RIVERSIDE COUNTY FLOOD CONTROL AND
WATER CONSERVATION DISTRICT
RIVERSIDE, CALIFORNIA

MASTER DRAINAGE PLAN

FOR THE

ANZA & WILSON CREEK AREAS

ZONE SEVEN

KENNETH L. EDWARDS
CHIEF ENGINEER

MAY 1988

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CONTENTS

TABLE

PLATES

MAPS

PHOTOGRAPHS

PURPOSE

The purpose of this report is to investigate and evaluate the drainage problems of the Anza and Wilson Creek areas and to develop an economical drainage plan which will enhance flood protection for the community of Anza and improve the road crossing of Route 3 and Wilson Creek.

The community of Anza is situated along State Highway 371 approximately 20 miles southeast of the City of Hemet. It is bounded roughly by Thomas Mountain to the north, State Highway 371 to the south, Table Mountain to the east and Cahuilla Creek watershed to the west.

The specific segment of Wilson Creek to be studied is located at the crossing of Route 3 (Sage Road), approximately 14 miles southwest of Anza and 10 miles south of the community of Sage, near the Cottonwood School. Route 3 is the major link between Anza and the City of Hemet which provides many support services for the Anza community.

The plan presented herein will provide collector and conveyance systems for major storm flows which presently impact the community.

It should be noted by the reader that the cover of this report clearly states it is a master plan and, therefore, should be read and used with this in mind. Simply stated, this plan is an overview, a study of the drainage problems that exist in a specific geographical area, and a conceptual solution to those problems. As stated elsewhere in this report, the selection of the facilities presented in this plan is based on engineering and economic considerations and is by no means the only solution.

The alignment and location of the facilities proposed in this master drainage plan are general; precise facility locations will be dictated by conditions and other factors existing at the time of design. Similarly, the sizing information shown on the enclosed map is preliminary. A more detailed analysis performed at the design stage will determine final sizing.

SCOPE

The drainage area covered in the study of the Anza area is 16.9 square miles in size. The terrain varies from the rather steep hillsides of the Thomas and Table Mountains to the moderately sloping Anza Valley. The drainage area tributary to Wilson Creek at Route 3 is approximately 126 square miles in size including the acreage tributary to the Anza area. The terrain is composed of rugged hillsides and gentle sloping valleys. The extent of the studies establishing this master plan includes:

1. Determination of the quantity and points of concentration of storm runoff.

2. Preparation of drainage boundary maps (see Pages 9 and 10).

3. Determination of the location and size of the proposed drainage structures.

4. Investigation of alternate routes and methods as a basis for selecting the most economically and engineeringly sound plan.

5. Preparation of preliminary plans and profiles, and supporting cost estimates.

GENERAL DISCUSSION

This report provides a master drainage plan for the Anza and Wilson Creek areas. In the Anza area, the plan consists of two trapezoidal concrete lined open channels and three approach levees; one small trapezoidal channel and some underground storm drains. The proposed system will collect and safely convey Hamilton Creek and Anza Creek storm runoff through the developing community. The crossing of Route 3 and Wilson Creek will be improved by constructing a 60-foot clear span bridge.

At present, during periods of runoff, floodwaters emanating from the mountains and hills surrounding the Anza area impact the community causing property damage and leaving roads impassable. A photo showing flow patterns experienced during the storms of March 1980 is shown on Page 3.

The extent of flooding that could be expected from a 100 year storm impacting the Anza area has been determined by the Federal Insurance Administration. A reproduction of this mapped flood plain is shown on Page 4.

During periods of runoff, Wilson Creek, backed by a drainage area of 126 square miles, severs Route 3 approximately 1.5 miles north of Highway 371. An aerial photograph showing flows estimated at 1000 cubic feet per second during the storm of February 1980 is shown on Page 5. To date the FIA has not included this area in their flood plain mapping.

