

RIVERSIDE COUNTY FLOOD CONTROL AND
WATER CONSERVATION DISTRICT

RIVERSIDE, CALIFORNIA

REPORT ON
MASTER DRAINAGE PLAN
FOR
THE RUBIDOUX AREA
ZONE ONE

JULY 1970

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Chief Engineer

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PLATES

NO.

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Line D
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Rubidoux Retention Basin

S U M M A R Y

The Rubidoux Area is one of the oldest developed communities in Riverside County. Homes and businesses constructed in the early 1900's were often done so without adequate provision for flood control. Development has taken place in recent years in those areas lying upstream of the older development, causing runoff in the lower part of the watershed to increase. In recent years, flooding along Mission Boulevard and to homes south of this main thoroughfare has become a serious problem. Many homes and businesses have been damaged by uncontrolled runoff.

This report, called the Rubidoux Master Drainage Plan, provides the most economical solution to the storm water flooding problems for the community of Rubidoux. The plan consists of a network of underground storm drains, one open channel, and a retention basin that would intercept and convey flows through the developed areas to the Santa Ana River.

A high degree of protection will be provided when the recommended improvements are constructed. These facilities will minimize storm damage and will eliminate most of the public inconvenience that now occurs during periods of normal rainfall. The total estimated cost of the plan is \$890,930.

I N T R O D U C T I O N

General Statement - The Riverside County Flood Control and Water Conservation District is developing Master Drainage Plans for the various cities and unincorporated areas in the county.

This report provides a Master Drainage Plan for the Rubidoux Area. The plan includes a retention basin, and a network of underground storm drains leading into a proposed open channel. The system will convey storm flows away from the developed area to the existing Sunnyslope Channel and eventually to the Santa Ana River. When completed this plan will substantially reduce storm water damage and inconvenience to the public.

Purpose - The purpose of this report is to investigate and evaluate the drainage problems within the Rubidoux Area and to develop an economically feasible Master Drainage Plan for that area. Such a plan will provide adequate protection to the community and serve as a guide for the programming of storm drain and open channel construction in this area.

Scope - The general drainage boundaries of the area covered by this plan are the foothills on the north, (north of Highway 60), 46th Street on the south, Wallace Street on the east, and Pacific Avenue on the west. The extent of the studies establishing the Master Plan includes:

1. Determination of the amounts and points of concentration of storm runoff in the area.
2. Preparation of a drainage map showing all of the subdrainage areas tributary to each system of drains.
3. Location, size and capacity of all proposed underground storm drains and open channels and location of inlets which will be required for ultimate development of the plan.
4. Investigation of alternate routes and methods of control to insure the most economical and feasible plan.
5. Preparation of preliminary design plans and supporting cost estimates.

Description of Problem - The Rubidoux Area is rapidly becoming a major commercial and residential community. One of the most serious problems confronting both existing and future development of this area is inadequate drainage and flood control. Several homes and businesses are flooded during storms of even moderate intensity. Storms of heavy intensity cause extensive damage to this community.

The total watershed contains 1,523 acres or 2.38 square miles. About two thirds of the 465 acre watershed lying north of Highway 60 lies on a very steep slope. The slope of the watershed between Highway 60 and the Flabob Airport is moderate while the lower portion of the watershed is relatively flat as it

approaches the Santa Ana River. The portion of the watershed between the freeway and Flabob Airport is nearly all developed. Runoff in these areas concentrates rapidly and moves toward the river. As it reaches the flat slopes along the downstream reaches the velocity of flow decreases and causes a build up of water depths creating widespread flooding.

The Riverside County Flood Control and Water Conservation District has already constructed the main outlet channel for runoff from the Rubidoux watershed (Sunnyslope Channel Stage IV, 1968), and the outlet for the retention basin, which consists of a 36-inch to 60-inch diameter storm drain in the median of the freeway extending from the basin outlet to the Santa Ana River, (constructed in 1962). However the retention basin and collection system proposed in this report is necessary to eliminate the existing flooding conditions and provide adequate flood protection for the area.

D I S C U S S I O N

General - The present drainage system for the Rubidoux Area is inadequate to handle storms of even moderate intensity. In order to reduce flood damage and public inconvenience, a means of controlling excess storm runoff should be provided. The Master Drainage Plan presented herein provides an economical method of collecting storm runoff in a flood retention basin, a system of underground drains, and an open concrete-lined channel, which will all discharge into the Santa Ana River. The plan provides a high degree of protection throughout the area, utilizing as many of the existing storm drains and catch basins as possible.

Criteria - Generally all underground storm drains proposed in this plan are to be located within either existing or proposed future street rights of way. When the runoff from a once in 10-year storm reaches the top of the curb in the street, an underground drain is initiated and from that point downstream the entire 10-year storm runoff is carried in the underground drain. It should be recognized that flows exceeding the 10-year frequency storm will generally be carried within street systems and the combination of both a street and underground storm drain provide a high degree of flood protection.

Open channels are provided when the discharge is large and the construction and right of way costs for the channel

proved to be less than the costs of an underground storm drain. The open channel proposed in this report is designed to carry the 100-year frequency storm runoff.

The alignments of all drains and channels were based on hydraulic efficiency, ability to serve tributary areas and economics. In addition to the criteria mentioned above, flood control facilities have been proposed when:

- a. Relief for an overloaded existing drain is necessary.
- b. Economic consideration dictated a diversion from the normal path of storm flows.
- c. Relief for a major traffic carrying street or street intersection is needed.

Any major departure from the proposed alignments will require a re-evaluation of the design of the system.

Hydrology - The hydrology for the plan was developed by two methods; namely, the modified rational method and the synthetic unit hydrograph method.

The modified rational method was used to determine the 10-year frequency design discharge generated within the rapidly developing moderately sloping areas of the watershed. Street systems were rated for these flows and all drain lines were sized using the 10-year frequency discharge. The modified rational method was also used to compute runoff for the 100 year frequency discharge in the proposed open channel. The basic equation for the rational method is $Q=CIA$: Where Q is the quantity of flow in cubic feet per second; C is a runoff coefficient based on

soil type, slope of land, type of development and intensity of rainfall; I is the intensity of rainfall in inches per hour; and A is the size of contributing area in acres.

