RIVERSIDE COUNTY FLOOD CONTROL

AND WATER CONSERVATION DISTRICT

Riverside, California

MASTER PLAN

FOR THE

SAN SEVAINE CHANNEL

April 1983

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Chief Engineer

MASTER PLAN

FOR THE

SAN SEVAINE CHANNEL

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PURPOSE

The purpose of this report is to supplement the report entitled, "Day, Etiwanda and San Sevaine Creeks System Drainage Plan", dated March 1983, prepared for the San Bernardino County Flood Control District by Bill Mann and Associates. That report proposes two channel systems entering Riverside County from the north. First is the Day Creek Channel which is proposed to exit the Riverside Basin and extend southeasterly parallel to the Union Pacific Railroad tracks to the Pomona Freeway. Here it turns southerly, crosses under the freeway and joins the channel proposed by this District in the "Day Creek Master Drainage Plan", dated June 1977, at Riverside Drive.

The second channel deals with the San Sevaine Creek. The San Bernardino County report proposes a concrete lined channel extending southerly to the Riverside/San Bernardino County Line. This report recommends the extension of the channel through Riverside County to the Santa Ana River.

Currently, the San Sevaine Channel flows that impact Riverside County are transported via various conveyances including, concrete lined channel, wire and rail revetted channel and flood plain. The existing system downstream of Van Buren Boulevard can convey smaller flows (less than 2,500 cfs) with little or no damage to neighboring properties. Upstream of Van Buren Boulevard, however, substantial damage is sustained by the Union Pacific Railroad and the Glen Avon Mutual Water Company wells even with normal frequent flows due to both siltation and erosion. Flow rates in excess of 3,000 cfs will cause major damage to the entire area. Many homes will be inundated and traffic flow will be severely impaired. In short, the overall impact of a major storm on this area, given the limited capacity of the existing channel, would be quite devastating.

HYDROLOGY

The 100 year flow rates used in this study are:

1. Reach of channel between the County Line and the Fontana Lateral - Q100 = 12,400 cfs.

2. Reach of channel between the Fontana Lateral and the Santa Ana River - Q100 = 15,100 cfs.

The above information is taken from the "Day, Etiwanda and San Sevaine Creeks System Drainage Plan" report, dated March 1983, referenced herein.

RECOMMENDED IMPROVEMENTS

The recommended improvements discussed in this report deal only with the main San Sevaine Channel and not any future appurtenant structures. Preliminary plan and profile plates as well as an overall map of the proposed channel system are included in this report. Supporting data for all proposed facilities is available at the Riverside County Flood Control and Water Conservation District office.

For the purpose of this report, the San Sevaine Channel has been divided into seven reaches. The reaches, described below, are also shown on the map on page 11. The cost sheet (page 10) is divided similarly.

Reach 1 - Riverside/San Bernardino County Line to Pomona Freeway.

Currently, this reach consists of an earth bottom channel with side slopes of either (1) wire and rail revetment, (2) rock sope protection, or (3) concrete slope paving. A bottom width of approximately 100 feet, coupled with a minimum depth of six feet provides capacity for about 4600 cfs.

In the fall of 1982, restoration work on this reach of the San Sevaine Channel added several drop structures and about 2400 feet of concrete slope paving (left side only). The intent of the proposed ultimate channel for this reach is to perpetuate this type of configuration. An attempt was made to utilize as much of the existing structure as possible and expand the channel to the west sufficiently to provide adequate capacity for 100 year flow rates of 12,100 cfs to 15,100 cfs.

As shown on plates 9 through 12 of this report, the ultimate channel is proposed to have a 150 foot wide unlined bottom with concrete side slopes and a channel depth of 7 to 8 feet. The concrete slope paving will also extend below the invert approximately 9 feet. This is to prevent erosion damage to the paving. Additionally, two more drop structures are proposed to help reduce the channel gradient which in turn will reduce flow velocities and the threat of unchecked erosion. An ultimate right of way width of 200 feet for this reach will require the aquisition of a minimum 50 foot wide strip adjacent to the west side of the 150 foot wide easement already held by this District. This property is currently owned by Southern California Edison. When contacted, they expressed a willingness to cooperate as long as additional property adjacent to their west boundary can be obtained to offset any loss to the District.

