

**RIVERSIDE COUNTY FLOOD CONTROL AND
WATER CONSERVATION DISTRICT
RIVERSIDE, CALIFORNIA**

REPORT ON

**MASTER DRAINAGE PLAN
FOR
THE WILDOMAR AREA**

ZONE SEVEN

AUG. 1980

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AND WATER CONSERVATION DISTRICT
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MASTER DRAINAGE PLAN

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MASTER DRAINAGE PLAN

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Wildomar Master Drainage Plan	Envelope
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PURPOSE

The purpose of this report is to investigate and evaluate the drainage problems of the Wildomar area and to develop the most economical drainage plan which considers both the natural environment and economy of the area.

The Wildomar watershed is located southeast of Lake Elsinore and is bounded roughly by Bryant Street on the northwest and Clinton Keith Road on the southeast. The rest of the boundary consists mainly of a divide in both the mountains to the northeast and the southwest.

The plan presented herein will provide adequate protection to the community when implemented and serve as a guide for the long term construction scheduling of the primary drainage facilities. The plan will also act as a planning guide for the location and sizing of local drainage facilities to be constructed by developers and others within the area.

SCOPE

The drainage area covered by this plan consists of approximately 10 square miles, and ranges from moderately flat valley terrain to foothills with steep slopes. The extent of the studies establishing this master plan includes:

1. Determination of the quantity and points of concentration of storm runoff in the area.
2. Preparation of a drainage area map.
3. Determination of the location, size and capacity of the proposed drainage structures.
4. Investigation of alternate routes and methods as a basis for selecting the most economical plan.
5. Preparation of preliminary design plans and supporting cost estimates.

GENERAL DISCUSSION

This report provides a Master Drainage Plan for the Wildomar area. The plan consists of two debris basins and a network of open channels. This proposed system will carry storm runoff through the area to an outlet at a point between McVicar Street and Clinton Keith Road.

During periods of runoff, floodwaters, silt, and other debris impact a wide area of prime agricultural land and the developing community, causing property damage and leaving roads and highways impassable. Subdivision activity within the plan area has increased substantially within the last several years. With this increased development the need for greater degrees of flood protection has become obvious.

The Master Drainage Plan presented herein provides the most economical method of collecting and conveying storm runoff through the study area. The proposed drainage structures will also provide an outlet for local drainage facilities built by developers and others as growth occurs in the area. When completed, the facilities will provide the area with improved drainage and protection from the once in 100 year flood.

CRITERIA

Open channels are considered the only economically feasible means for transporting large flood flows through the study area. The channels in this report were all designed to carry the runoff from a 100-year frequency storm.

The alignments of all channels as well as the locations of the two debris basins are based on hydraulic efficiency, the ability to drain tributary areas and economics.

HYDROLOGY

The synthetic unit hydrograph method was used to determine the 100 year peak flows in the open channels. Debris production was calculated by two methods: The Los Angeles County Flood Control District Method and the United States Army Corps of Engineers Method.

The modified rational hydrology method should be used to determine 10-year frequency design discharges for sizing all future appurtenant underground drains in the study area.

Methodology and supportive data for the rational and synthetic hydrology can be found in "The Riverside County Flood Control and Water Conservation District's Hydrology Manual" dated April 1978.

Methodology and supportive data for the debris production methods can be found in "Los Angeles County Flood Control District Report on Debris Production Studies for Mountain Watersheds of Los Angeles County" by William R. Farrel dated November 1959 and "A New Method of Estimating Debris-Storage Requirements for Debris Basins" by Fred E. Tatum, U. S. Army Engineers District, dated 1963.

RECOMMENDED IMPROVEMENTS

The recommended improvements discussed below are shown on the enclosed map found at the back of this report. Supporting data for all proposed facilities is available for review at the Riverside County Flood Control and Water Conservation District's office. Costs shown on the enclosed map include right of way and 30% for engineering, administration and contingencies.

WILDOMAR CHANNEL

The Wildomar Channel begins as the outlet to the Wildomar Channel Debris Basin. From this point the channel extends in a northeasterly direction to the major low in the Wildomar Valley. From this point

the channel turns and continues to follow the low to a point about 1/4 mile below McVicar Street where the channel outlets into the natural low of the valley.