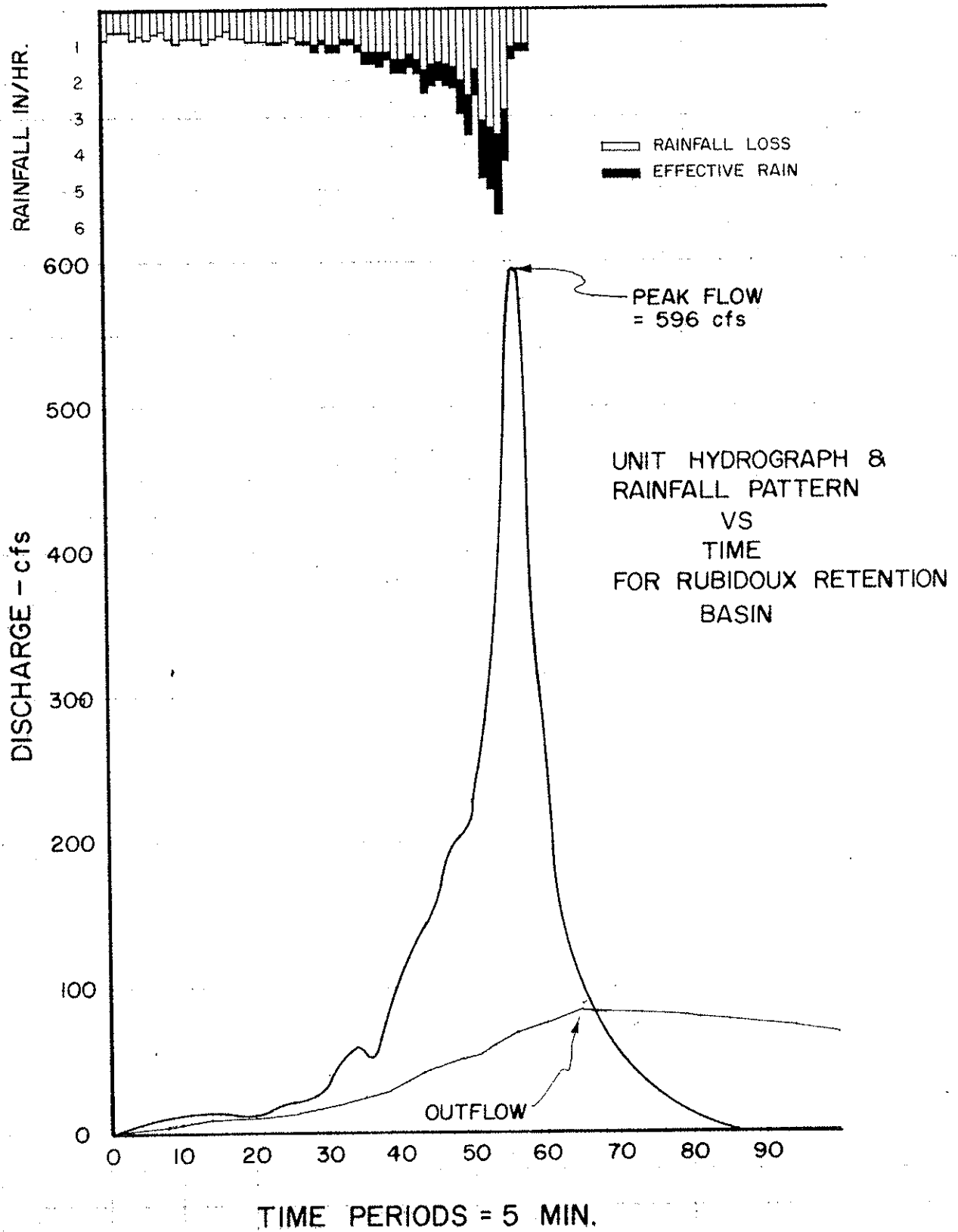
The synthetic unit hydrograph method was used to determine the 100-year peak flow and storm runoff volume for the foothill watershed north of Highway 60. The 100-year frequency five hour storm was used to determine the size of the proposed Rubidoux Retention Basin. Figure I of this report shows the resulting inflow and outflow hydrograph for the Rubidoux Retention Basin.