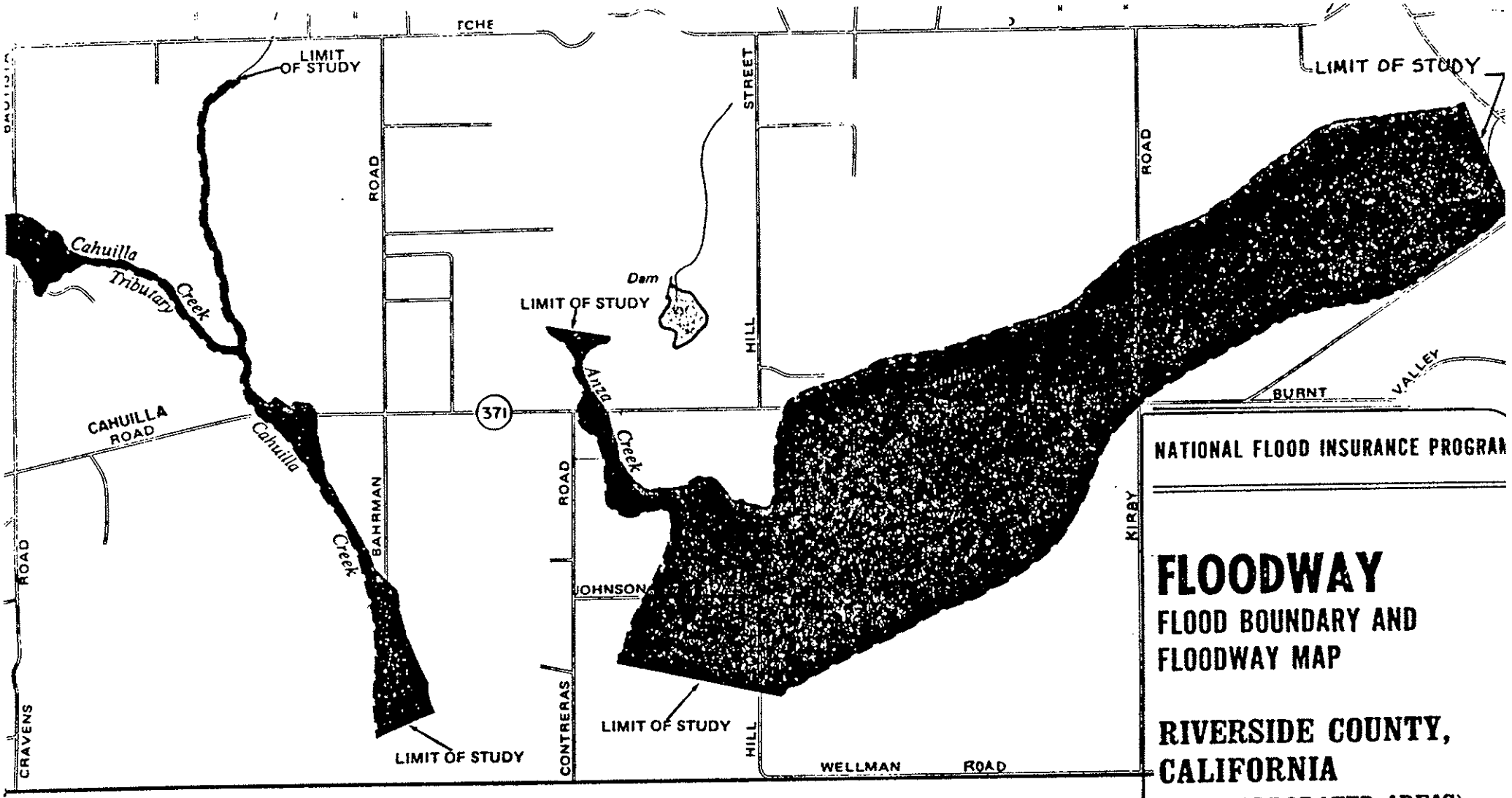
CRITERIA

Open channels are proposed when the discharge is large and the construction and right of way costs for a channel prove to be less than the cost of an underground storm drain. The open channels provided in this plan are designed to carry the runoff from a 100 year frequency storm with allowance for debris laden flows.

Control or approach levees are proposed to contain flows and direct them toward inlet facilities.

PHOTO DATE 6-20-80

—ANZA AREA—



NATIONAL FLOOD INSURANCE PROGRAM

FLOODWAY

FLOOD BOUNDARY AND FLOODWAY MAP

RIVERSIDE COUNTY, CALIFORNIA

(UNINCORPORATED AREAS)

SCALE: 1" = 2000'

PHOTO DATE 2-28-80

WILSON CREEK AT ROUTE 3

The alignment and location of all drainage facilities proposed in this plan are based on hydraulic efficiency, the ability to drain tributary areas and economics.

