     3.5
1211        SE  1230.0  1230.5  1231.0  1231.5  1232.0  1232.5  1233.0
1212        SQ     0.0     7.2    15.1    18.5    21.4    23.9    26.2

1213        KK    HC98
1214        HC       2

1215        KK     99S
1216        KM    SUB-BASIN 99
1217        BA    .047
1218        LS              77
1219        UD    .167
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1220          KK    HC99
1221          HC       2

1222          KK    99RR
1223          KM    LAKE NO.7
1224          RS       1    ELEV  1229.0
1225          SV     0.0     1.9     3.8     5.8     7.8     9.8    11.9
1226          SE  1229.0  1229.5  1230.0  1230.5  1231.0  1231.5  1232.0
1227          SQ     0.0     7.2    15.1    18.5    21.4    23.9    26.2

1228          KK     90S
1229          KM    SUB-BASIN 90
1230          BA    .077
1231          LS              77
1232          UD    .300

1233          KK   HC580
1234          KM    OUTFLOW FROM SYSTEM VI
1235          HC       2
              *
              *
              *   CONCLUDE PORTION OF HEC-1 MODEL INPUT OBTAINED FROM ARROWHEAD RANCH
              *   DEVELOPMENT REPORT BY DIBBLE & ASSOCIATES.
              *
              *

1236          KK   RM580
1237          KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 580 THROUGH 581
1238          KM            1) Reach Length = 5515 ft
1239          RS       6    FLOW      -1
1240          RC    .030    .020    .030    5515   .0047
1241          RX     148     168     188     200     208     220     260     300
1242          RY     110     107     106     100     100     106     108     109

1243          KK    581S
1244          KM   RUNOFF GENERATED ON SUB-BASIN 581
1245          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1246          KM   L= 1.836 mi  S= 15 ft/mi  Kb= 0.033
1247          KM   CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
1248          BA    .823
1249          LG    .206    .184   3.920    .429  54.370
1250          UC    .896    .595
1251          UA       0       5      16      30      65      77      84      90      94      97
1252          UA     100

1253          KK   HC581
1254          KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 581 WITH ROUTED FLOW FROM 580
1255          HC       2
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1256          KK  HC555B
1257          KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 555 WITH 581
1258          HC       2

1259          KK   RM555
1260          KM   NORMAL DEPTH STORAGE ROUTE FLOW FROM SUB-BASIN 555 & 581 THROUGH 556
1261          KM            1) Reach Length = 7336 ft
1262          RS       5    FLOW      -1
1263          RC    .040    .040    .040    7336   .0054
1264          RX       0      20      80     250     440     480     530     560
1265          RY      84      80      76      74      74      80      90      92

1266          KK    556R
1267          DR    556D

1268          KK    556S
1269          KM   RUNOFF GENERATED ON SUB-BASIN 556
1270          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1271          KM   L= 1.379 mi  S= 26 ft/mi  Kb= 0.053
1272          KM   CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
1273          BA    .558
1274          LG    .426    .110   3.920    .514   8.400
1275          UC    .904    .597
1276          UA       0       5      16      30      65      77      84      90      94      97
1277          UA     100

1278          KK  HC556A
1279          KM   COMBINE HYDROGRAPHS FROM SUB-BASIN 556 WITH ROUTED FLOWS FROM 535,
1280          KM   556 & 581.  ALSO, TOTAL FLOW FROM NEW RIVER UPSTREAM OF ITS CONFLUENCE
1281          KM   WITH SKUNK CREEK.
1282          HC       4

1283          KK    408S
1284          KM   RUNOFF GENERATED ON SUB-BASIN 408
1285          KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1286          KM   L= 1.935 mi  S= 22 ft/mi  Kb= 0.057