The proposed alignment of this reach is based on the alignment of the existing interim channel. It is suggested, though, that at the final design stage, consideration be given to some straightening of this alignment. Generally, a staighter alignment is viewed as hydraulically more desirable. This, however, would require the procurement of up to 150 feet of additional right of way. Edison, again, has expressed a willingness to consider this under the same provisions as stated above.

The only major channel junction is also found in this reach. The Fontana Lateral, a 15 foot wide, 8 foot deep channel, will carry a 100 year peak flow rate of about 3000 cfs. This 3000 cfs flow rate is largely the resultant outflow from a proposed retention basin less than a mile upstream of the confluence. The timing effect of this basin is to make the 3000 cfs directly additive to the San Sevaine peak flow rate, raising the mainline Q from 12,100 cfs to 15,100 cfs. From this point to the Santa Ana River, the channel encounters no major side inflows and, for this reason, the design discharge can be assumed to remain constant at 15,100 cfs.

Reach 2 - Pomona Freeway through San Sevaine Way.

At the present time, there is no well defined channel in this reach and major flows tend to spread out over a fairly wide flood plain. The master plan for this reach, as well as the remaining downstream reaches, is for a more conventional fully concrete lined channel. The 60 foot bottom will have a 60:1 cross slope to help localize nuisance nature flows in a 10 foot wide, one foot deep v-section at the channel centerline (see typical section on plates). The channel depth will be 11 feet. It should be noted that this particular reach of channel is currently undergoing final design and may be funded in the near future. Construction funding, however, is uncertain and for that reason this reach has been included in this report.

Reach 3 - San Sevaine Way through Van Buren Boulevard.

The existing condition in this reach is much the same as in Reach 2. Likewise, the proposed channel section is also similar. As the channel approaches Van Buren Boulevard, it narrows to a double 25 foot wide by 12 foot high reinforced concrete box culvert (RCB). This facility extends some 400 feet under the Union Pacific Railroad tracks and Van Buren Boulevard.

Today, flows cross under the railroad tracks and Van Buren Boulevard at a point about 600 feet easterly of the proposed crossing. Hydraulic and economic consideration proved the proposed alignment to be the most desirable. This is discussed further in the "Alternates" section of this text.

Reach 4 - Van Buren Boulevard to Jurupa Road.

The majority of this reach currently exists as an interim channel. The proposed channel improvement will take advantage of as much of the existing channel excavation as possible. The proposed, fully lined, trapezoidal section will maintain the 60 foot wide bottom described in Reach 2 above and vary in depth from 9 feet to 11 feet. Just upstream of the Jurupa Road Bridge, the channel bottom widens to 82 feet. This will result in a channel section that will function adequately without rebuilding the bridge.

Reach 5 - Jurupa Road through 60th Street.

This reach is quite similar to Reach 4 except that the flatter slope of the invert requires the use of a somewhat deeper section (d=14').

The interim channel in this reach makes a 90 degree turn to the west at a point just north of 60th Street. The proposed ultimate channel will extend southerly at this point but a provision will be made to allow about 2700 cfs to spill off to the west into this existing channel. This will permit the ultimate channel downstream of this point to be sized for a flow rate of 12,400 cfs instead of 15,100 cfs, thus reducing the size and cost.

Reach 6 - 60th Street through Limonite Avenue.

As stated above, interim flows are directed westerly at a point just north of 60th Street. Therefore, the master plan channel in this reach will be a new facility, and not the improvement of an existing interim facility. A more detailed discussion of this alignment selection can be found in the "Alternates" section of this report.