HYDROLOGY

Due to the large drainage area involved in this plan, the Synthetic Unit Hydrograph Method was used to determine peak storm runoff. The enveloping curves were used only on the Wilson Creek watershed due to its immense size. The design discharges used in sizing future facilities in the study area should also be determined using this method as well as the Modified Rations Hydrology Method for smaller tributary areas, up to 500 acres in size.

Methodology and supportive data for the rational and synthetic hydrology, as well as peak discharge enveloping curves, can be found in "The Riverside County Flood Control and Water Conservation District Hydrology Manual", dated April 1978.

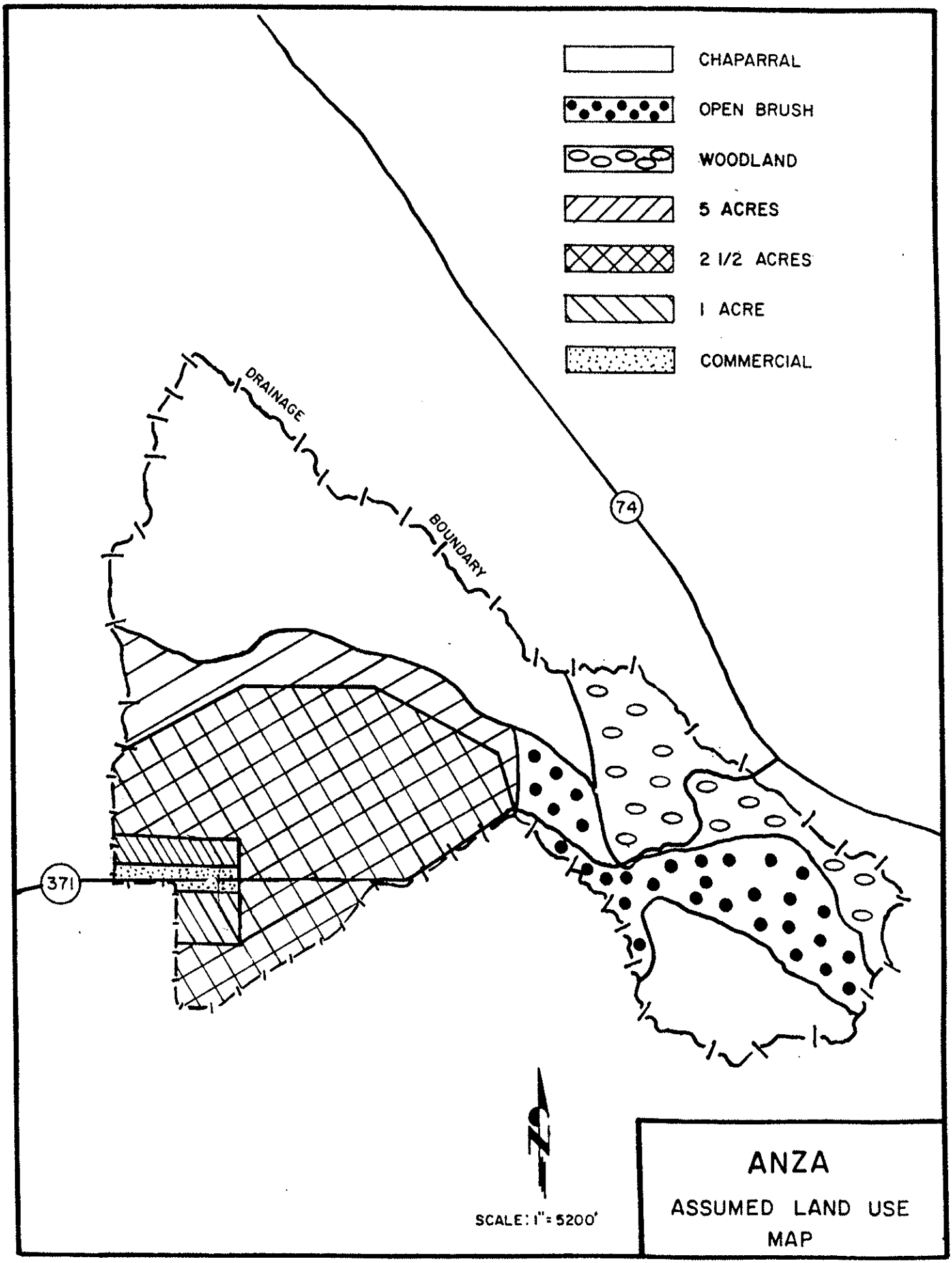
As a result of soil characteristics, the existing topography of the area and anticipated flow velocities, debris transportation is expected to be a factor in the Hamilton Creek watershed in determining the volume of debris generated, "The U. S. Army Corps of Engineers' Method of Estimating Debris Storage Requirements for Debris Basins" (1963), as well as "The Report on Debris Reduction Studies for Mountain Watersheds", Los Angeles County Flood Control District, 1958, was used. Values obtained through the Corps' method were chosen to be representative of the study area.