The trapezoidal channel ranges in size from a bottom width of 2 feet and a depth of 4 feet to a 22 foot bottom 7 feet deep. Below McVicar the bottom increases in width to 100 feet while at the same time the depth decreases. This gradual widening and shallowing of the section in conjunction with a 200 foot rip rap section, will essentially discharge the flows into the natural section in a manner approximating current existing conditions. Design discharges range from 330 cfs to 6200 cfs.

LATERAL A

Lateral A is designed to carry the 1290 cfs released from the Lateral A Debris Basin in the canyon above Wilson Street to a junction with the Wildomar Channel in the vicinity of Gruwell Street. The 6 foot bottom trapezoidal concrete channel varies in depth from 6 feet to 6.5 feet over its 4120 foot length.

LATERAL B

Lateral B extends from its terminus at the Wildomar Channel, just upstream of McVicar Street, westerly across Grand Avenue to a point at the base of the foothills. The channel increases in size from a bottom width of 4 feet and a depth of 5 feet in its upper most reaches, to a 6 foot bottom 6 feet deep downstream of its junction with Lateral B-1. This channel, when completed, will serve to convey the flows from the canyon southwest of its upstream terminus, across Grand Avenue and into the Wildomar Channel. To assure that the flows exiting the canyon will follow the base of the foothills to the upstream terminus of the Lateral B Channel, a training levee is proposed at the mouth of the canyon. This 300 foot levee will prevent the flows from spreading over the alluvial fan as is common with this type of topography, and will direct them northeasterly into an existing watercourse.

LATERAL B-1

Lateral B-1 consists of 2 training levees and a 2 foot bottom, 4 foot to 4.5 foot deep concrete lined trapezoidal channel. The two levees are provided to direct the runoff from the alluvial fan to the south into the Lateral B-1 Channel. The longer of the two levees is planned to be constructed with more or less the same toe elevation along its entire 820 foot length sloping slightly toward the channel at about .5%. This design will tend to decrease the velocity of the flows along the dike thus decreasing the erosion threat. The channel itself begins at the juncture of the two levees and runs approximately 1600 feet to its junction with Lateral B just upstream of Grand Avenue.

LATERAL C

Lateral C begins at Central Street about 2000 feet northeast of Palomar Street, at the point where the flows from Bundy Canyon cross Central. This point of beginning was chosen with the knowledge that the owner of the property on the upstream side of Central Street proposes to leave an approximately 400 foot wide floodway as part of his development. This master plan proposes building a triple cell, 12 foot wide by 6.5 foot high RCB under Central Street as the upstream terminus of Lateral C. The downstream end of the proposed box outlets into a 10 foot wide 6.5 foot deep concrete lined trapezoidal channel. This channel increases in size to a bottom width of 16 feet and a depth of 6 feet before discharging its flow into the Wildomar Channel upstream of McVicar Street.

LATERAL C-1

This relatively small, 2 foot bottom, concrete lined channel will convey approximately 430 cfs across Palomar Street to Lateral C just downstream of its Palomar crossing. Without this 560 foot long channel, the flow resulting along this section of Palomar Street would flood the street and could foreseeably cause sufficient damage to make the roadway impassable.

LINE D

Currently the flows both upstream and downstream of Line D are fairly well contained within the natural low. The problem occurs at the point where this flow crosses Palomar Street. The existing crossing is inadequate to pass the 10 year flow of 180 cfs without having water pond and flow across the road. Line D, a 66 inch RCP is proposed to eliminate this problem.

DEBRIS BASINS

The two debris basins proposed in this plan will be a combination of flood control and debris storage sites. The main purpose of the two basins is debris storage, but the dams will provide some runoff peak reduction in the interim before the time that the debris storage volume is used. However, in sizing the facilities downstream of these two dams, no peak reduction was assumed.

WILDOMAR CHANNEL DEBRIS BASIN

The Wildomar Channel Debris Basin is proposed at the upstream end of the Wildomar Channel. The 25 foot high compacted earth fill dam will incorporate an over the embankment type spillway. In addition, a non-plugging outlet structure will be used to discharge approximately 330 cfs into the Wildomar Channel. The natural volume of this canyon in combination with the volume realized from extracting the required dam fill will result in a storage volume of approximately 12 acre-feet for this site.

LATERAL A DEBRIS BASIN

The Lateral A Debris Basin is located at the upstream end of the Lateral A Channel. Like the Wildomar Channel Debris Basin, the dam height is proposed to be approximately 27 feet. Again, a non-plugging outlet structure is needed to pass 100 year peak flow of 1290 cfs through the dam and into the Lateral A Channel. The topography of this canyon allows for a spillway cut through a notch in the northwest abutment of the dam. This will prove to be far less costly than the over the embankment type. The storage volume, resulting from the natural topography in conjunction with excavating the needed dam material will be about 67 acre-feet.