Because of the "spill off" occurring just upstream, a reduced channel bottom of only 44 feet can be used in this reach. This 13 foot deep section will pass the 100 year flow rate of 12,400 cfs.

As the channel approaches Limonite Avenue, flows are conveyed into a double 20 foot wide by 11 foot high RCB which passes under Limonite Avenue and the 30 inch high pressure gas line.

Reach 7 - Limonite Avenue to Santa Ana River.

The channel extends downstream of Limonite Avenue, about 400 feet, as a 40 foot wide, 8 foot deep concrete lined trapezoidal section. At this point, the channel drops rapidly down the river bank and then gradually out another 800 feet to the low flow channel of the Santa Ana River. After dropping down the embankment, flows will encounter a riprapped length of channel and then a gradually widening and shallowing earth section. This sequence of facilities will help slow and spread flows as they approach the main low of the river.

Before any design is undertaken, it should be noted that during preparation of preliminary plan and profile drawings, a detailed utility search was not completed. This means that, while major known facilities were dealt with, a more thorough search may discover utilities that will necessitate minor alignment or size changes or utility relocation.

Alternates

Because of the existence of an interim channel over the majority of the master plan alignment, the study of alternates was limited to two locations.

1. Reach 3 - San Sevaine Way to Van Buren Boulevard.

2. Reach 6 - 60th Street to Limonite Avenue.

In the first case (Reach 3), three alternate alignments were studied for their merits, both economically and hydraulically. The three alignments are shown on page 8 of this report.

Alternate No. 1 tried to accommodate the crossing of future Bain Street and Van Buren Boulevard at right angles. This, however, forced the use of curve radii in the range of 500 feet to 700 feet which in turn forced a super elevated water surface in the channel of about 4 feet above a normal water surface. Aside from being hydraulically undesirable, this amount of super elevation would require a rather deep and costly channel section. Additionally, it can be seen that this alignment would cause a substantial amount of severance damage to the neighboring properties.

Alternate No. 2, attempts to accomplish basically the same goals as Alternate No. 1 but with some softening of the crossing angles. This does enable the use of larger curve radii and the severance damage is greatly reduced but the overall cost is still more than $100,000 greater than Alternate No. 3, the proposed alignment.

Page 9 of this report shows the second area where several alternates were studied. Basically, the three alternatives consist of different combinations of two alignments.

Alternate No. 1 was to improve the existing alignment to a 100 year frequency capacity. Alternate No. 2 was to abandon the existing facility west of Bain Street and instead, take the full 15,100 cfs straight south to the Santa Ana River. Alternate No. 3, the proposed alignment, was to split the flow as described in the "Recommended Improvements - Reach 6" section of this report. A cost analysis was performed on all three alternates and the decision to pursue Alternate No. 3 was based on the fact that it was substantially less costly than the other two alternates.

Conclusions

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

1. The existing facilities located along San Sevaine Creek are inadequate to safely convey the expected 100 year peak flow.

2. An improved drainage channel is required to safely convey storm runoff through the area. The Master Plan Channel presented in this report is such a facility 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 construction, right of way, engineering, contingencies, and administration is estimated to be $12,180,000.