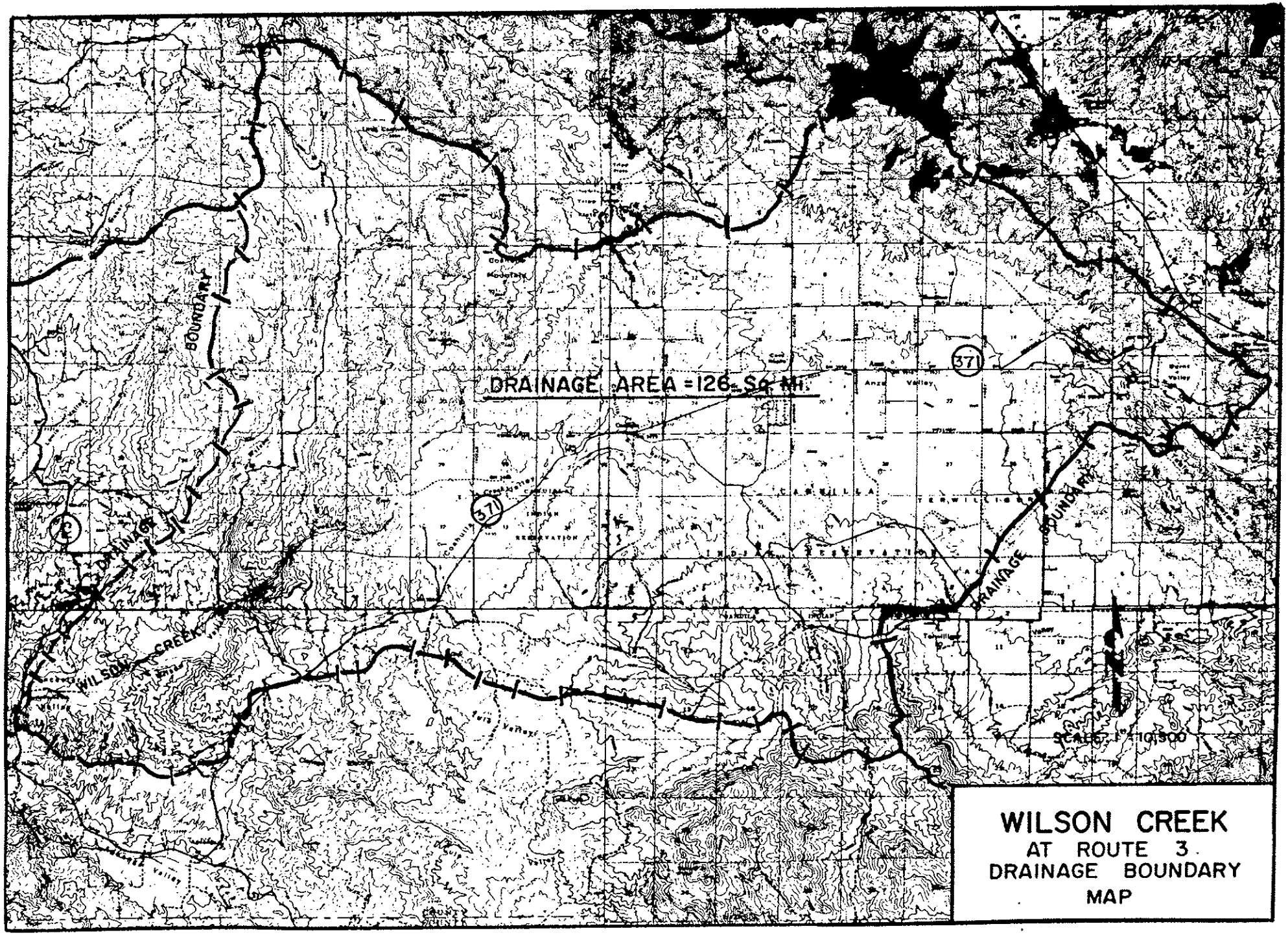
Usually, future land use assumptions used in District prepared master drainage plans are based on County and/or local general land use plans. In the Anza Creek area, however, the only land use plan currently in use is the "Riverside Extended Mountain Area Plan", adopted September 1979. This plan shows land use designations that are far too general for our purpose. Therefore, it became necessary to generate a more defined land use plan. The map on Page 7 of this report shows the assumed future land use patterns that were used throughout this plan. The map is based on a review of recent aerial photography, recent subdivision activity and existing topography. If development varies substantially from the indicated assumptions, revisions of the drainage plan may become necessary. If, however, development continues as predicted with only minor deviations from the assumptions made by this report, the runoff quantities and approximate facility locations should prove to be quite adequate.