1287          KM   CLARK UNIT HYDROGRAPH FOR URBAN WATERSHEDS WAS USED FOR THIS BASIN
1288          BA   1.076
1289          LG    .298    .275   3.870    .415  18.170
1290          UC   1.337    .831
1291          UA       0       5      16      30      65      77      84      90      94      97
1292          UA     100
1293          ZZ
```

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*****************************************                    *****************************************
*                                       *                    *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *   U.S. ARMY CORPS OF ENGINEERS        *
*              MAY   1991               *                    *   HYDROLOGIC ENGINEERING CENTER       *
*           VERSION 4.0.1E              *                    *         609 SECOND STREET             *
*                                       *                    *      DAVIS, CALIFORNIA 95616          *
* RUN DATE  01/25/95  TIME  12:03:17    *                    *          (916) 551-1748               *
*                                       *                    *                                       *
*****************************************                    *****************************************
```

```
                   ACDC AREA DRAINAGE MASTER STUDY
                   FILENAME:  NR324B.DAT          KHE JOB NO. 0146
                   WATERSHED CONTRIBUTING TO NEW RIVER UP TO ITS CONFLUENCE WITH
                   SKUNK CREEK

                   100-YEAR 24-HOUR DURATION STORM FOR EXISTING CONDITIONS


  9 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      1   0  STARTING DATE
                   ITIME       0000  STARTING TIME
                      NQ        800  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE      3   0  ENDING DATE
                  NDTIME       0516  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	500S	204.	12.67	46.	12.	6.	0.41		
ROUTED TO	RM500	190.	13.07	46.	12.	6.	0.41	100.63	13.07
HYDROGRAPH AT	501S	310.	12.67	55.	14.	6.	0.52		
2 COMBINED AT	HC501	406.	12.93	100.	26.	12.	0.93		
ROUTED TO	RM501	381.	13.40	98.	26.	12.	0.93	101.02	13.40
HYDROGRAPH AT	502S	179.	13.20	59.	15.	7.	0.55		
HYDROGRAPH AT	510S	466.	12.47	77.	21.	9.	0.63		
ROUTED TO	RM510	441.	12.67	77.	21.	9.	0.63	100.35	12.67
HYDROGRAPH AT	511S	272.	12.60	49.	12.	6.	0.44		
2 COMBINED AT	HC511	711.	12.67	125.	33.	15.	1.06		
ROUTED TO	RM511	672.	12.93	125.	33.	15.	1.06	100.72	12.93
HYDROGRAPH AT	512S	227.	12.87	54.	13.	6.	0.47		
2 COMBINED AT	HC512A	895.	12.93	179.	46.	21.	1.53		
DIVERSION TO	533D	447.	12.93	89.	23.	10.	1.53		
HYDROGRAPH AT	502RE	447.	12.93	89.	23.	10.	1.53		
3 COMBINED AT	HC502	873.	13.20	245.	64.	29.	3.02		
ROUTED TO	RM502	865.	13.40	245.	64.	29.	3.02	101.09	13.40
HYDROGRAPH AT	503S	575.	12.73	167.	50.	23.	0.95		
2 COMBINED AT	HC503	1221.	13.40	407.	114.	52.	3.97		
ROUTED TO	503RR	25.	13.07	25.	25.	20.	3.97	30.06	19.73
ROUTED TO	RM503	25.	14.33	25.	25.	19.	3.97	100.28	14.60
HYDROGRAPH AT	533R	447.	12.93	89.	23.	10.	0.00		
HYDROGRAPH AT	533A	13.	12.00	2.	0.	0.	0.01		
2 COMBINED AT	HC512B	448.	12.93	91.	24.	11.	0.01		
ROUTED TO	RM512	439.	13.07	91.	24.	11.	0.01	101.56	13.07
HYDROGRAPH AT	533B	377.	12.07	57.	18.	8.	0.28		

ROUTED TO	533RR1	39.	13.07	31.	17.	8.	0.28	32.27	13.07
2 COMBINED AT	HC533A	478.	13.07	122.	41.	19.	0.29		
HYDROGRAPH AT	520S	705.	12.27	88.	24.	11.	0.68		
DIVERSION TO	530D	137.	12.27	38.	12.	5.	0.68		
HYDROGRAPH AT	520RE	568.	12.27	50.	13.	6.	0.68		
ROUTED TO	RM520	525.	12.47	50.	13.	6.	0.68	101.82	12.47
HYDROGRAPH AT	521S	706.	12.33	100.	28.	13.	0.62		
2 COMBINED AT	HC521	1179.	12.40	150.	40.	18.	1.29		
ROUTED TO	RM521	1047.	12.73	150.	40.	18.	1.29	101.73	12.73
HYDROGRAPH AT	522S	309.	12.73	63.	16.	7.	0.51		
2 COMBINED AT	HC522	1356.	12.73	213.	56.	25.	1.80		
HYDROGRAPH AT	533C	172.	12.20	26.	8.	4.	0.12		
2 COMBINED AT	HC533B	1410.	12.73	239.	64.	29.	1.92		