ALTERNATE STUDIES

A number of alternates were developed in the Wildomar area.

One alternate excluded the drainage area to the northeast of Palomar Street from the plan boundary. This was found to be impractical due to the fact that if these flows are not contained in some manner, they will tend to broadside the Wildomar Channel in the reach downstream of Central Street. Not only will this present an erosion threat to the channel, but these extensive overland flows will carry large quantities of debris which will diminish the conveyance capacity of the channel.

A second alternate explored the possibility of using unlined channels in lieu of the concrete facilities proposed in the recommended plan. With unlined channels, erosive velocities become a problem and so in this alternate an effort was made to keep the velocity in a non-erosive range. To accomplish this, the bottom width of the Wildomar Channel had to be increased to almost 200 feet in places. This increased the needed right of way substantially and forced the channel to exceed the bounds of the abandoned 100 foot railroad right of way. This in turn would force the relocation of a number of homes. While the unlined channel itself is less expensive to build, the increased costs of right of way, larger bridge structures, and the increased maintenance cost must also be considered.

In the course of preparing this plan, an alternate alignment for Lateral C was developed and studied. This alternate alignment proposed that Lateral C parallel Palomar Street to a point just beyond McVicar Street before crossing the roadway. This added length proved to be slightly more costly as well as presenting a longer length of channel to be maintained in the future.

Another alternate considered eliminating the open channel portion of the Wildomar Channel above Grand Avenue and carrying the flow in an underground system. This alternate proved to be unacceptable because the cost of the underground system was 40% higher than the comparable reach of open channel.

Consideration was given to extending the Wildomar Channel to a point downstream of Clinton Keith Road (Page 8 shows a preliminary plan view of this alternate along with tentative sizes). This additional 4400 feet of channel would increase the overall cost of the Wildomar plan by more than \$1.6 million. This large cost when compared with the small amount of acreage that would be recovered from the floodplain lead to the elimination of this alternate as a feasible addition to the plan.

Similarly, consideration was given to extending Lateral C upstream to Walnut Street. This would increase the plan cost over \$840,000. By the same reasoning as above this alternate also, was found to be unacceptable.

In summary, the Wildomar Master Drainage Plan, as presented herein, is the coalescence of the best alternates explored.

CLINTON KEITH ROAD

In developing this master drainage plan, it became evident that during periods of intense rainfall, Clinton Keith Road will be subject to flooding and depending on the severity of the storm there is a possibility that portions of the roadway will wash out. Under existing development this washed out roadway will affect a minimal number of people. If, however, the pending ARCO Development gains approval, the number of people using Clinton Keith Road will increase dramatically, which in turn will increase the impact of a wash out.

The problem lies between Grand Avenue and Palomar Road where the Wildomar floodplain crosses Clinton Keith Road. A 100 year peak flow of approximately 7000 cfs will impact the road at this point and the only feasible means of passing this flow under the roadway is a bridge structure. A preliminary plan view of this crossing appears on Page 9 of this report. To keep the crossing as narrow as possible, a wing dike is proposed to concentrate and direct flows through the bridge. The cost of an improvement such as this, including a bridge crossing, a wing dike, right of way and the necessary road fill would be approximately \$961,000.

While this problem is a very real one that eventually needs to be addressed, it does not lie within the bounds of the Wildomar Master Drainage Plan, and the number of Wildomar residents that would be benefitted by this improvement is very minimal. Therefore, this crossing is not recommended to be part of the Wildomar Master Drainage Plan.

CONCLUSIONS

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

1. The Wildomar area has experienced serious flooding problems in the past. As this area converts from primarily agricultural to more urban uses, these damages are ex-