A map showing the watershed boundary in the Anza area is included on Page 8 of this report.

RECOMMENDED IMPROVEMENTS

The recommended improvements discussed briefly below are shown on the enclosed map found at the back of this report. Pre-


CHAPARRAL
OPEN BRUSH
WOODLAND
5 ACRES
2 1/2 ACRES
1 ACRE
COMMERCIAL
DRAINAGE
BOUNDARY
74
371
N
SCALE: 1" = 5200'
ANZA
ASSUMED LAND USE
MAP



WILSON CREEK
AT ROUTE 3
DRAINAGE BOUNDARY
MAP

liminary plan and profile drawings showing pertinent details for all improvements are included in this report as Plates 1 through 15. Supporting data for all proposed improvements is available for review at the Riverside County Flood Control and Water Conservation District office.

Cost estimates shown in Table I, "Cost Summary", on Page 13, as well as on the enclosed map, include right of way and 31% for engineering, administration and contingencies.

Hamilton Creek Channel

This channel will serve to convey storm flows from Hamilton Creek through the community of Anza. Hamilton Creek Channel is a concrete lined trapezoidal channel varying from 9 feet to 13 feet in depth and from 20 feet to 40 feet in bottom width. The alignment shown on the map found in the envelope was chosen since it provided the largest curve radii which lessened the problems with super-elevation considerably.

The channel begins as a wide concrete apron with two adjoining approach levees which funnel flow into a trapezoidal channel section. This inlet is located approximately 4600 feet east of Kirby Road. The existing crossing of Highway 371 will require an additional 5 cell reinforced concrete box to ensure flows cross under the highway and are collected by the levees. The approach levees vary from 5 feet to 15 feet in height and are constructed of compacted fill with concrete facing extending 8 feet below the natural flow line to provide protection against scouring. Runoff from the 11.1 square mile drainage area is joined with Anza Channel north of Johnson Road and then gradually discharged south of Johnson Road.

Anza Creek Channel

Anza Creek Channel conveys the 100 year discharge from a watershed 4.5 square miles in size. To ensure complete collection of the discharge from the mountains and hills north of Anza, its upstream terminus is located approximately 3000 feet north of Mitchell Road and 100 feet west of Old Forest Road. The first 150 feet of facility is constructed of compacted fill with a 4-inch concrete facing extending 9 feet below the natural flow line to protect against scouring. This approach levee then funnels flow into a trapezoidal concrete channel section. The depths of this channel vary from 6.5 feet to 7 feet and the width varies between 8 feet to 10 feet. The terminus of this facility is approximately 150 feet north of Johnson Road where Anza Creek Channel junctions with Hamilton Creek Channel.

Wilson Creek Crossing at Route 3

In a 100 year storm event, the Wilson Creek watershed is expected to produce an approximate flow rate of 107,000 cubic feet per second at Route 3. A flow of such magnitude is comparable to that of the Santa Ana River at Prado Dam near Corona. Clearly, a road crossing facility to handle such a flow rate is beyond the scope of this report. Even though this roadway is the major link between the Anza and Wilson Creek areas and the City of Hemet, justification for such a costly all-weather structure is questionable. A more sensible approach would be to provide a less costly structure that is capable of conveying the more frequent flows.