ROUTED TO	533RR2	1129.	12.93	235.	64.	29.	1.92	37.82	12.93
HYDROGRAPH AT	533D	102.	12.47	24.	7.	3.	0.10		
2 COMBINED AT	HC533C	1193.	12.93	258.	71.	32.	2.02		
ROUTED TO	533RR3	1128.	13.07	184.	62.	32.	2.02	36.90	13.07
HYDROGRAPH AT	533E	20.	12.07	3.	1.	0.	0.01		
2 COMBINED AT	HC533D	1129.	13.07	185.	62.	32.	2.04		
ROUTED TO	533RR4	1102.	13.13	185.	62.	32.	2.04	36.75	13.13
HYDROGRAPH AT	530S	1128.	12.13	121.	34.	15.	0.82		
HYDROGRAPH AT	R530	137.	11.87	38.	12.	5.	0.00		
2 COMBINED AT	HC530	1265.	12.13	159.	45.	20.	0.82		
ROUTED TO	RM530	1165.	12.33	159.	45.	20.	0.82	101.80	12.33
HYDROGRAPH AT	531S	739.	12.47	144.	38.	17.	0.65		
2 COMBINED AT	HC531	1882.	12.40	303.	83.	38.	1.47		
ROUTED TO	RM531	1730.	12.73	303.	83.	38.	1.47	102.35	12.73
HYDROGRAPH AT	532S	570.	12.47	108.	27.	12.	0.52		
2 COMBINED AT	HC532	2183.	12.67	411.	110.	50.	2.00		
DIVERSION TO	554D1	1528.	12.67	288.	77.	35.	2.00		

HYDROGRAPH AT	532RE	655.	12.67	123.	33.	15.	2.00		
HYDROGRAPH AT	533F	92.	12.13	13.	4.	2.	0.06		
2 COMBINED AT	HC533E	674.	12.67	136.	37.	17.	2.06		
HYDROGRAPH AT	533G	105.	12.13	16.	5.	2.	0.08		
2 COMBINED AT	HC533F	704.	12.67	151.	42.	19.	2.14		
ROUTED TO	533RR6	645.	12.80	100.	39.	19.	2.14	33.69	12.80
2 COMBINED AT	HC533G	1529.	13.07	285.	101.	51.	4.18		
ROUTED TO	RM522B	1511.	13.20	285.	101.	51.	4.18	103.05	13.20
HYDROGRAPH AT	533H	56.	12.07	8.	3.	1.	0.03		
2 COMBINED AT	HC533H	1515.	13.20	291.	103.	52.	4.21		
HYDROGRAPH AT	533I	111.	12.27	20.	6.	3.	0.08		
ROUTED TO	533RR8	20.	13.20	16.	6.	3.	0.08	30.18	13.27
2 COMBINED AT	HC533I	1535.	13.20	307.	109.	55.	4.29		
ROUTED TO	RM522C	1525.	13.20	307.	109.	55.	4.29	102.42	13.20
HYDROGRAPH AT	533J	58.	12.07	9.	3.	1.	0.03		
2 COMBINED AT	HC533J	1529.	13.20	314.	111.	56.	4.33		
HYDROGRAPH AT	533K	80.	12.13	11.	4.	2.	0.06		
ROUTED TO	533RR9	20.	12.60	11.	4.	2.	0.06	28.40	12.60
2 COMBINED AT	HC533K	1548.	13.20	325.	114.	58.	4.38		
DIVERSION TO	554D2	100.	13.20	56.	14.	6.	4.38		
HYDROGRAPH AT	533RE1	1448.	13.20	269.	100.	51.	4.38		
DIVERSION TO	555D1	323.	13.20	46.	12.	5.	4.38		
HYDROGRAPH AT	533RE2	1126.	13.20	223.	88.	46.	4.38		
DIVERSION TO	534D1	334.	13.20	48.	12.	5.	4.38		
HYDROGRAPH AT	533RE3	792.	13.20	175.	76.	41.	4.38		
DIVERSION TO	534D2	396.	13.20	55.	14.	6.	4.38		
HYDROGRAPH AT	533RE4	396.	13.20	120.	62.	34.	4.38		
ROUTED TO	RM533C	389.	13.27	119.	62.	34.	4.38	101.81	13.27
3 COMBINED AT	HC533L	831.	13.20	263.	126.	73.	8.64		
ROUTED TO	RM533D	800.	13.40	263.	125.	72.	8.64	101.86	13.40

HYDROGRAPH AT	534R1	334.	13.20	48.	12.	5.	0.00		
ROUTED TO	RM533E	323.	13.40	48.	12.	5.	0.00	101.37	13.40
DIVERSION TO	555D2	150.	13.40	33.	8.	4.	0.00		
HYDROGRAPH AT	533RE6	173.	13.40	15.	4.	2.	0.00		
DIVERSION TO	535D	113.	13.40	11.	3.	1.	0.00		
HYDROGRAPH AT	533RE7	60.	13.40	4.	1.	0.	0.00		
ROUTED TO	RM533F	49.	13.60	4.	1.	0.	0.00	100.75	13.60
HYDROGRAPH AT	534R2	396.	13.20	55.	14.	6.	0.00		
ROUTED TO	RM533G	386.	13.40	55.	14.	6.	0.00	101.42	13.40
HYDROGRAPH AT	534S	601.	12.47	155.	44.	20.	0.90		
4 COMBINED AT	HC534	1472.	13.40	469.	180.	99.	9.54		
ROUTED TO	RM534A	1454.	13.53	468.	180.	98.	9.54	102.46	13.53
HYDROGRAPH AT	535R	113.	13.40	11.	3.	1.	0.00		
DIVERSION TO	556D	63.	13.40	6.	1.	1.	0.00		
HYDROGRAPH AT	535RE	50.	13.40	5.	1.	1.	0.00		
ROUTED TO	RM534C	49.	13.53	5.	1.	1.	0.00	100.70	13.53
ROUTED TO	RM534E	47.	13.67	5.	1.	1.	0.00	100.78	13.67
HYDROGRAPH AT	535S	697.	12.20	108.	31.	14.	0.64		
3 COMBINED AT	HC535	1534.	13.53	574.	209.	113.	10.18		
DIVERSION TO	DV91S	259.	13.53	16.	4.	2.	10.18		
HYDROGRAPH AT	535RE	1275.	13.53	558.	205.	111.	10.18		
ROUTED TO	RM535	1271.	13.60	557.	205.	111.	10.18	105.68	13.60
HYDROGRAPH AT	540S	1015.	13.13	270.	71.	32.	2.24		
ROUTED TO	RM540	994.	13.40	270.	71.	32.	2.24	21.97	13.40
HYDROGRAPH AT	541S	231.	12.73	46.	11.	5.	0.47		
2 COMBINED AT	HC541	1106.	13.33	315.	82.	37.	2.71		
ROUTED TO	RM541	1088.	13.53	314.	82.	37.	2.71	90.04	13.53
HYDROGRAPH AT	542S	329.	12.53	53.	13.	6.	0.49		