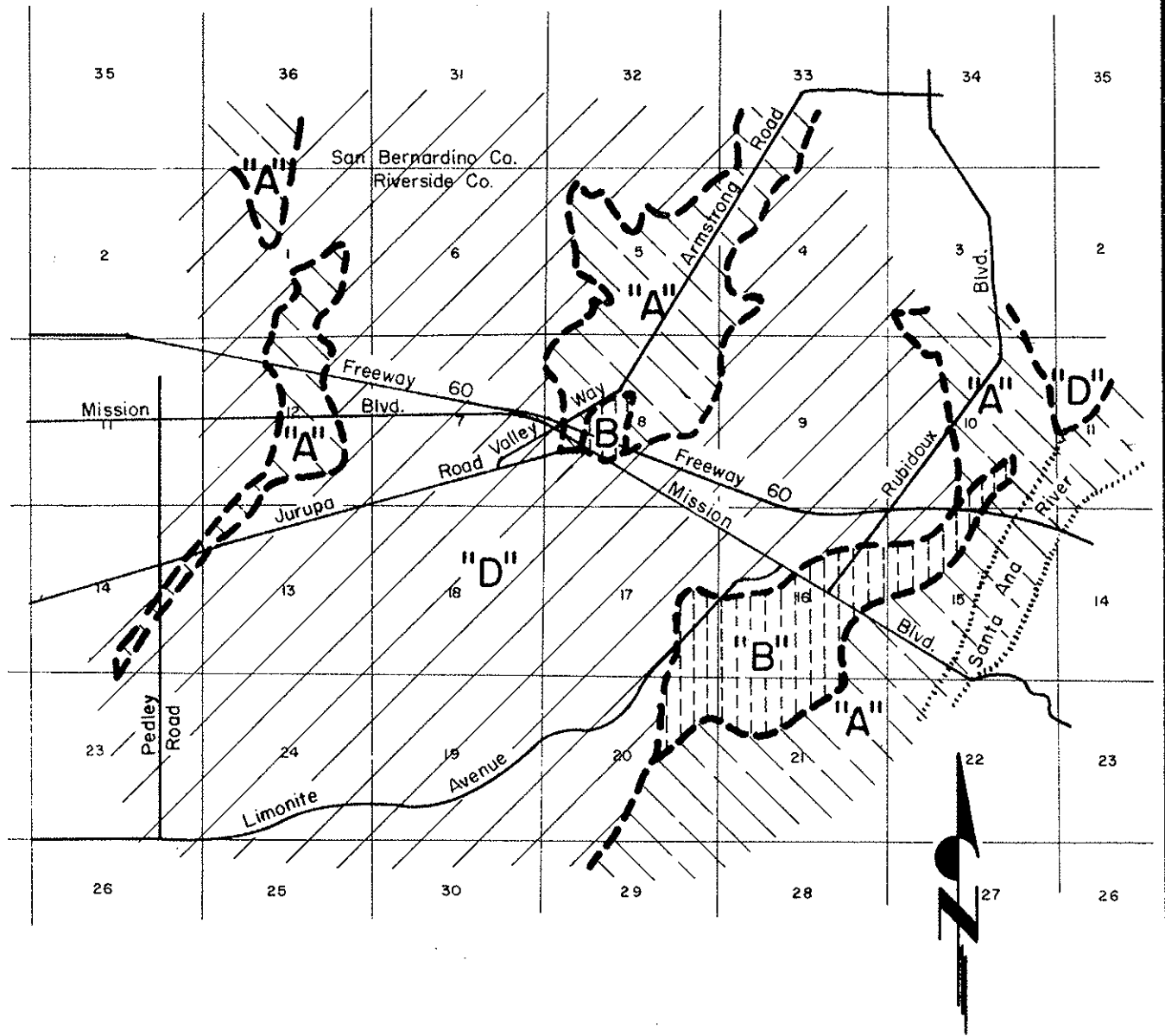
A soil map depicting the various soil classifications in the watershed was prepared and included in the appendix of the report as Figure II. The U. S. Soil Conservation Service classifies soils into four hydrologic groupings. The grouping or classification signifies the relative permeability of the soil, with group A being the most permeable soil and group D the least permeable soil. The Rubidoux area watershed contains primarily groups A, B, and D soil types. These soil types were verified with the Riverside office of the U. S. Soil Conservation Service. Runoff coefficient (C) curves for each of the three soil groups are included in this report as Figures III, IV, and V.

Rainfall intensity-duration, frequency curves for the Rubidoux Area were developed from a statistical analysis of the 25 year record at the Citrus Experiment Station in Riverside. Results of this analysis, shown on Figure VI, compare favorably with U. S. Weather Bureau Bulletin No. 24.

Maps and Plates - A map showing the composite drainage plan and location of all existing and proposed facilities is

RIVERSIDE COUNTY FLOOD CONTROL
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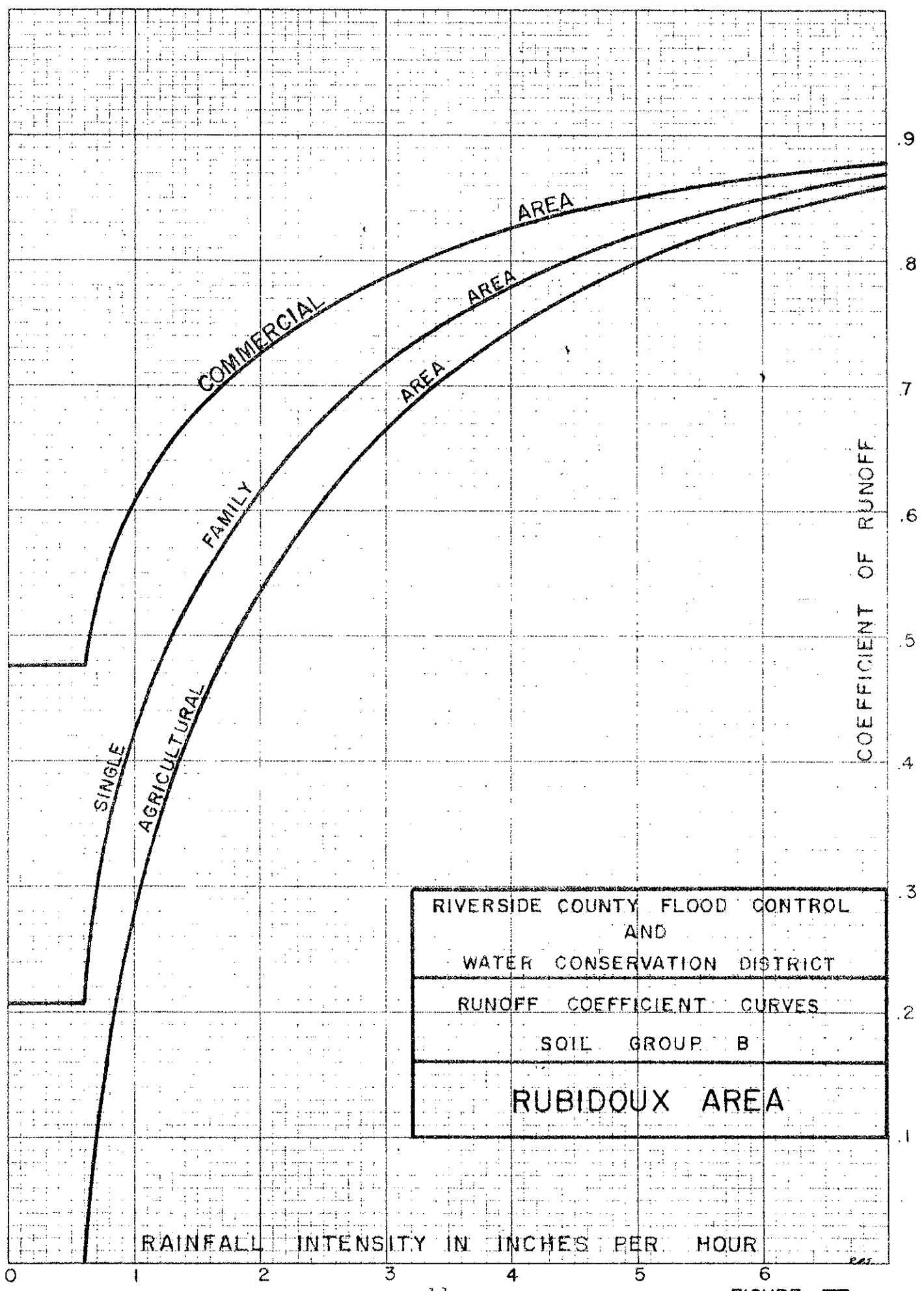
LEGEND