The crossing proposed in this master plan involves constructing a clear span bridge of 60 feet. The bridge will be constructed on piles such that during the large magnitude storm, overtopping of the roadway and scouring of the streambed will not jeopardize the integrity of the bridge itself. This bridge will be able to safely convey ten times the flow experienced in the storms of February 1980.

ALTERNATIVE STUDIES

In developing this master drainage plan, a number of alternates were developed and studied for their feasibility, both hydraulically and economically.

One of the major alternatives explored dealt with controlling debris tributary to Hamilton Creek Channel. The possibility of locating a debris dam at the upstream end of the proposed channel was investigated. Such a structure would consist of a high compacted fill embankment and concrete spillway. Sufficient storage would be provided to store the anticipated volume of debris expected to be generated during a 100 year storm. This would allow for a less costly system because clear water flow rather than bulked flow would be the basis for sizing.

The results of research into seismic conditions in the Anza area showed that the San Jacinto Fault (an active fault) travels along the base of Thomas Mountain and through the dam site. This information is based on Plate IA "Seismic Hazards Map" of the "Seismic Safety and General Plan Elements Technical Report", September 1976. In addition, the cost of this alternative proved to be greater than the proposed facility (with bulked flow). Because of these reasons this alternative was abandoned.

In addition to the alternatives discussed above, several others of lesser magnitude were studied and eventually rejected as being too costly or not providing adequate protection.

In short, the master drainage plan for the Anza and Wilson Creek areas as presented herein is the coalescence of the best alternative explored.

FLOODPROOFING

The community of Anza is a highly rural area impacted by considerable flood flows during periods of runoff. As these flows exit the well defined watercourses of the steep terrain and reach the moderately sloping Anza Valley, they disperse and "sheet flow" across commercial and residential properties.

The proposed flood control facilities in this plan will serve to free a considerable amount of acreage from the threat of flooding. However, since these facilities are basically a backbone system, until the increase in development produces collector systems there still is a need for flood protection not afforded complete protection by Anza Creek Channel or Hamilton Creek Channel.

To reduce the probability of flood damage to new development in the area located north of Hamilton and Anza Channel, the following floodproofing measures are suggested.

In general:

1. All finished floors should be elevated on pads a minimum of 18 inches above the surrounding ground.

2. Limitations on density of development to allow for adequate "flow-through" areas between structures should be set.

3. All natural watercourses should remain free from obstruction by both new and existing development.

4. Erosion protection should be required from mobile home supports.

Floodproofing throughout the Anza community is seen as a practical method of protecting new development. The District, in its review of new subdivisions has and will continue to follow guidelines similar to those suggested above. It is the goal of this section to endorse the use of these types of guidelines in all phases of future development.

Existing structures which have been constructed without the above floodproofing measures will continue to be susceptible to flooding until a collector system is in place. Owners of these structures should maintain flood insurance coverage until a collector system eliminates the sheet flows to Anza and Hamilton Channels.

CONCLUSIONS

Based on the studies and investigations made for this report, it is concluded that:

1. The Anza and Wilson Creek areas has experienced serious flooding problems in the past. As the Anza area continues to develop, these damages are expected to increase. A more orderly growth pattern can safely occur with the construction of these proposed facilities.

2. A drainage system is required to safely convey storm runoff through the area with minimal interruption to public services. The master drainage plan presented in this report details such a system and is the most economical of the alternative studied.

3. The total cost of the recommended improvements, including right of way, engineering, contingencies, and administration is estimated to be $9,316,000.00.

RECOMMENDATIONS

It is recommended that:

1. The master drainage plan as set forth herein be approved by the Riverside County Flood Control and Water Conservation District's Board of Supervisors as part of the overall master plan for the County.

2. The master drainage plan as set forth herein be used as a guide for all future developments in the study area and that such developments be required to conform to the plan insofar as possible.