2 COMBINED AT	HC542	1145.	13.53	365.	95.	43.	3.20		
ROUTED TO	RM542	1125.	13.73	364.	95.	43.	3.20	67.93	13.73

HYDROGRAPH AT	550S	3700.	12.60	2548.	2401.	2373.	1.95		
ROUTED TO	RM550	3607.	12.87	2548.	2401.	2373.	1.95	29.06	12.87
HYDROGRAPH AT	560S	1080.	12.33	135.	35.	16.	1.12		
ROUTED TO	RM560	880.	12.93	135.	35.	16.	1.12	90.77	12.93
HYDROGRAPH AT	551S	542.	13.00	137.	34.	16.	1.45		
3 COMBINED AT	HC551	4975.	12.93	2819.	2471.	2405.	4.51		
ROUTED TO	RM551	4868.	13.07	2819.	2471.	2405.	4.51	79.38	13.07
HYDROGRAPH AT	552S	932.	13.20	281.	76.	34.	2.38		
2 COMBINED AT	HC552	5796.	13.13	3100.	2547.	2439.	6.90		
ROUTED TO	RM552	5706.	13.33	3100.	2547.	2439.	6.90	51.93	13.33
HYDROGRAPH AT	21S	39.	12.07	6.	2.	1.	0.04		
ROUTED TO	21RR	0.	24.20	0.	0.	0.	0.04	1279.03	24.20
HYDROGRAPH AT	22S	42.	12.00	7.	2.	1.	0.03		
2 COMBINED AT	HC22	42.	12.00	7.	2.	1.	0.06		
ROUTED TO	22RR	19.	12.27	6.	2.	1.	0.06	1277.97	12.27
HYDROGRAPH AT	23S	12.	12.00	2.	1.	0.	0.01		
2 COMBINED AT	HC23	29.	12.07	8.	3.	1.	0.07		
ROUTED TO	23RR	19.	12.73	8.	3.	1.	0.07	1276.23	12.73
HYDROGRAPH AT	24S	8.	12.00	1.	0.	0.	0.01		
2 COMBINED AT	HC24	21.	12.13	9.	3.	1.	0.08		
ROUTED TO	24RR	17.	13.20	9.	3.	1.	0.08	1273.15	13.20
HYDROGRAPH AT	25S	63.	12.07	10.	3.	1.	0.05		
2 COMBINED AT	HC25	74.	12.07	19.	6.	3.	0.13		
ROUTED TO	25RR	10.	15.27	10.	6.	3.	0.13	1269.63	15.27
HYDROGRAPH AT	27S	137.	12.07	21.	7.	3.	0.12		
ROUTED TO	27RR	10.	13.80	10.	6.	3.	0.12	1279.85	13.87
HYDROGRAPH AT	29S	57.	12.07	9.	3.	1.	0.06		
2 COMBINED AT	HC29	65.	12.07	18.	9.	4.	0.19		
HYDROGRAPH AT	30S	67.	12.07	10.	3.	1.	0.06		
ROUTED TO	30RR	11.	12.73	9.	3.	1.	0.06	1266.79	12.73

2 COMBINED AT	HC30	75.	12.07	27.	12.	6.	0.24		
HYDROGRAPH AT	31S	48.	12.07	7.	2.	1.	0.05		
3 COMBINED AT	HC31	128.	12.07	44.	20.	10.	0.42		
HYDROGRAPH AT	32S	48.	12.07	7.	2.	1.	0.05		
2 COMBINED AT	HC32	176.	12.07	51.	23.	11.	0.48		
HYDROGRAPH AT	34S	69.	12.07	11.	3.	1.	0.08		
2 COMBINED AT	HC34	245.	12.07	62.	26.	12.	0.55		
HYDROGRAPH AT	41S	30.	12.00	5.	1.	1.	0.02		
HYDROGRAPH AT	42S	72.	12.07	11.	3.	2.	0.07		
2 COMBINED AT	HC42	102.	12.07	16.	5.	2.	0.09		
ROUTED TO	42RR	17.	12.73	14.	5.	2.	0.09	1304.57	12.73
HYDROGRAPH AT	43S	4.	12.07	1.	0.	0.	0.01		
2 COMBINED AT	HC43	18.	12.67	15.	5.	2.	0.10		
HYDROGRAPH AT	44S	37.	12.07	6.	2.	1.	0.03		
2 COMBINED AT	HC44	54.	12.07	20.	7.	3.	0.13		
HYDROGRAPH AT	45S	26.	12.00	4.	1.	1.	0.02		
HYDROGRAPH AT	46S	71.	12.07	11.	3.	2.	0.06		
2 COMBINED AT	HC46	97.	12.00	15.	5.	2.	0.07		
ROUTED TO	46RR	23.	12.53	14.	5.	2.	0.07	1301.35	12.53
HYDROGRAPH AT	47S	41.	12.07	6.	2.	1.	0.03		
2 COMBINED AT	HC47A	59.	12.07	20.	7.	3.	0.11		
2 COMBINED AT	HC47B	113.	12.07	40.	13.	6.	0.24		
ROUTED TO	47RR	66.	12.33	37.	13.	6.	0.24	1290.61	12.33
HYDROGRAPH AT	48S	66.	12.07	10.	3.	1.	0.06		
2 COMBINED AT	HC48	105.	12.13	47.	17.	7.	0.30		
ROUTED TO	48RR	97.	12.27	46.	17.	7.	0.30	1288.19	12.27
HYDROGRAPH AT	49S	12.	12.07	2.	1.	0.	0.04		
2 COMBINED AT	HC49	106.	12.20	49.	17.	8.	0.34		
HYDROGRAPH AT	50S	26.	12.07	4.	1.	1.	0.02		
2 COMBINED AT	HC50	125.	12.13	52.	18.	8.	0.36		

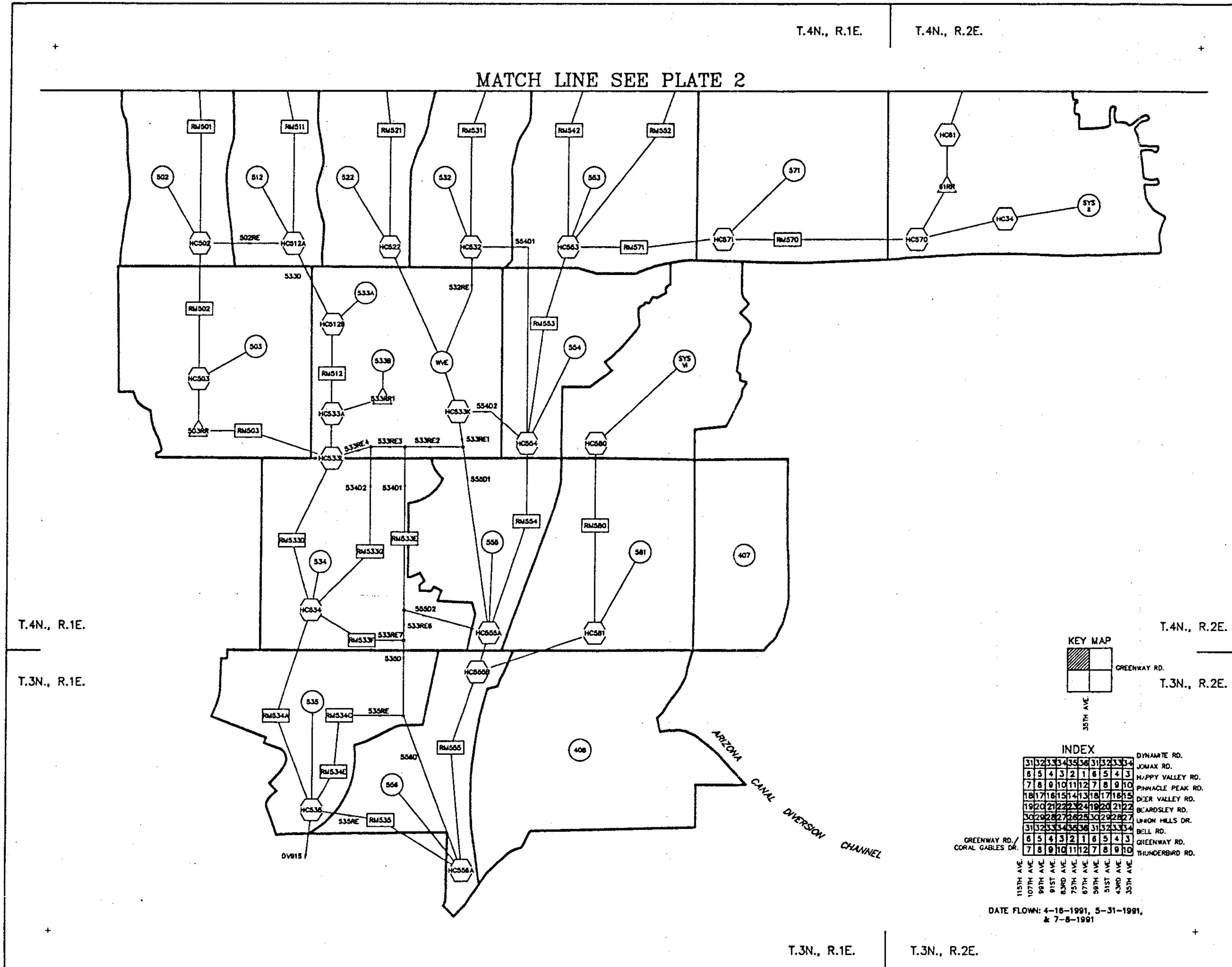
HYDROGRAPH AT	52S	15.	12.00	2.	1.	0.	0.01		
HYDROGRAPH AT	53S	40.	12.00	6.	2.	1.	0.03		
2 COMBINED AT	HC53	55.	12.00	9.	3.	1.	0.04		
ROUTED TO	53RR	35.	12.20	9.	3.	1.	0.04	1298.59	12.20
HYDROGRAPH AT	54S	42.	12.00	7.	2.	1.	0.03		
HYDROGRAPH AT	55S	28.	12.00	4.	1.	1.	0.02		
2 COMBINED AT	HC55A	69.	12.00	11.	3.	2.	0.05		
2 COMBINED AT	HC55B	94.	12.07	19.	6.	3.	0.09		
ROUTED TO	55RR	77.	12.20	19.	6.	3.	0.09	1295.67	12.20
HYDROGRAPH AT	56S	46.	12.07	7.	2.	1.	0.04		
HYDROGRAPH AT	57S	116.	12.07	18.	6.	2.	0.10		
2 COMBINED AT	HC57A	163.	12.07	25.	8.	3.	0.14		
2 COMBINED AT	HC57B	226.	12.07	44.	14.	6.	0.23		
ROUTED TO	57RR	218.	12.13	44.	14.	6.	0.23	1291.37	12.13
HYDROGRAPH AT	58S	6.	12.07	1.	0.	0.	0.01		
2 COMBINED AT	HC58	223.	12.13	45.	14.	6.	0.24		
HYDROGRAPH AT	51S	159.	12.07	25.	8.	3.	0.13		
3 COMBINED AT	HC51	496.	12.07	121.	40.	18.	0.72		