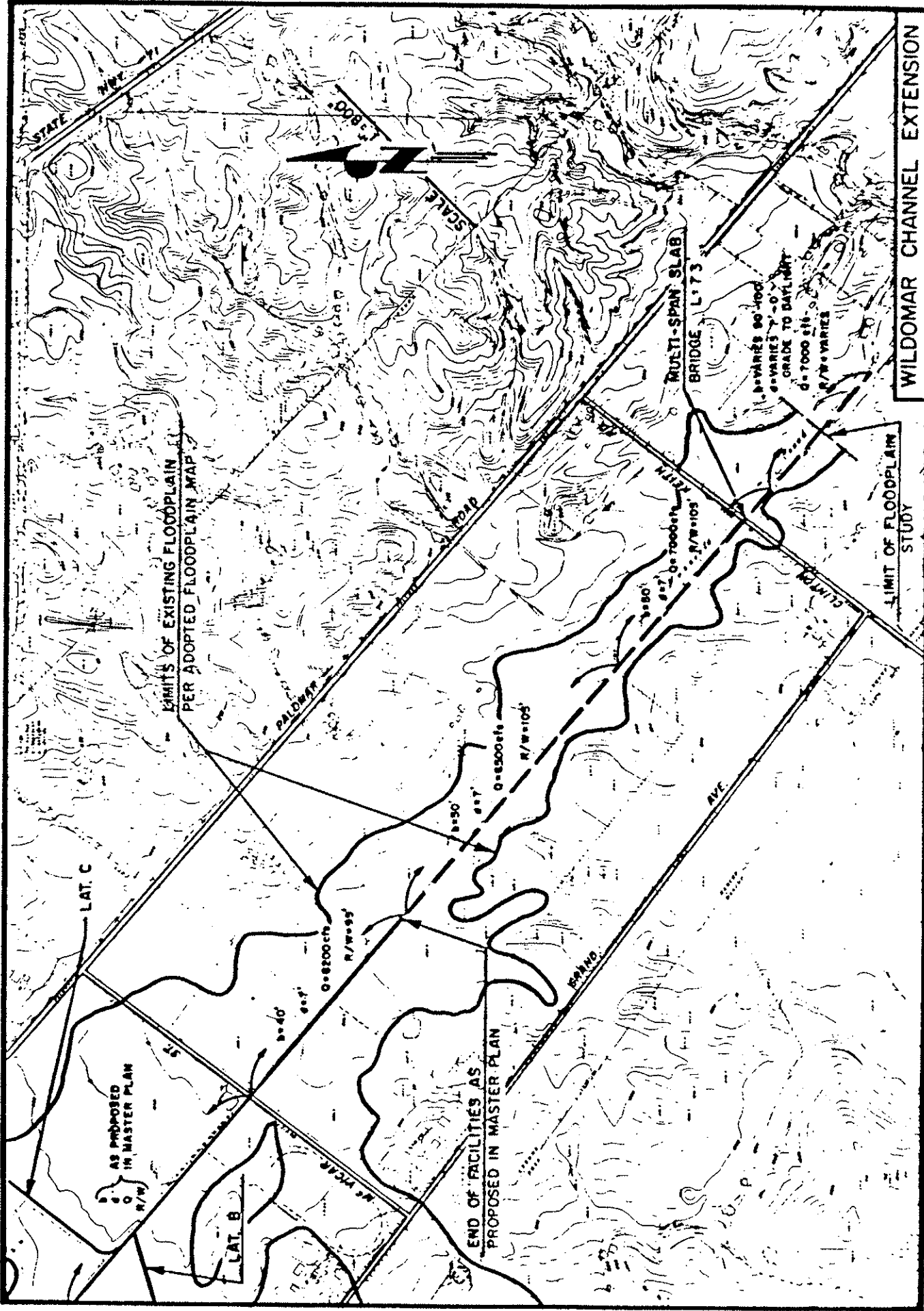
pected to increase. A more orderly growth pattern can safely occur with the construction of these proposed facilities.

2. A drainage system is required to safely convey storm runoff through the area with the least interruption to public services. The Master Drainage Plan presented in this report is such a system and is the most economical of the alternatives studied.
3. The proposed plan lends itself to stage construction as funds become available.
4. The total cost of the recommended improvements, including right of way, engineering, contingencies and administration is estimated to be \$5,291,000 (June, 1980).

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. The right of way required for the plan be protected from encroachment.
4. The Wildomar Area Drainage Plan, prepared by the Riverside County Flood Control and Water Conservation District, be adopted by the Riverside County Board of Supervisors as the primary means through which funding may be procured for implementation of the plan and that other funding sources be investigated and adopted so as to complete the plan at the earliest possible date.