3. Floodproofing measures as set forth herein be required for all future development in the study area.

4. The right of way required for the plan be protected from encroachment.

TABLE I

MASTER DRAINAGE PLAN

for the

ANZA AND WILSON CREEK AREAS

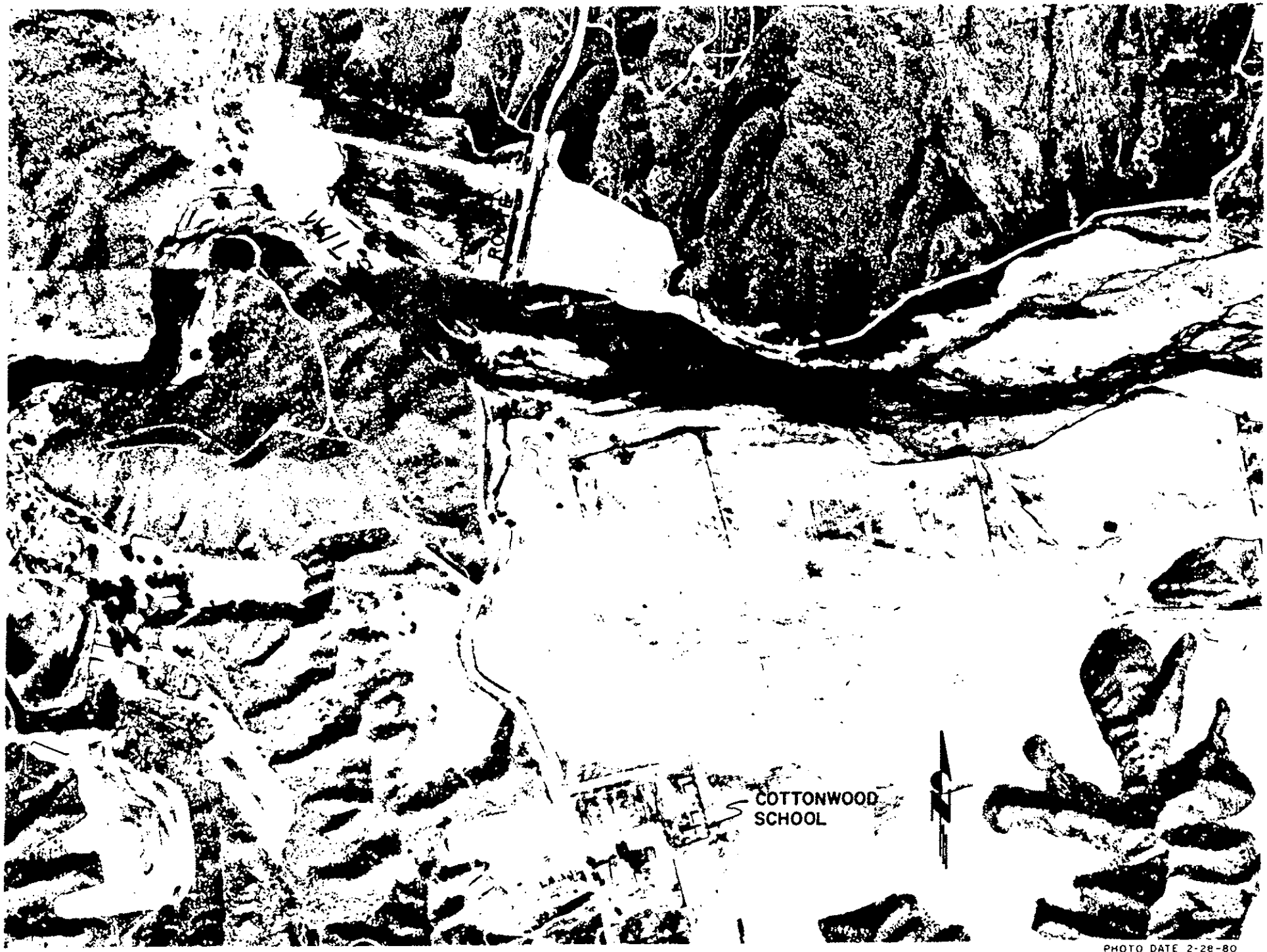
COST SUMMARY

FACILITY	CONSTRUCTION COST *	RIGHT OF WAY	MASTER PLAN COST
Anza Creek Channel	$2,025,000	$303,000	$2,328,000
Line A	473,000	56,000	529,000
Hamilton Creek Channel	5,421,000	566,000	5,987,000
Wilson Creek Crossing at Route 3	472,000	- 0 -	472,000
TOTAL	$8,391,000	$925,000	$9,316,000