ROUTED TO	51RR1	328.	12.33	118.	40.	18.	0.72	1279.18	12.33
ROUTED TO	51RR2	323.	12.40	117.	40.	18.	0.72	1274.35	12.40
HYDROGRAPH AT	61S	113.	12.07	17.	5.	2.	0.12		
2 COMBINED AT	HC61	362.	12.33	134.	46.	21.	0.85		
ROUTED TO	61RR	201.	13.20	112.	44.	20.	0.85	1268.48	13.20
2 COMBINED AT	HC570	265.	12.07	168.	69.	32.	1.40		
ROUTED TO	RM570	255.	13.47	167.	69.	32.	1.40	103.41	13.47
HYDROGRAPH AT	571S	920.	12.67	193.	52.	23.	1.35		
2 COMBINED AT	HC571	1102.	12.67	356.	119.	55.	2.74		
ROUTED TO	RM571	1072.	12.87	355.	119.	55.	2.74	106.84	12.87
HYDROGRAPH AT	553S	1023.	12.33	116.	30.	13.	0.93		
4 COMBINED AT	HC553	7253.	13.33	3926.	2790.	2550.	13.77		

ROUTED TO	RM553	7210.	13.47	3925.	2790.	2550.	13.77	29.21	13.47
HYDROGRAPH AT	554R1	1528.	12.67	288.	77.	35.	0.00		
HYDROGRAPH AT	554R2	100.	12.07	56.	14.	6.	0.00		
HYDROGRAPH AT	554S	297.	12.73	77.	22.	10.	0.54		
4 COMBINED AT	HC554	7984.	13.40	4340.	2902.	2601.	14.31		
ROUTED TO	RM554	7918.	13.60	4338.	2902.	2601.	14.31	99.38	13.60
HYDROGRAPH AT	555R1	323.	13.20	46.	12.	5.	0.00		
HYDROGRAPH AT	555R2	150.	13.27	33.	8.	4.	0.00		
HYDROGRAPH AT	555S	443.	12.47	72.	20.	9.	0.54		
4 COMBINED AT	HC555A	8340.	13.60	4485.	2942.	2619.	14.85		
HYDROGRAPH AT	91S	60.	12.07	10.	3.	1.	0.07		
HYDROGRAPH AT	92S	40.	12.07	6.	2.	1.	0.03		
2 COMBINED AT	HC92	100.	12.07	16.	5.	2.	0.10		
ROUTED TO	92RR	0.	24.07	0.	0.	0.	0.10	1245.19	24.60
HYDROGRAPH AT	93S	39.	12.07	6.	2.	1.	0.06		
2 COMBINED AT	HC93	39.	12.07	7.	2.	1.	0.16		
ROUTED TO	93RR	4.	13.60	4.	2.	1.	0.16	1236.40	13.60
HYDROGRAPH AT	94S	64.	12.07	10.	3.	1.	0.08		
2 COMBINED AT	HC94	66.	12.07	14.	5.	2.	0.24		
HYDROGRAPH AT	95S	57.	12.07	9.	3.	1.	0.07		
2 COMBINED AT	HC95	122.	12.07	23.	8.	4.	0.31		
HYDROGRAPH AT	96S	88.	12.13	16.	5.	2.	0.09		
ROUTED TO	96RR	17.	13.00	13.	5.	2.	0.09	1238.31	13.00
HYDROGRAPH AT	97S	22.	12.73	7.	2.	1.	0.07		
3 COMBINED AT	HC97	138.	12.07	43.	15.	7.	0.47		
ROUTED TO	97RR	31.	15.00	21.	8.	4.	0.47	1233.92	14.93
HYDROGRAPH AT	98S	22.	12.07	3.	1.	0.	0.02		
ROUTED TO	98RR	9.	12.33	3.	1.	0.	0.02	1230.62	12.33
2 COMBINED AT	HC98	33.	14.93	22.	9.	4.	0.48		
HYDROGRAPH AT	99S	43.	12.07	7.	2.	1.	0.05		

2 COMBINED AT	HC99	50.	12.07	24.	11.	5.	0.53		
ROUTED TO	99RR	19.	18.40	18.	11.	5.	0.53	1230.51	18.47
HYDROGRAPH AT	90S	58.	12.13	11.	3.	1.	0.08		
2 COMBINED AT	HC580	64.	12.13	23.	14.	6.	0.61		
ROUTED TO	RM580	60.	12.40	23.	14.	6.	0.61	101.18	12.40
HYDROGRAPH AT	581S	639.	12.33	168.	55.	25.	0.82		
2 COMBINED AT	HC581	699.	12.33	186.	67.	31.	1.43		
2 COMBINED AT	HC555B	8542.	13.53	4664.	3008.	2650.	16.28		
ROUTED TO	RM555	8467.	13.73	4663.	3008.	2650.	16.28	78.02	13.73
HYDROGRAPH AT	556R	63.	13.40	6.	1.	1.	0.00		
HYDROGRAPH AT	556S	338.	12.33	69.	18.	8.	0.56		
4 COMBINED AT	HC556A	9808.	13.73	5287.	3226.	2770.	27.02		
HYDROGRAPH AT	408S	499.	12.53	146.	42.	19.	1.08		

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

SECTION VII
Plates 1-8



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ACDC/ADMS PHASE 1 NEW RIVER 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

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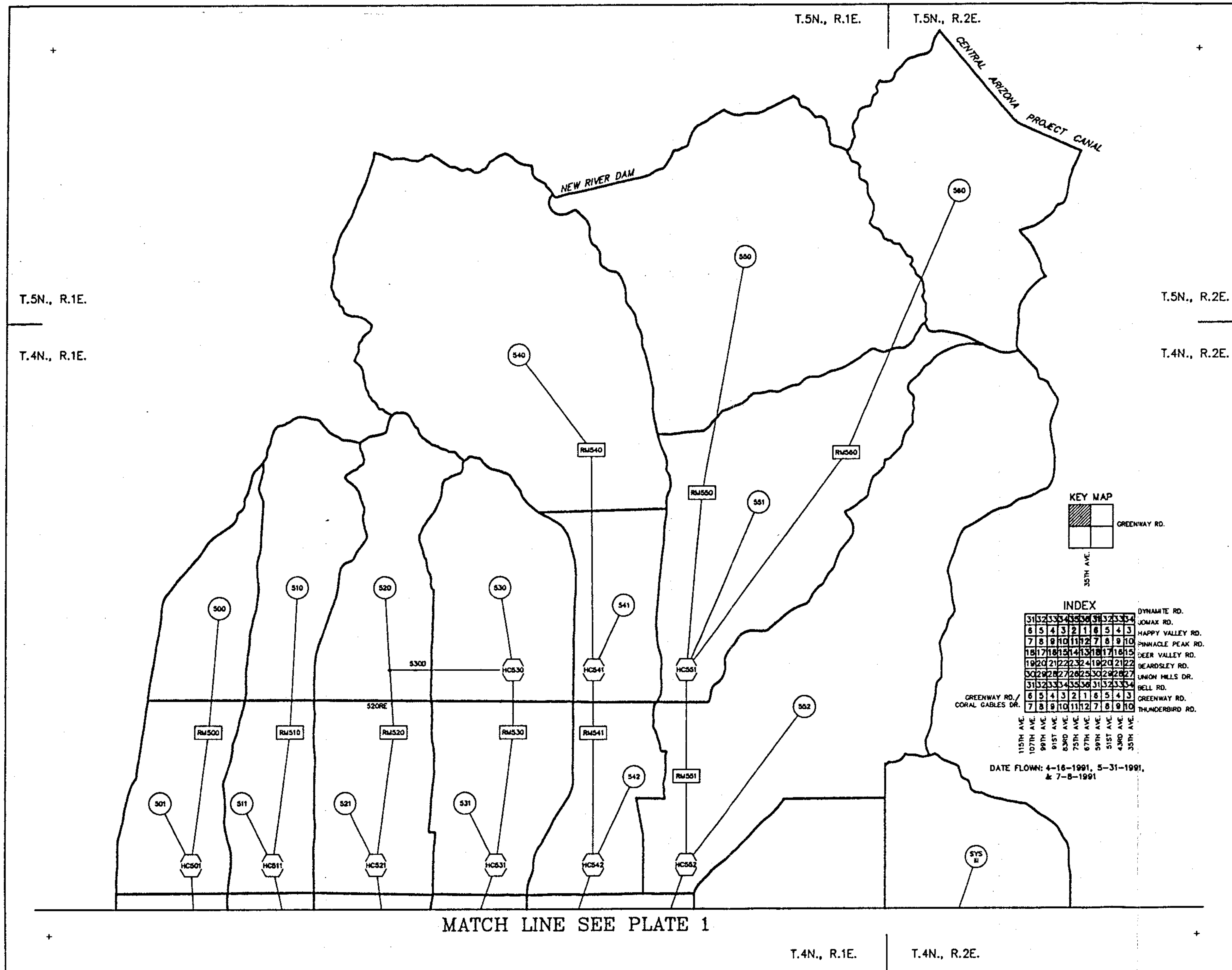
FEET



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ACDC/ADMS PHASE 1 NEW RIVER 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 2

KAMINSKI HUBBARD engineering, inc.
SURVEYING • CIVIL • HYDROLOGY
4550 N. BLACK CANYON HWY., SUITE C
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N

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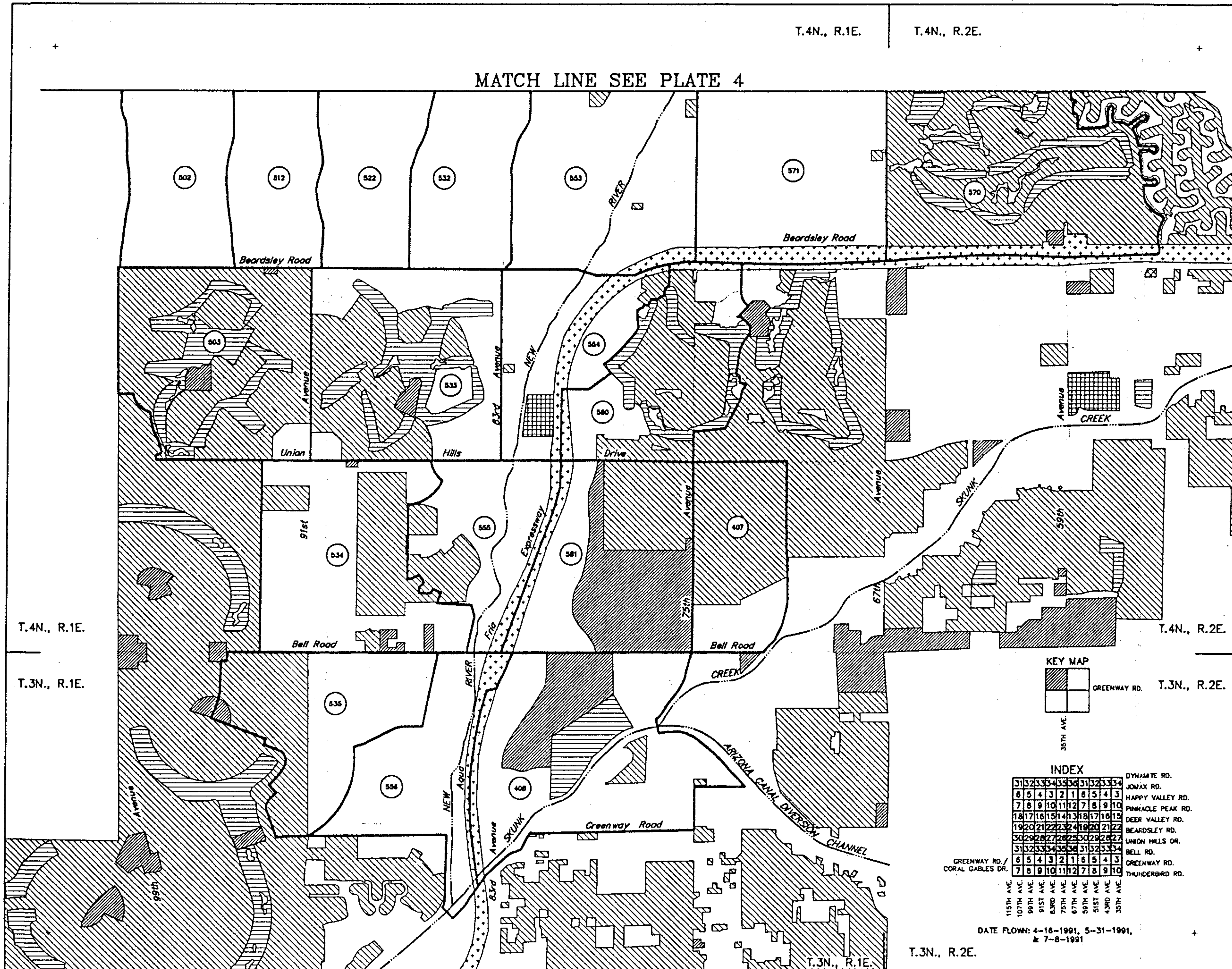

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ACDC/ADMS PHASE 1 NEW RIVER HYDROLOGY STUDY

LEGEND

- Drainage Basin Boundary
- Residential Land Use
- Commercial Land Use
- Golf Course/Park
- Utility Land Use
- Industrial Land Use
- Right-of-Way
- Vacant Land Use
- (510) Drainage Sub-Basin Number

LAND USE MAP
EXISTING CONDITIONS

PLATE 3

KAMINSKI HUBBARD engineering, inc.