"A" SOIL TYPE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
SOIL MAP (RUBIDOUX AREA)

FIGURE II

K&E 10 x 10 1/2 INCH 45 0/02
7 x 1/2 INCH
KUFFEL & ESSER CO



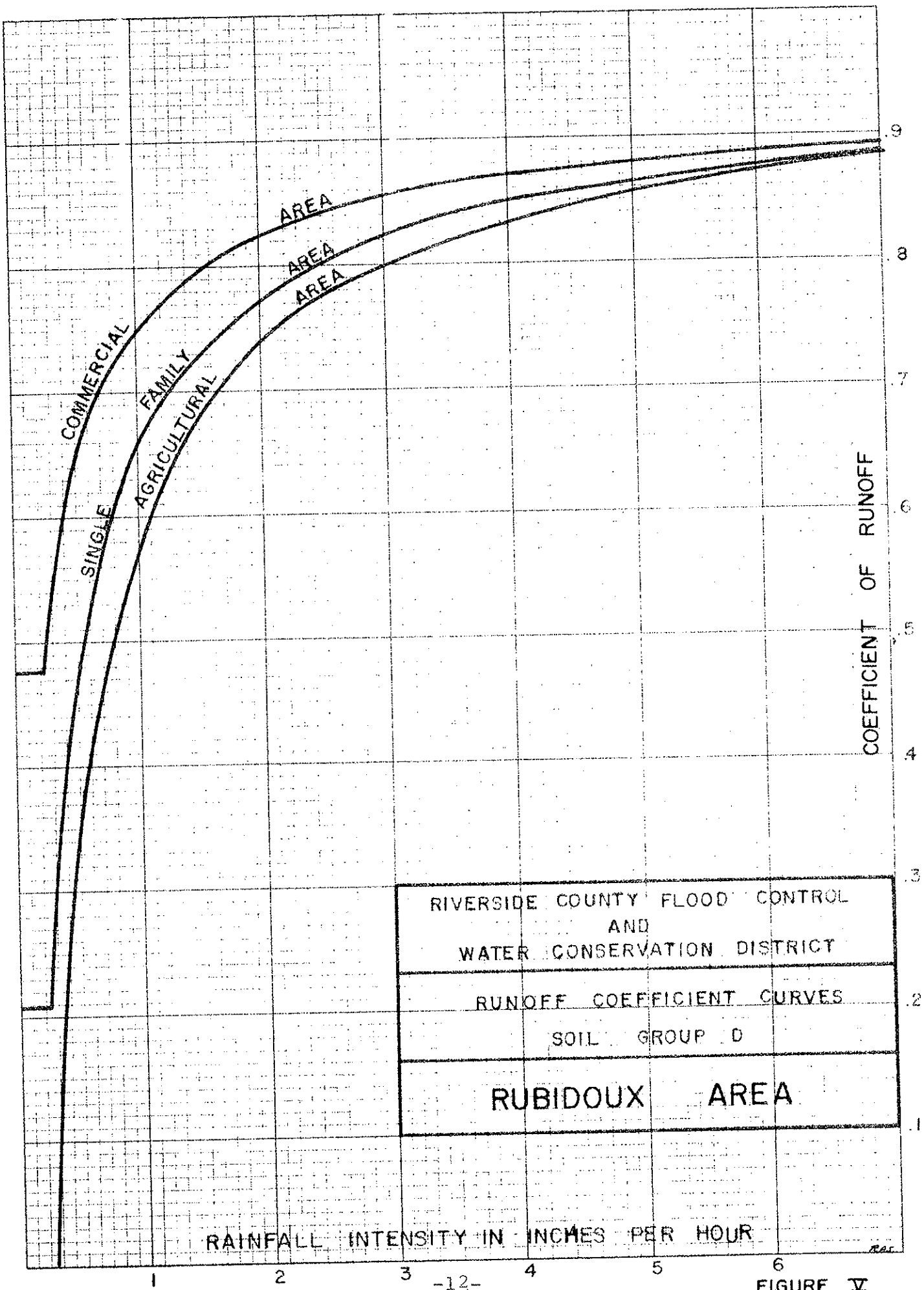
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
RUNOFF COEFFICIENT CURVES
SOIL GROUP B
RUBIDOUX AREA