Recommendations

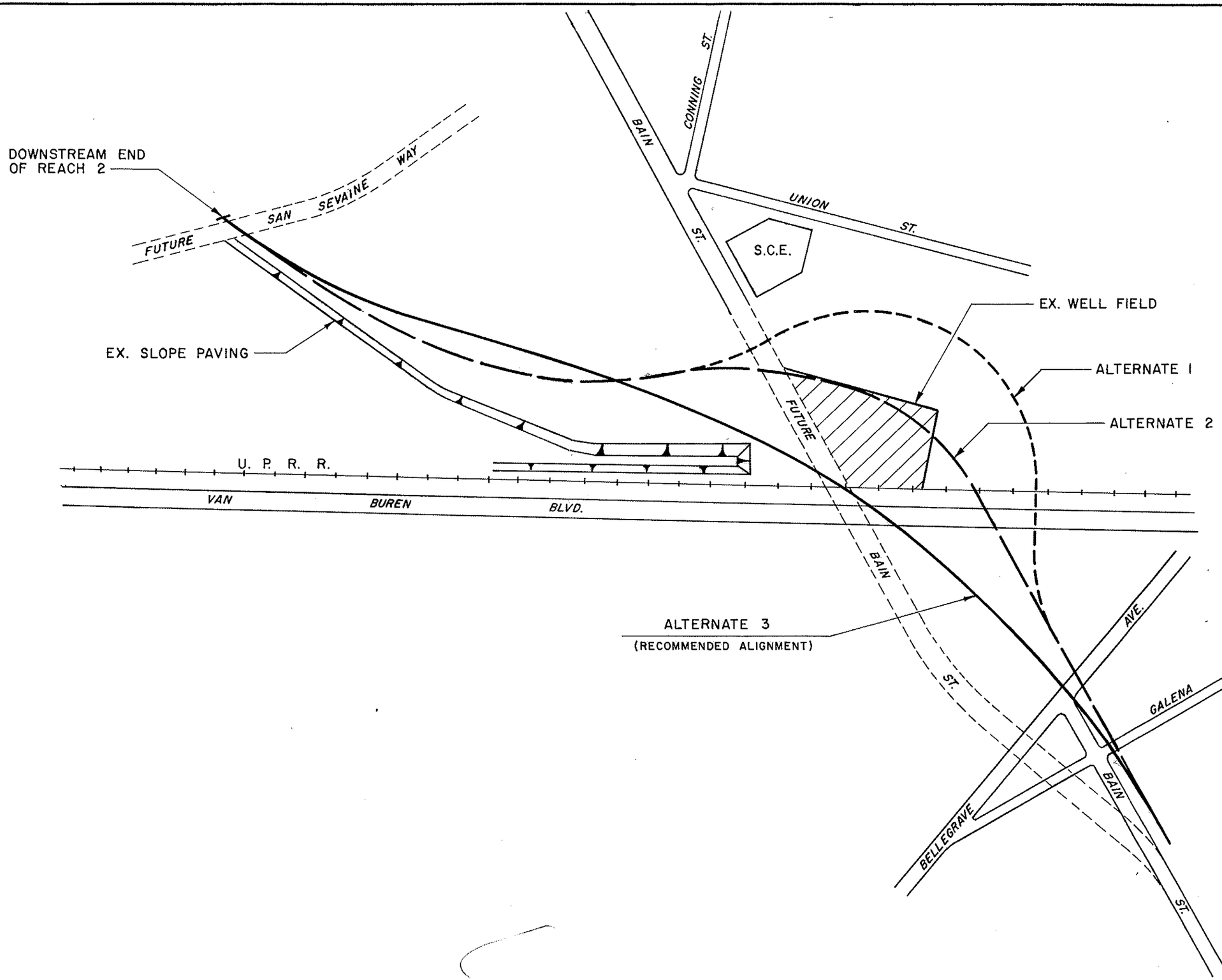
It is recommended that:

1. The Environmental Impact Report prepared by the San Bernardino County Flood Control District in cooperation with this District, for the "Day, Etiwanda and San Sevaine Creeks System Drainage Plan" be approved by the Riverside County Flood Control and Water Conservation District's Board of Supervisors.

2. The Master 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.

3. The Master Plan as set forth herein be used as a guide for all future developments in the immediate area and that such developments be required to conform to the plan insofar as possible.