SURVEYING • CIVIL • HYDROLOGY
4550 N. BLACK CANYON HWY., SUITE C
PHOENIX, ARIZONA 85017
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N

SCALE
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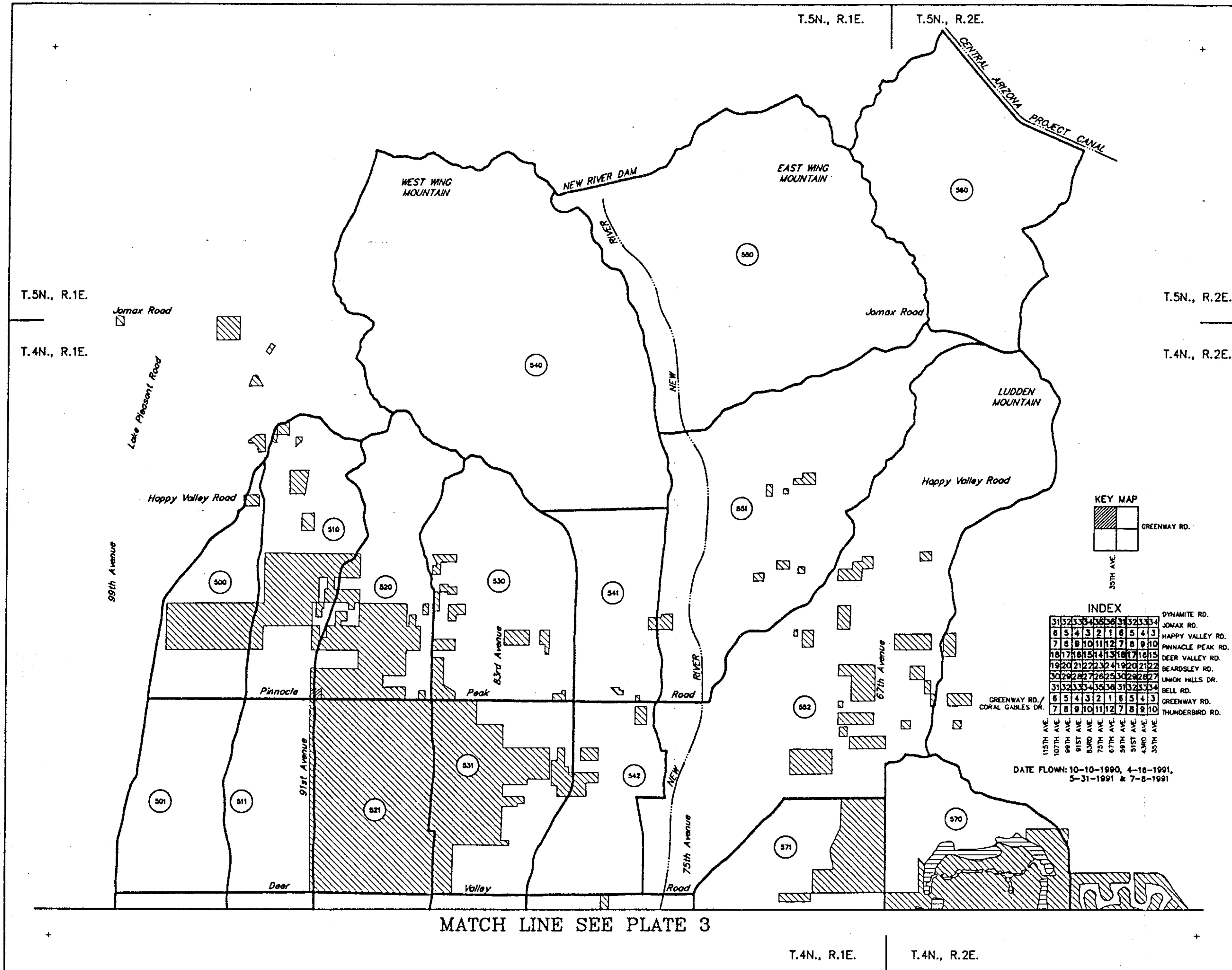
FEET



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ACDC/ADMS PHASE 1 NEW RIVER HYDROLOGY STUDY

LEGEND

- Drainage Basin Boundary
- Residential Land Use
- Commercial Land Use
- Golf Course/Park
- Utility Land Use
- Industrial Land Use
- Vacant Land Use
- (510) Drainage Sub-Basin Number

LAND USE MAP
EXISTING CONDITIONS

PLATE 4

KAMINSKI HUBBARD engineering, inc.