RAINFALL INTENSITY IN INCHES PER HOUR

COEFFICIENT OF RUNOFF

FIGURE IV

10 X 10 TO THE INCH 46 0702
7 X 10 INCHES MADE IN U.S.A.
KLUFFEL & ESSER CO.



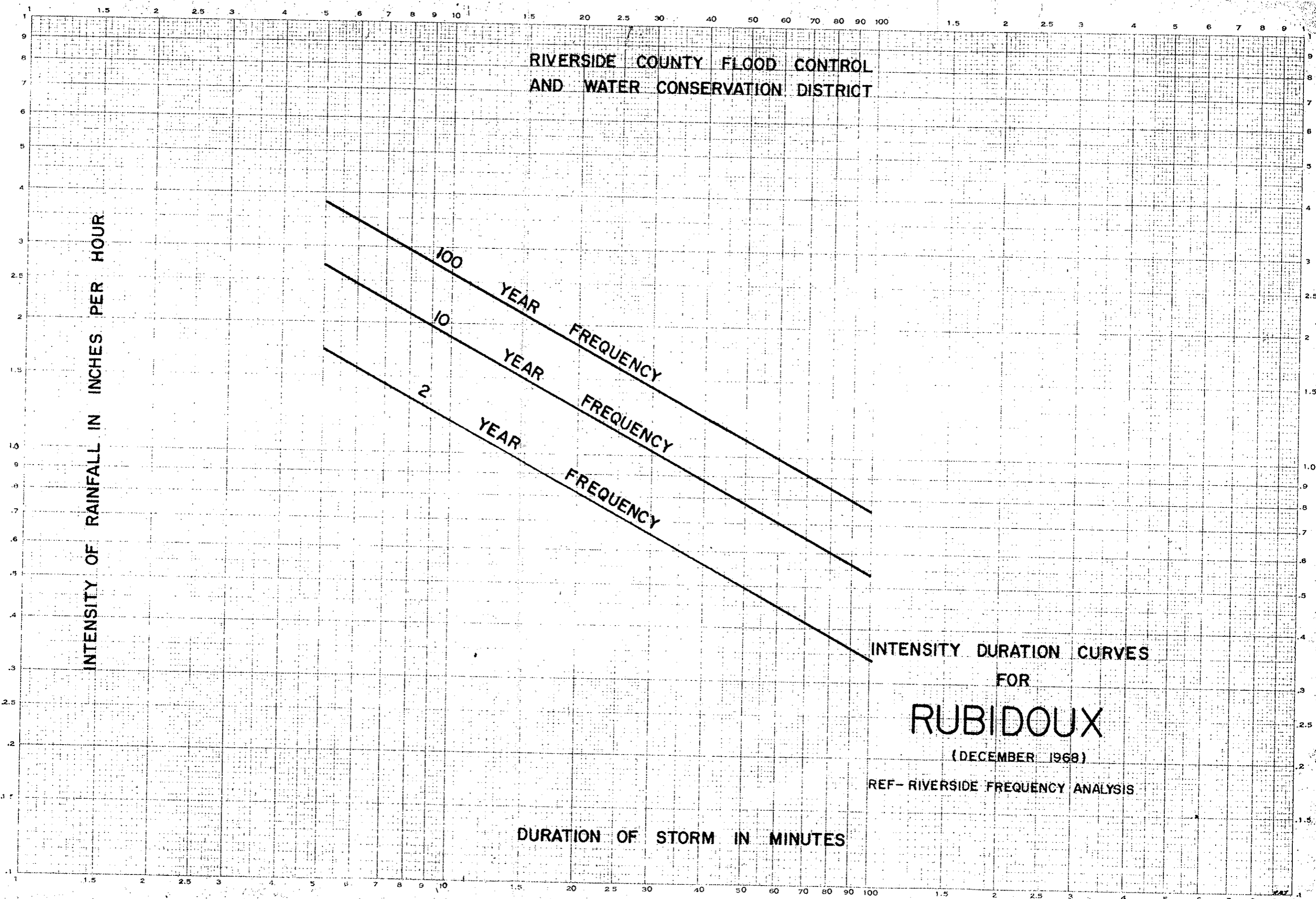
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
RUNOFF COEFFICIENT CURVES
SOIL GROUP D
RUBIDOUX AREA

RAINFALL INTENSITY IN INCHES PER HOUR

FIGURE V

NO. 3400-225 DIETZEN FINISH PAPER
100% RECYCLED PAPER
2 CYCLES X 3 CYCLES

SUSSENE DIETZEN CO.
P.O. BOX 100
MILWAUKEE, WIS. 53201



RIVERSIDE COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT

INTENSITY OF RAINFALL IN INCHES PER HOUR

DURATION OF STORM IN MINUTES

INTENSITY DURATION CURVES
FOR
RUBIDOUX
(DECEMBER 1968)
REF- RIVERSIDE FREQUENCY ANALYSIS

included in the rear of the report. Preliminary plan and profile drawings indicating pertinent details for each proposed facility are also included in this report (Plates 1 through 9).

Existing Facilities

Drainage District No. 3 - One of the earliest special districts formed in Riverside County was formed in Rubidoux (Drainage District No. 3) in 1918. The purpose of this District was to construct drainage facilities to drain surface and ground water to the Santa Ana River. Several small drains (8 inches to 16 inches in diameter) were constructed in the Rubidoux area, all leading to a 24 inch diameter outlet which drains southerly to the River.

Approximately \$41,000 worth of bonds were sold on the 8th of November, 1920 to finance the construction of about three miles of small clay pipe drains. Final payment was made on these bonds in 1935 leaving only minor maintenance costs for Drainage District No. 3 to levy funds for in the ensuing years. Taxation for the purpose of maintaining these old drains (administered and maintained by the Riverside County Road Department) has ranged from nothing, to three or four cents per hundred dollars of assessed valuation in recent years.

Most of these old drain lines are not aligned within the streets, and pass beneath houses and commercial buildings, thereby rendering maintenance of them nearly impossible. The old drains are entirely inadequate to serve any useful purpose

in the proposed Master Drainage Plan and are in such poor condition that they are not worth improving. They can be abandoned once the proposed improvements are completed.

Line F is an existing underground storm drain which was constructed in 1962 in the median of U. S. Highway 60 from the natural wash west of Rubidoux Boulevard, east some 3,500 feet to an outlet into an unlined channel that drains southerly to the Santa Ana River. The project was constructed jointly by the California State Division of Highways and the Riverside County Flood Control and Water Conservation District. It ranges in size from 36 to 60 inches in diameter, with a reach of double 48 inch diameter pipe near the outlet. It was originally designed to take low flows from the natural wash and divert them to the river. Major storm flows exceed the capacity of this storm drain, overtop the control weir at its inlet and continue southerly in the natural wash through the 8 foot wide by 4 foot high reinforced concrete box through the freeway. Storms of this type would cause severe damage to properties south of Highway 60 in the community of Rubidoux.