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



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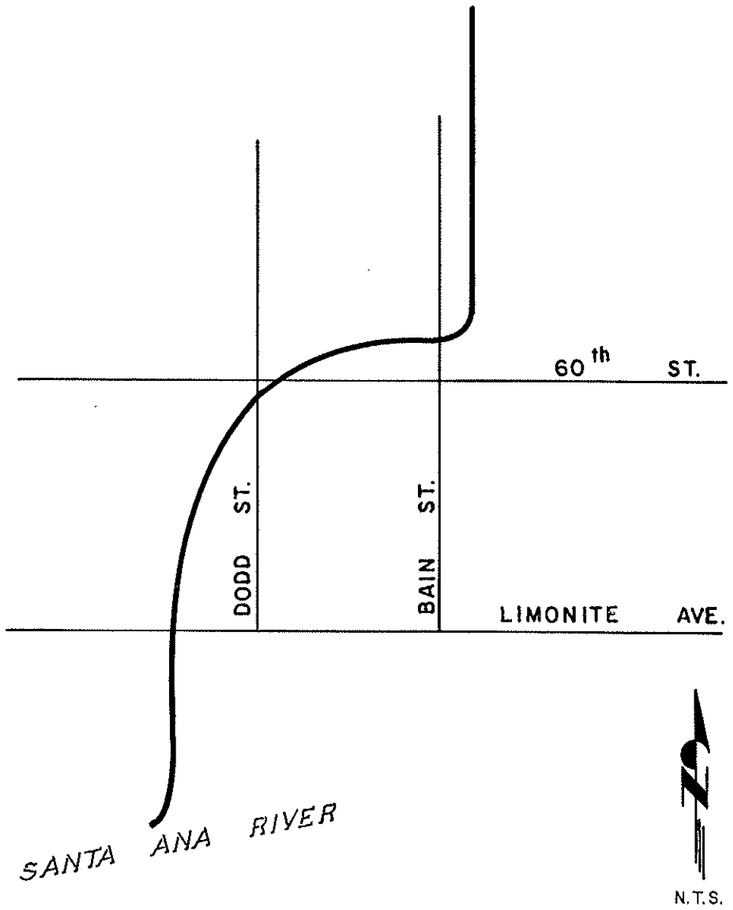
ALTERNATES - REACH 3

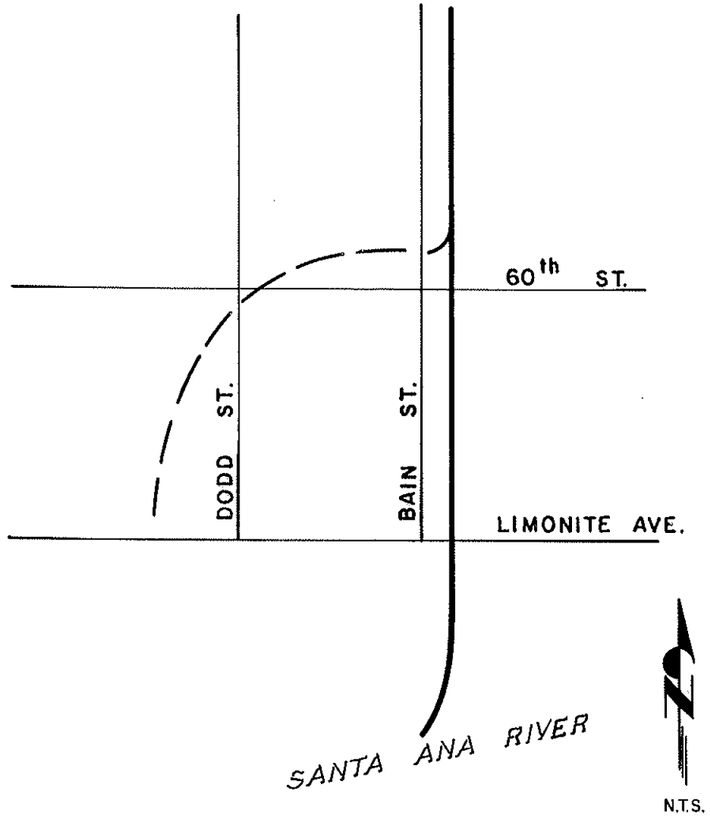
APPROVED: CHIEF ENGINEER R.E. NO.	DRAWN BY: R.A.S.	SHEET NO.
DATE:	CHECKED BY:	
	DATE DRAWN:	DR. NO.