SURVEYING • CIVIL • HYDROLOGY
4550 N. BLACK CANYON HWY., SUITE C
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N

SCALE
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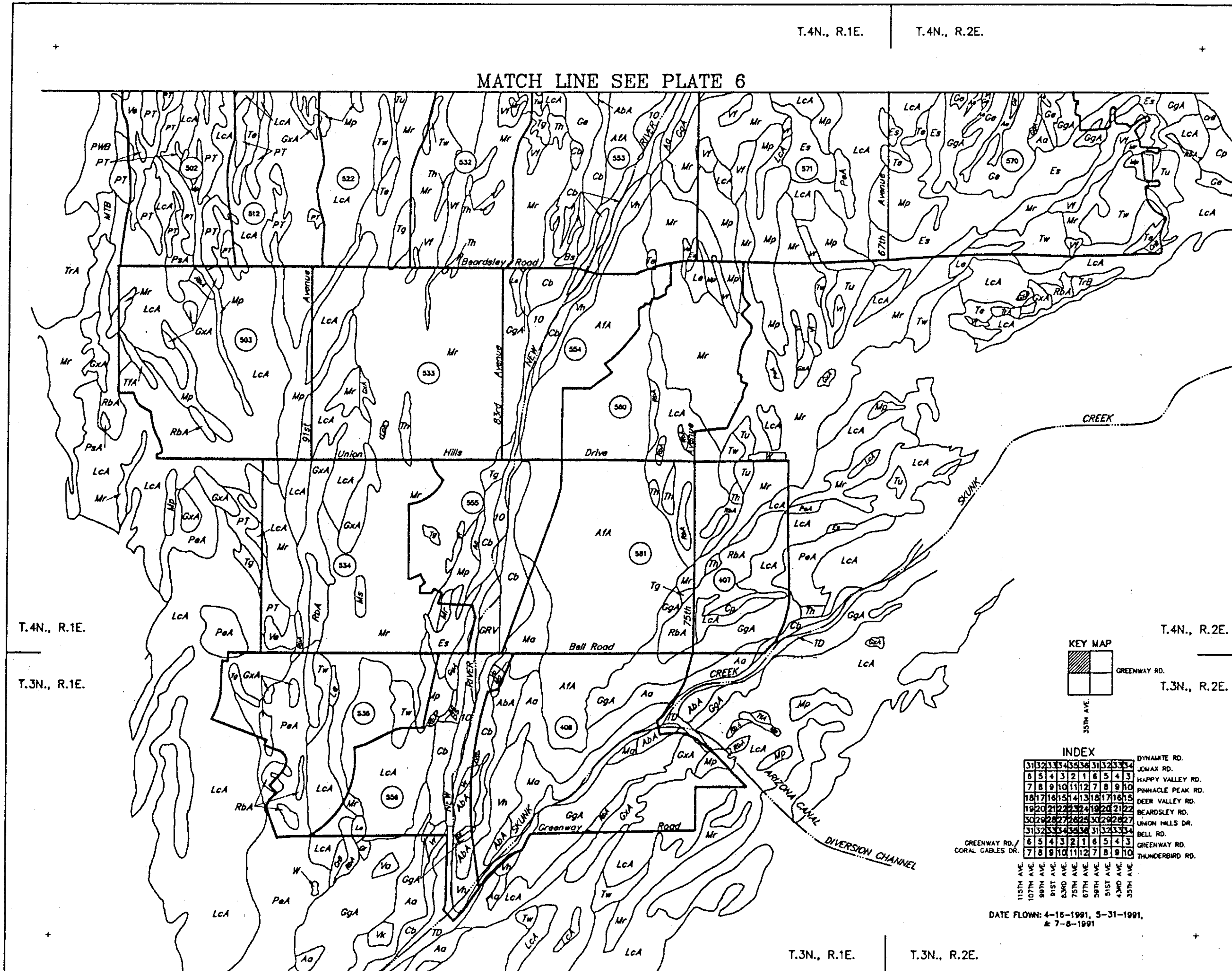
FEET



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ACDC/ADMS PHASE 1 NEW RIVER HYDROLOGY STUDY

LEGEND

- Drainage Basin Boundary
- (510) 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 5

KAMINSKI HUBBARD engineering, inc.
SURVEYING • CIVIL • HYDROLOGY
4550 N. BLACK CANYON HWY., SUITE C
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N

SCALE
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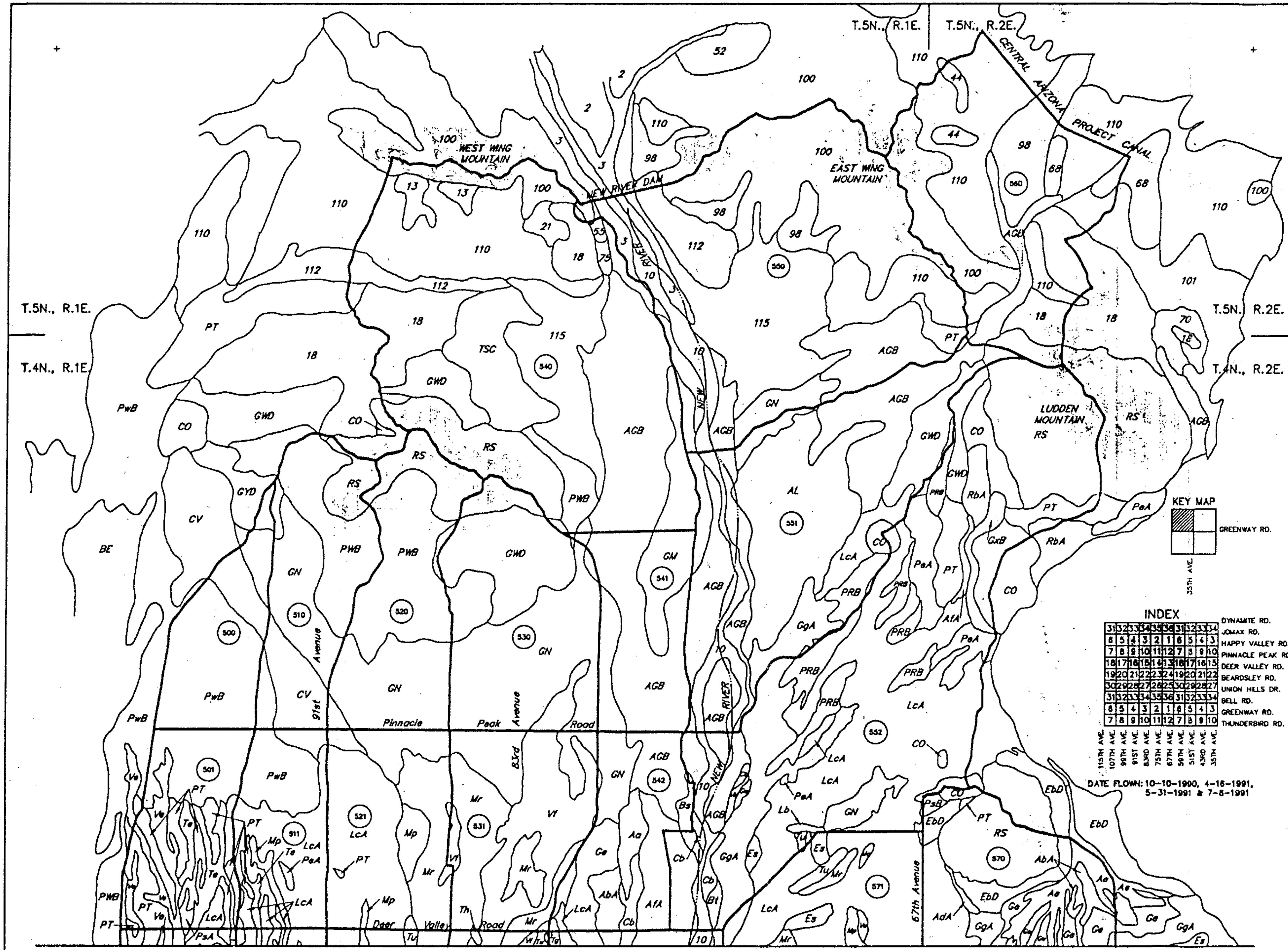

MATCH LINE SEE PLATE 5

T.4N., R.1E. T.4N., R.2E.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ACDC/ADMS PHASE 1 NEW RIVER HYDROLOGY STUDY

LEGEND

Drainage Basin Boundary

(510) 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 6

KAMINSKI HUBBARD engineering, inc.