Line F (commonly known as the Rubidoux Storm Drain) is proposed to be used in conjunction with the proposed Rubidoux Retention Basin (see Plate 9 in the rear of this report). The combination of the proposed basin along with Line F will give downstream Rubidoux development protection from the 100-year frequency storm. It is considered to be a vital and unique part of the overall Master Drainage Plan.

Recommended Improvements

It should be noted at this point that an undeveloped area southerly of Mission Boulevard between the Flabob Airport and the District's Santa Ana River Levee will likely require construction of some flood control facilities when the area develops. Proposals for facilities in the area were intentionally omitted from this plan. It is a large flat open area with large ownerships in which numerous alignments or methods of storm runoff control could be utilized. Whatever is ultimately done to protect this area from storm runoff will be closely tied to the type of development proposed; consequently storm drain facilities are considered the responsibility of the developer. These facilities will be reviewed by this District for adequacy at the time subdivision development is proposed. A portion of this open area immediately south of Mission Boulevard is presently being developed and drainage facilities are proposed.

The recommended improvements for the plan presented in this report consist of one open channel, five main underground storm drains, and one retention basin. Construction of the retention basin is vital to the integrity of the size of facilities proposed for Line A.

Line A is the proposed major outlet storm drain for the Rubidoux Area Master Drainage Plan. It includes nearly 3/4 of a mile of open concrete lined channel and approximately 1/2 mile of large reinforced concrete pipe storm drain. Line A joins the District's existing Sunnyslope Channel south of

46th Street where flows from the Sunnyslope and Rubidoux watersheds combine on their way to the Santa Ana River.

The proposed channel (b=6ft., d=6, s.s.=1½:1) will also collect storm runoff in the adjacent local areas between the Flabob Airport and Riverview Drive. It extends from its confluence with the Sunnyslope Channel upstream to near what is presently the southern end of Rubidoux Boulevard. Line A continues upstream as a 78 inch diameter underground storm drain in Rubidoux Boulevard to Mission Boulevard. Side drains (Lines B, C, D and E) outlet into Line A at Mission Boulevard, Tilton Street, and 42nd Street.

The alignment of the proposed channel follows the alignment of the old 18 inch to 24 inch diameter clay pipe drain which was constructed as the result of the formation of Drainage District No. 3 in 1918. Upon completion of the facilities proposed in this plan this drain line will be abandoned.

Preliminary plan and profile drawings for Line A are shown on Plates 1 through 3. The estimated construction cost is \$248,730.

Line B is an underground storm drain in Mission Boulevard extending from its outlet into Line A at Rubidoux Boulevard westerly to a point about 650 feet west of La Rue Street. All streets intersecting this reach of Mission Boulevard deliver runoff from the area between Highway 60 and Mission

Boulevard, to the proposed drain. Construction of the proposed 63 inch to 27 inch diameter drain will eliminate the flooding of homes and businesses along and to the south of Mission Boulevard as well as reduce traffic hazards during periods of heavy rainfall along this busy thoroughfare.

Preliminary plan and profile drawings of the proposed storm drain are shown on Plates 4 and 5. The estimated construction cost is \$126,550.

Line C is an underground storm drain in Mission Boulevard extending from its outlet into Line A at Rubidoux Boulevard easterly to Wallace Street. The proposed storm drain will collect runoff generated from the watershed between Highway 60 and Mission Boulevard east of Rubidoux Boulevard. It varies in size from 60 inches to 36 inches in diameter. Construction of this drain will eliminate the flooding of businesses along Mission Boulevard, eliminate the flooding of homes south of Mission Boulevard from runoff that is presently uncontrolled, and reduce the traffic hazards in this area during periods of heavy rainfall.

Preliminary plan and profile drawings of the proposed storm drain are shown on Plate 6. The estimated construction cost is \$62,025.

Line D is a proposed 45 inch diameter underground storm drain in Tilton Avenue extending from its outlet into Line A at Rubidoux Boulevard, westerly to Briggs Street. This drain

will intercept runoff collected by Tilton Street and Briggs Street generated in the watershed northwest of this intersection (the northern boundary of this watershed will be Mission Boulevard once Line B is constructed).

It should be noted that when the improvements proposed in this report (in particular, Lines A, B, and D) are constructed, runoff which reaches the intersection of 42nd Street and Riverview Drive should be rerouted to continue east in Tilton Street to an inlet at the end of proposed Line D. This rerouting can be accomplished by the construction of drop inlets at the Riverview Drive, 42nd Street intersection. Cost estimates for this work are included with Line D. Construction of the herein proposed improvements will eliminate the serious flooding on Riverview Drive in front of the West Riverside Elementary School as well as reducing the runoff problems along De La Vista Drive south of this intersection.

Preliminary plan and profile drawings for Line D are shown on Plate 7. The estimated construction cost is \$39,360.

Line E is a proposed 33 inch diameter underground storm drain in 42nd Street extending from Line A east to Fort Drive. This drain will intercept runoff generated in the residential area south of Mission Boulevard and east of Rubidoux Boulevard. When completed it will relieve serious flooding along the east edge of the Jay L Jay Apartment complex as well as around Flabob Airport.

A preliminary plan and profile drawing for Line E is shown on Plate 8. The estimated construction cost is \$15,140.

Rubidoux Retention Basin - The proposed Rubidoux Retention Basin is located north of Highway 60 in the natural wash west of Rubidoux Boulevard. Construction of this basin will make it possible to significantly reduce the size as well as the length of the proposed Line A downstream. The basin will provide control of the 446 acre watershed to the north, retarding runoff temporarily while it is slowly released through the existing storm drain (Line F discussed heretofore) in the freeway median to the Santa Ana River.