WILDOMAR CHANNEL EXTENSION

LIMIT OF FLOODPLAIN STUDY

LIMITS OF EXISTING FLOODPLAIN PER ADOPTED FLOODPLAIN MAP

END OF FACILITIES AS PROPOSED IN MASTER PLAN

AS PROPOSED IN MASTER PLAN

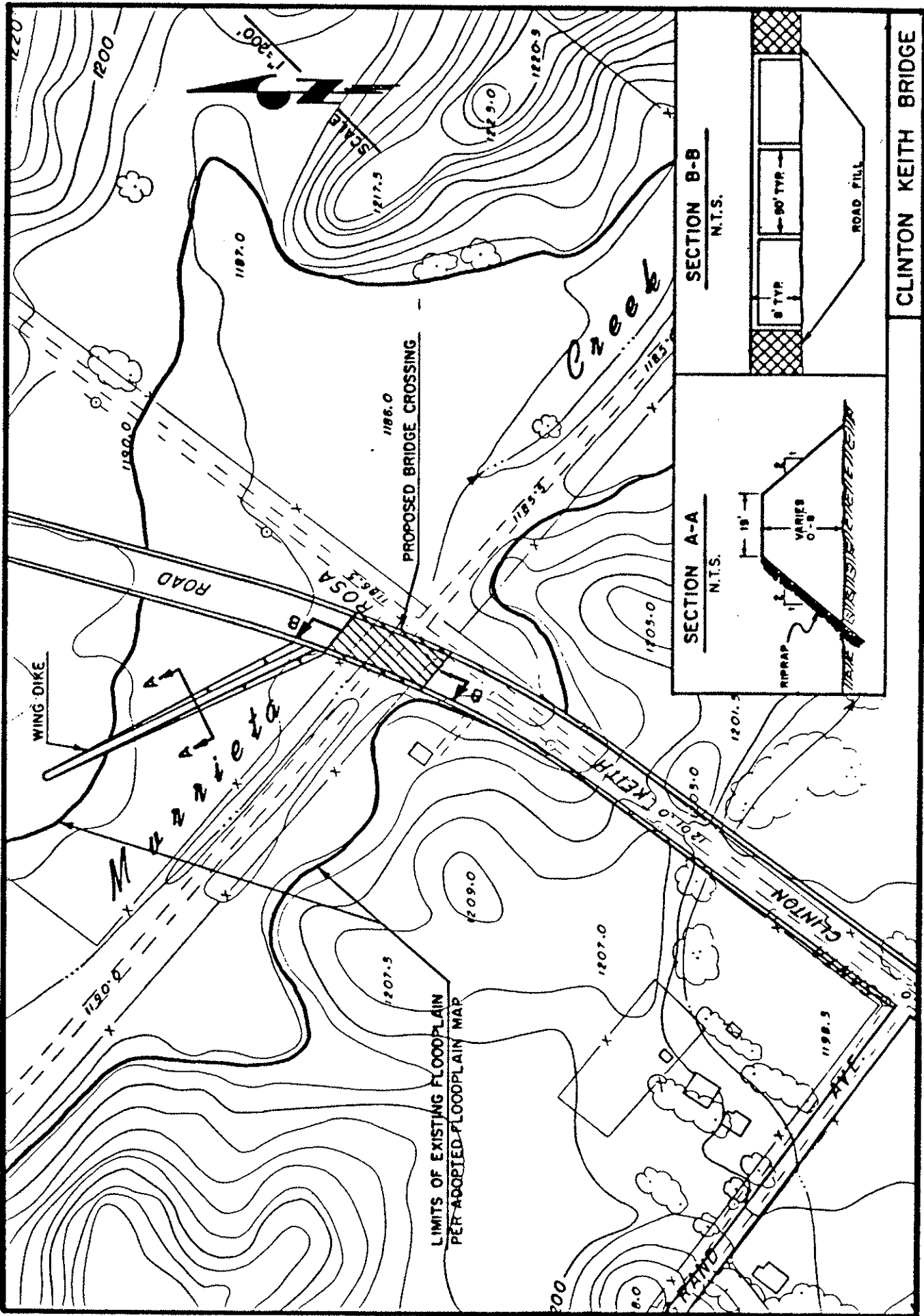
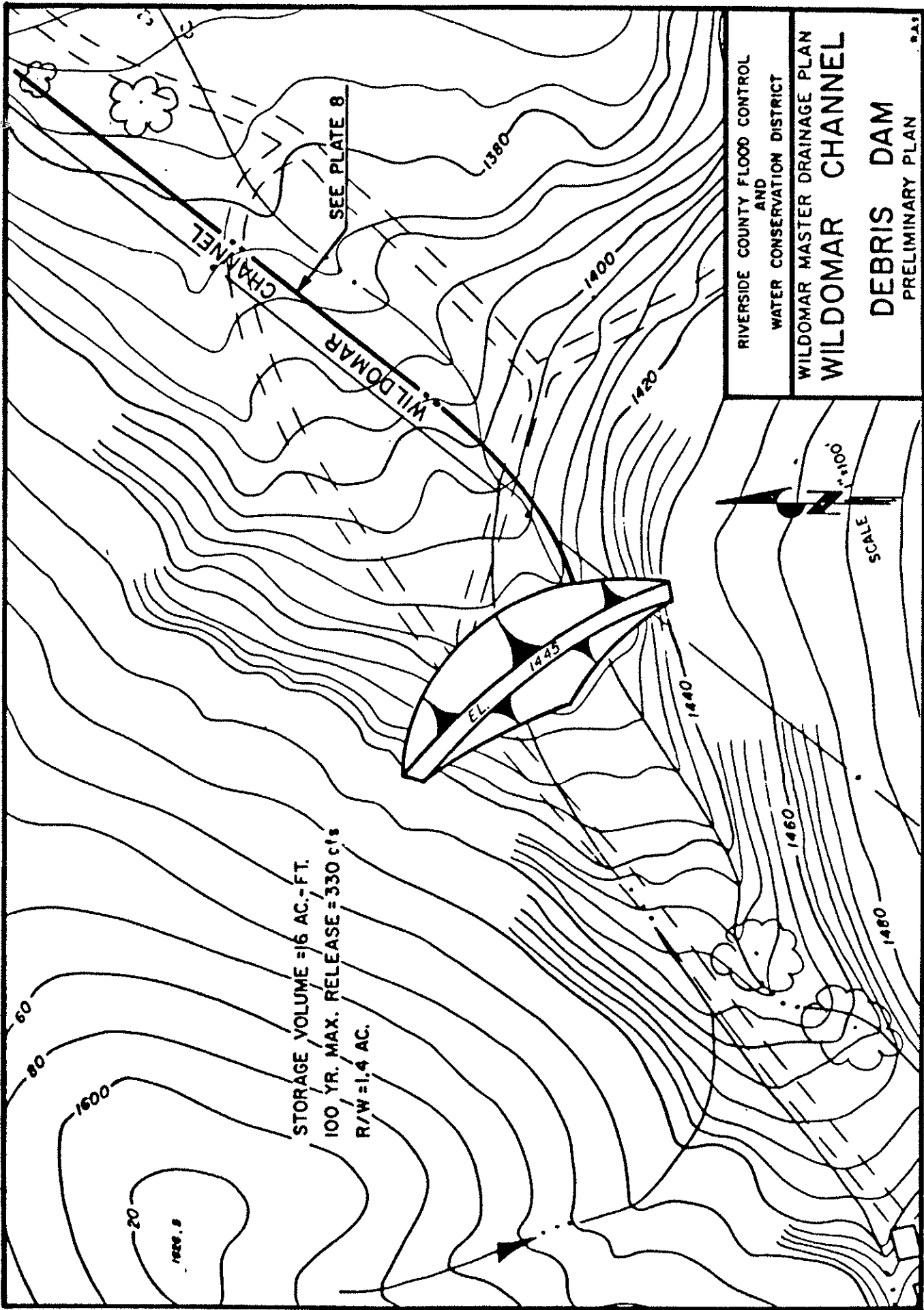
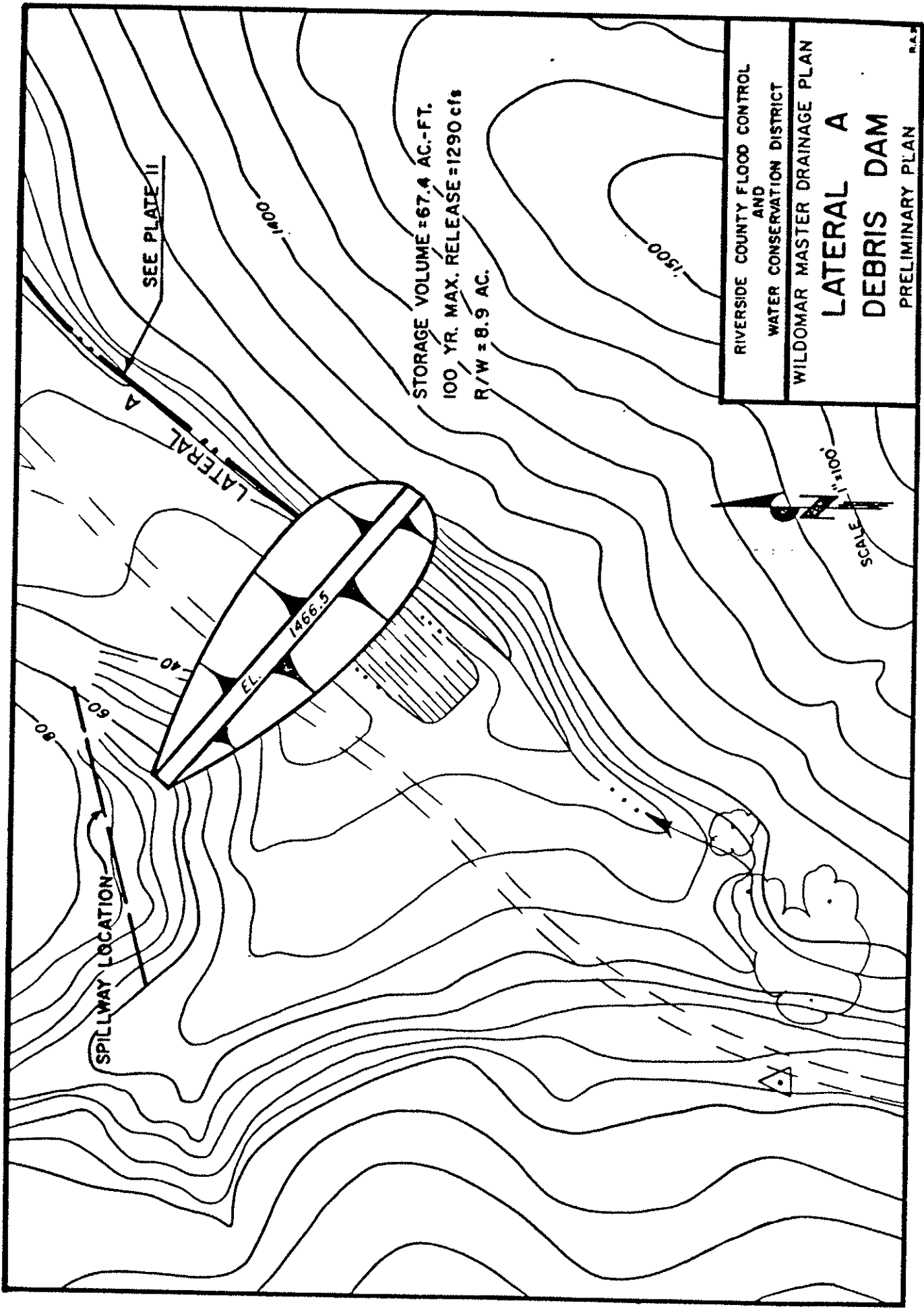