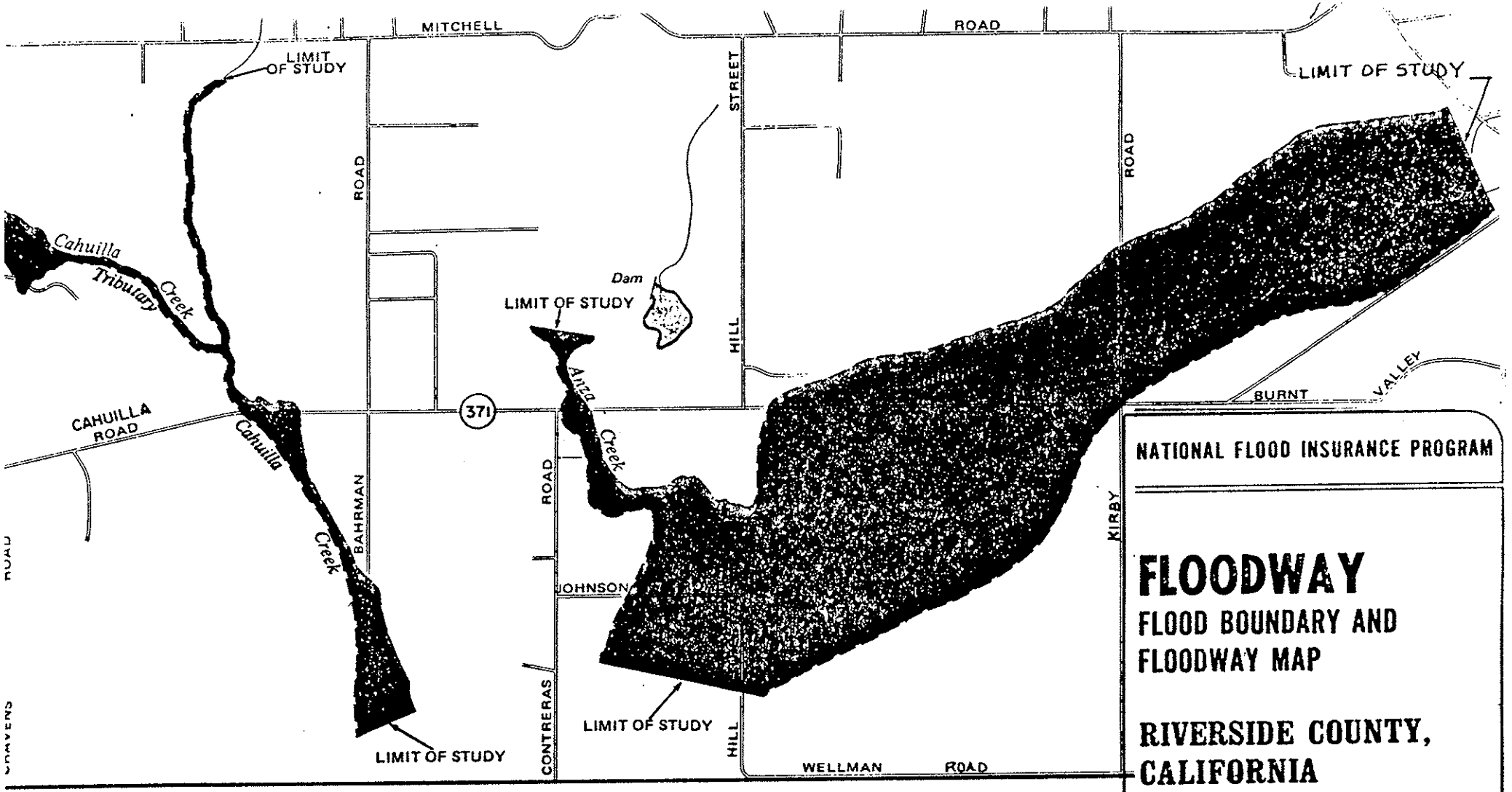
* Includes 31% for engineering, administration, and contingencies


ROAD
ROAD
ANZA CREEK
REEK
STREET
HILL
BAHRMAN
CAHUILLA
371
ROAD.
ROAD
JOHNSON
CONTRERAS
KIRBY
RO
PHOTO DATE

— ANZA AREA —



WILSON CREEK AT ROUTE 3



NATIONAL FLOOD INSURANCE PROGRAM

FLOODWAY

FLOOD BOUNDARY AND FLOODWAY MAP

RIVERSIDE COUNTY, CALIFORNIA

(UNINCORPORATED AREAS)

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SCALE: 1" = 2000'