The retention basin will store the estimated 100-year frequency routed storm volume of 38 acre feet, releasing the runoff at a maximum rate of 85 cubic feet per second. An emergency spillway will also be provided, to direct flows into the existing 8x4 R.C.B. under the freeway should such a storm ever occur. An estimated 85,000 cubic yards of material will be excavated from the 4.1 acre site.

Preliminary plan and profile drawings of the proposed Rubidoux Retention Basin are shown on Plate 9. The estimated construction cost is \$132,000.

Inlets - Inlets and their proper location are most important to the proper functioning of any flood control and drainage system. Inlets provide the means of intercepting

uncontrolled flows and getting them into the system. Most of the inlets in this plan are curb opening type catch basins. Field investigations have been made to generally establish the location of the proposed inlets and to locate existing inlets which are to be used in the system where possible. Table I lists the location of existing and proposed inlets and their approximate size required to intercept the necessary flows.

Alternate Studies - Alternate studies were made of the alignment of the proposed open channel and several underground storm drains in this plan. Alternate locations were also considered for the Rubidoux Retention Basin. In addition consideration was given to the system needed without the retention basin. It was determined that the alignments and types of construction proposed in this plan are the most economical and provide the most efficient system of collection and disposal of storm waters.

Estimated Cost - The estimated cost of each line is tabulated in Table II, (Preliminary Construction Cost Estimate). Unit prices used in determining costs are based on present (July 1970) price levels. The project costs for each line which includes engineering, contingencies and right of way costs are summarized in Table III, (Estimated Project Cost).

TABLE I
PROPOSED INLETS
FOR MASTER DRAINAGE PLAN

Line	Drainage Area No.	Location	Proposed Inlets - Feet		
			Total	Existing	Proposed
A	U-9	Rubidoux and Tilton Street	31	0	31
B	P-3	Mission and Haynes	35	0	35
B	P-4	Mission and LaRue Street	21	3	18
B	P-8	Mission and Riverview Drive	69	3	66
B	Q-4	Mission and Avalon Street	55	6	49
B	Q-9	Mission and Pioneer Drive	10	16	0
B	Q-7	Mission and Pontiac Avenue	18	15	3
B	R-3	Mission and Rubidoux Avenue	21	6	15
C	S-4	Mission and Packard Avenue	56	30	26
C	S-6	Mission and Mintern Street	9	10	0
C	T-2	Mission and Arora Street	8	9	0
C	T-6	Mission and Wallace Street	32	6	26
D	U-6	Tilton and Briggs Street	22	0	22
D	U-8	Tilton and Leigh Street	21	0	21
D	U-9	Tilton and Pontiac Street	21	0	21
E	T-8	42nd Street near JLJ Apt's.	36	0	36

TABLE II

PRELIMINARY CONSTRUCTION COST ESTIMATE

<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Total</u>
<u>Line A</u>				
78" R.C.P.	L.F.	2,580	\$ 60.00	\$154,800
Channel Concrete	S.F.	96,600	.50	48,300
Excavation	C.Y.	11,670	1.00	11,670
Cutoff Wall	L.F.	7,000	1.50	10,500
Fencing	L.F.	7,000	1.50	10,500
R.C.B. Concrete	C.Y.	59.4	75.00	4,450
R.C.B. Excavation	C.Y.	302	3.00	906
R.C.B. Backfill	C.Y.	85	3.50	264
Manholes	Ea.	5	600.00	3,000
Catch Basins	L.F.	31	140.00	<u>4,340</u>
			Sub total	\$248,730
<u>Line B</u>				
63" R.C.P.	L.F.	920	\$ 43.00	\$ 39,560
42" R.C.P.	L.F.	910	25.25	22,980
33" R.C.P.	L.F.	1120	18.50	20,720
27" R.C.P.	L.F.	780	17.50	13,650
Manholes	Ea.	6	600.00	3,600
Catch Basins	L.F.	186	140.00	<u>26,040</u>
			Sub Total	\$126,550

TABLE II
PRELIMINARY CONSTRUCTION COST ESTIMATE

<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Total</u>
<u>Line C</u>				
60" R.C.P.	L.F.	700	\$ 40.50	\$ 28,350
42" R.C.P.	L.F.	370	24.75	9,160
39" R.C.P.	L.F.	380	22.50	8,550
36" R.C.P.	L.F.	340	20.25	6,885
Manholes	Ea.	3	600.00	1,800
Catch Basins	L.F.	52	140.00	<u>7,280</u>
			Sub total	\$ 62,025
<u>Line D</u>				
45" R.C.P.	L.F.	860	\$ 27.00	\$ 23,200
Manholes	Ea.	2	600.00	1,200
Catch Basins	L.F.	64	140.00	8,960
Riverview Drive, 42nd Street Intersection	Lump Sum			<u>6,000</u>
			Sub total	\$ 39,360
<u>Line E</u>				
33" R.C.P.	L.F.	500	\$ 19.00	\$ 9,500
Manhole	Ea.	1	600.00	600
Catch Basins	L.F.	36	140.00	<u>5,040</u>
			Sub total	\$ 15,140
<u>Rubidoux Retention Basin</u>	Lump Sum			\$132,000

TABLE III
ESTIMATED PROJECT COST FOR THE RUBIDOUX AREA
MASTER DRAINAGE PLAN

Item	Line A	Line B	Line C	Line D	Line E	Rubidoux	
						Ret.	Basin Total
Storm Drain and Appurtenances	\$248,730	\$126,550	\$62,025	\$39,360	\$15,140	\$132,000	\$623,805
Right of Way	50,000					30,000	80,000
18% Engineering and Administration	44,775	22,780	11,160	7,080	2,725	23,760	112,280
12% Contingencies	<u>29,840</u>	<u>15,185</u>	<u>7,440</u>	<u>4,720</u>	<u>1,820</u>	<u>15,840</u>	<u>74,845</u>
Total	\$373,345	\$164,515	\$80,625	\$51,160	\$19,685	\$201,600	\$890,930

Environmental Effect - The facilities proposed in this report will greatly enhance the environment of the community. Under present conditions flooding occurs largely uncontrolled leaving behind damaged properties, pockets of mud, silt and debris, and standing ponds of water. Several small, sightly roadside ditches laden with weeds and debris can be eliminated after the proposed improvements are constructed. Implementation of this Master Plan should greatly enhance the living conditions of the community of Rubidoux.