REVISED:



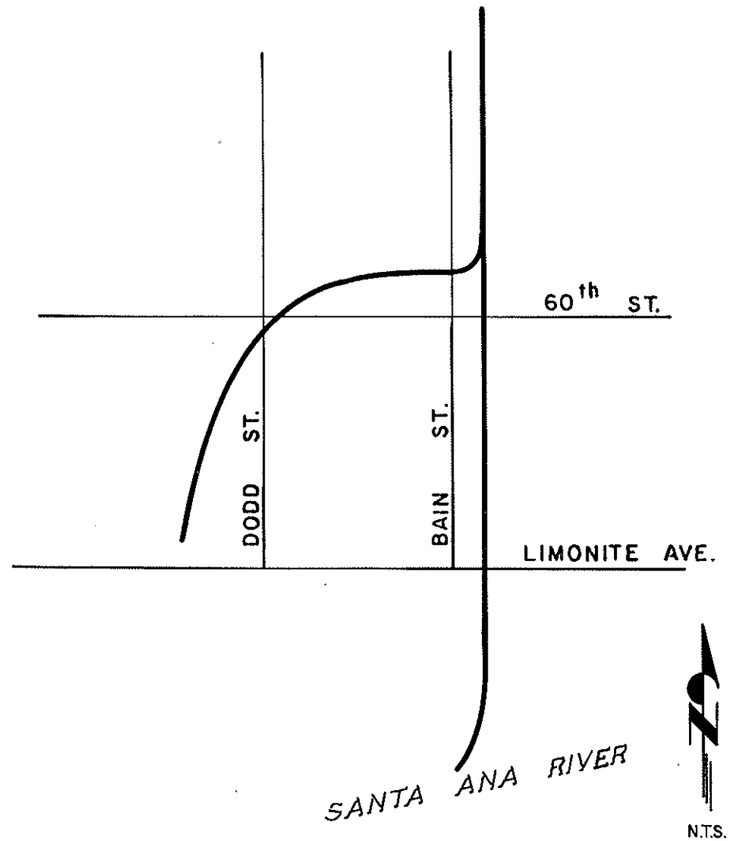
ALTERNATE 1

FULLY IMPROVE EXISTING ALIGNMENT TO RIVER



ALTERNATE 2

ABANDON EXISTING ALIGNMENT AND TAKE TOTAL FLOW STRAIGHT AHEAD TO RIVER



ALTERNATE 3

(PROPOSED ALIGNMENT)

SPILL-OFF 2700 cfs INTO EXISTING ALIGNMENT AND TAKE BALANCE STRAIGHT AHEAD TO RIVER

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

ALTERNATES - REACH 6

APPROVED: CHIEF ENGINEER R.C.F.C. & W.C.D.	DRAWN BY:	SHEET No.
DATE	CHECKED BY:	
	DATE DRAWN:	DR. No.

REVISED

TABLE I

SAN SEVAINE MASTER PLAN

COST SUMMARY

REACH	CONSTRUCTION COST	30% ENGINEERING & ADMINISTRATION	RIGHT OF WAY	MASTER PLAN COST
1 County Line to Freeway 60	$ 989,000	$ 297,000	$ 750,000	$ 2,036,000
2 Freeway 60 thru San Sevaine Wy	918,000	275,000	-	1,193,000
3 San Sevaine Wy thru Van Buren Blvd	1,982,000	595,000	-	2,577,000
4 Van Buren Blvd to Jurupa Road	1,980,000	594,000	78,000	2,652,000
5 Jurupa Road thru 60th St.	1,773,000	532,000	28,000	2,333,000
6 60th St. thru Limonite Ave.	662,000	199,000	164,000	1,025,000
7 Limonite Ave. to Santa Ana Riv.	226,000	68,000	70,000	364,000
TOTAL	$ 8,530,000	$ 2,560,000	$ 1,090,000	$12,180,000