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SCALE
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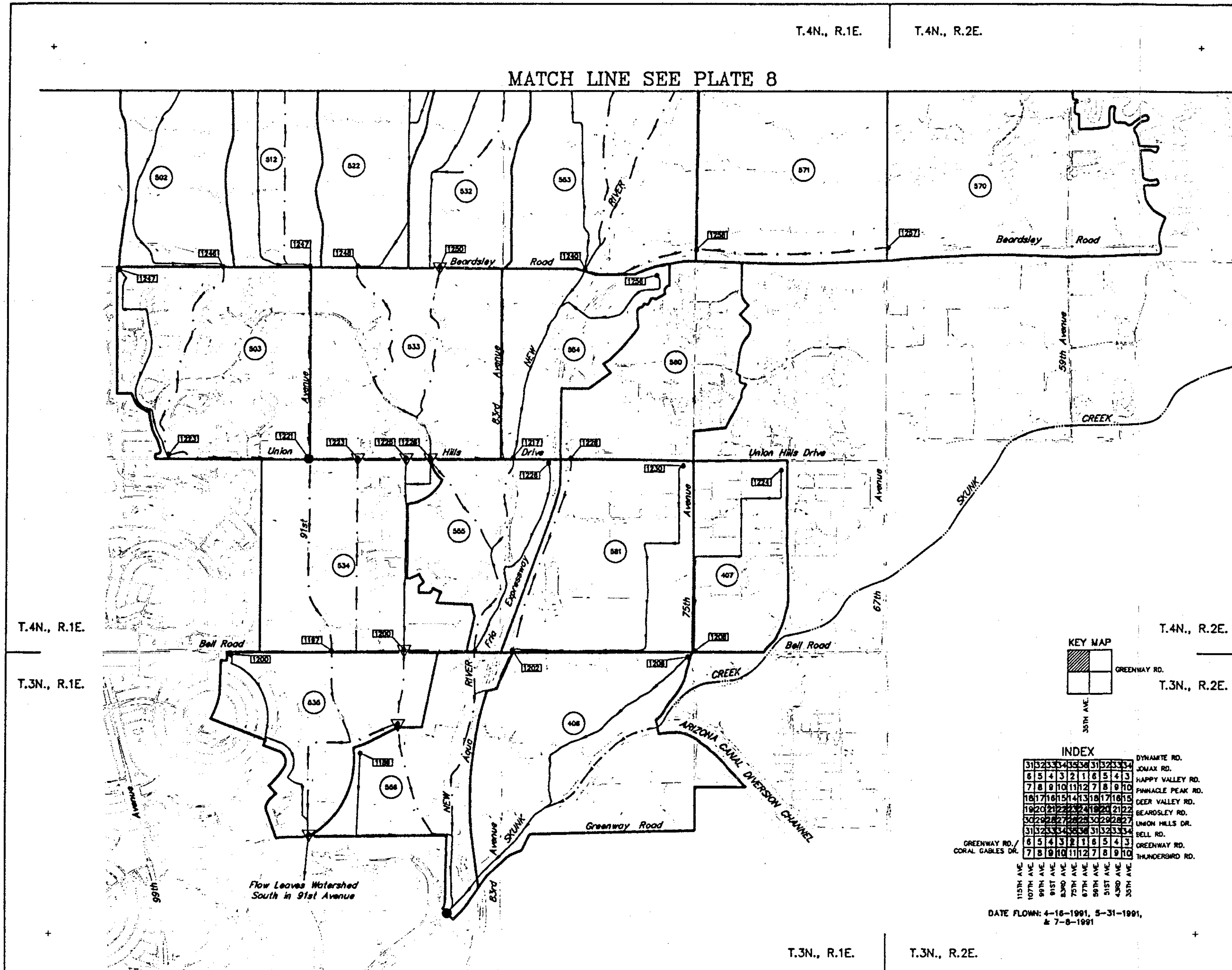


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ACDC/ADMS PHASE 1 NEW RIVER HYDROLOGY STUDY

LEGEND

- Drainage Basin Boundary
- Drainage Sub-Basin Number
- Major Drainage Basin Concentration Point
- Drainage Sub-Basin Concentration Point
- Flow Diversion Point
- Routing Flow Path
- Length of Longest Watercourse
- Elevation Along Flow Path

FLOW ROUTING MAP
EXISTING CONDITIONS

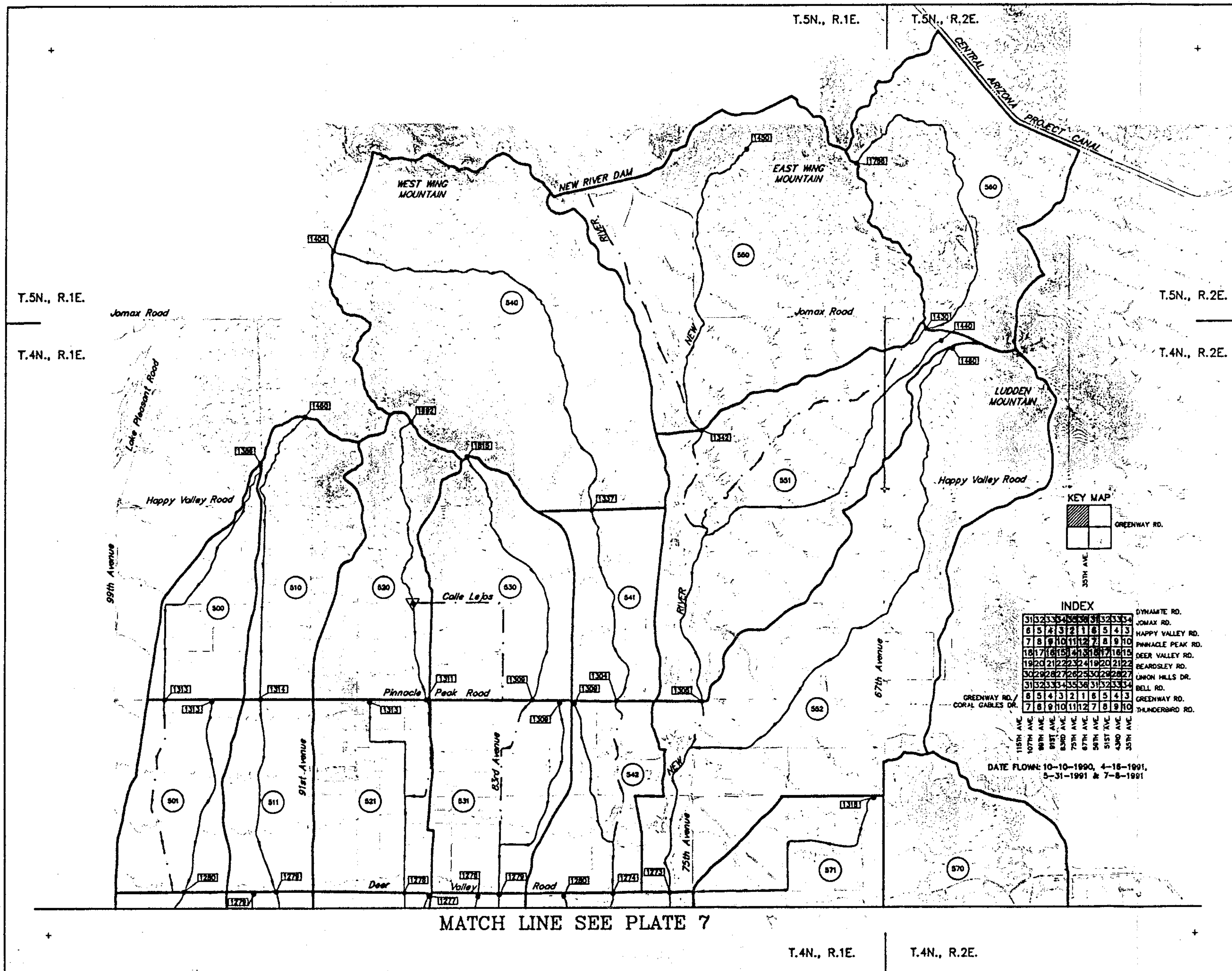
PLATE 7

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
FEET

CONTOUR INTERVAL 10 FEET



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ACDC/ADMS PHASE 1 NEW RIVER HYDROLOGY STUDY

LEGEND

- Drainage Basin Boundary
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- Routing Flow Path
- Length of Longest Watercourse
- Elevation Along Flow Path

FLOW ROUTING MAP

EXISTING CONDITIONS

PLATE 8

KAMINSKI HUBBARD engineering, inc.

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N

SCALE

1200 600 0 1200 2400

FEET

CONTOUR INTERVAL 10 FEET

SECTION VIII
HEC-1 Data Files on Computer Diskette