TABLE I
WILDOMAR MASTER DRAINAGE PLAN
COST SUMMARY

FACILITY	CONSTRUCTION COST	30% ENGINEERING & ADMINISTRATION	RIGHT OF WAY	MASTER PLAN COST
WILDOMAR CHANNEL	\$1,793,000	\$ 538,000	\$ 252,000	\$ 2,583,000
LATERAL A	392,000	118,000	70,000	580,000
LATERAL B	269,000	81,000	54,000	404,000
LATERAL B-1	87,000	26,000	29,000	142,000
LATERAL C	626,000	188,000	126,000	940,000
LATERAL C-1	51,000	15,000	3,000	69,000
LINE D	11,000	3,000	-0-	14,000
<u>DEBRIS BASINS</u>				
WILDOMAR CHANNEL	138,000	41,000	17,000	196,000
LATERAL A	197,000	59,000	107,000	363,000
TOTAL	\$3,564,000	\$1,069,000	\$ 658,000	\$ 5,291,000





STORAGE VOLUME = 67.4 AC.-FT.
 100 YR. MAX. RELEASE = 1290 cfs
 R/W = 8.9 AC.

RIVERSIDE COUNTY FLOOD CONTROL
 AND
 WATER CONSERVATION DISTRICT
 WILDOMAR MASTER DRAINAGE PLAN
LATERAL A
DEBRIS DAM
 PRELIMINARY PLAN