C O N C L U S I O N S

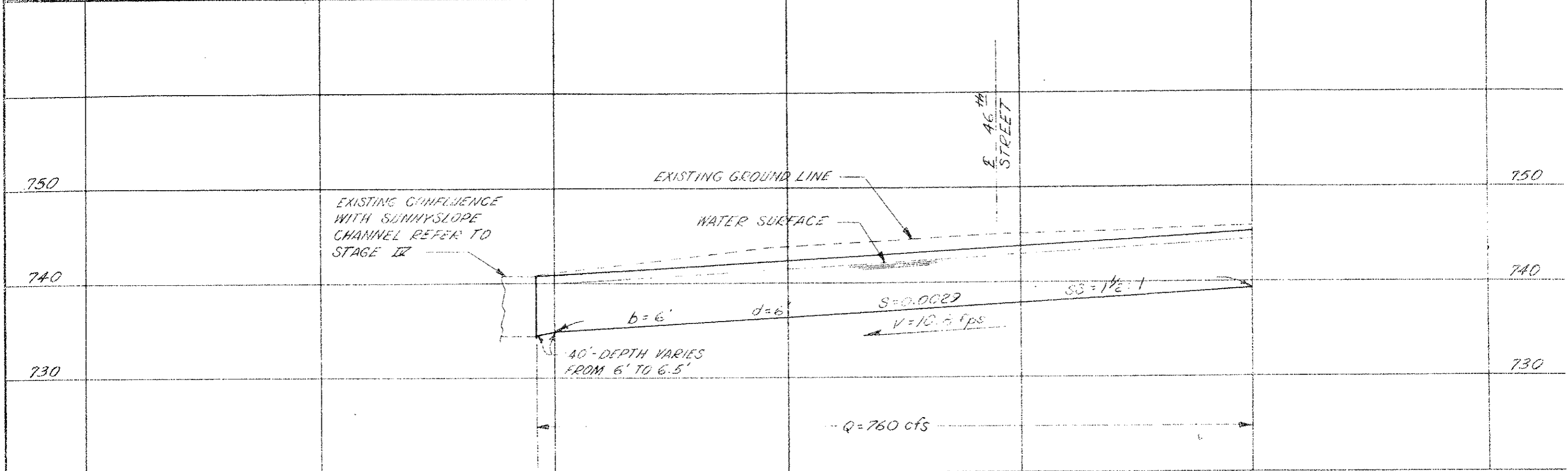
Based on the studies and investigations made for this report, it is concluded that:

1. Due to the lack of adequate drainage facilities, the Rubidoux area is experiencing serious flooding problems.
2. A system of facilities which includes a retention basin, one open channel, and several underground storm drains is required to convey storm runoff through the developed areas to the Santa Ana River.
3. The Master Drainage Plan proposed in this report is the most economical system of facilities required to eliminate the flooding and drainage problems.
4. The total cost of the proposed improvements, including rights of way, is estimated to be \$890,930.

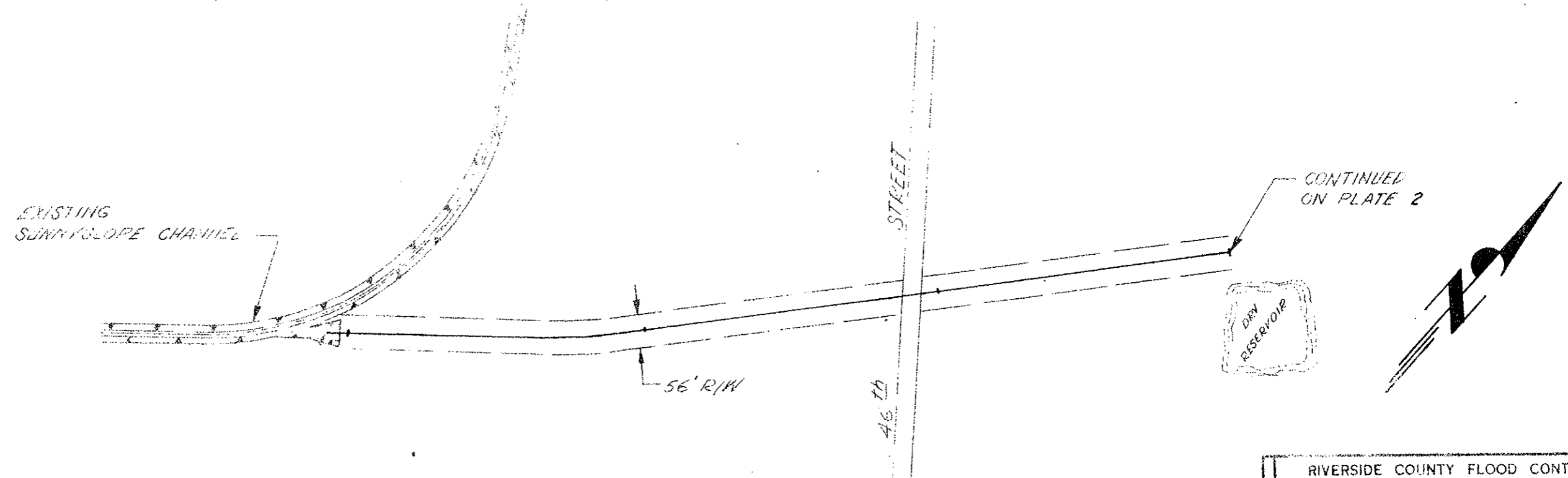
R E C O M M E N D A T I O N S

It is recommended that:

1. The Master Drainage Plan as set forth herein be adopted by the Riverside County 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 to all future developments and that such developments be required to conform to the plan insofar as it is possible to do so.
3. When possible, the right of way required for the proposed plan be protected from encroachment.



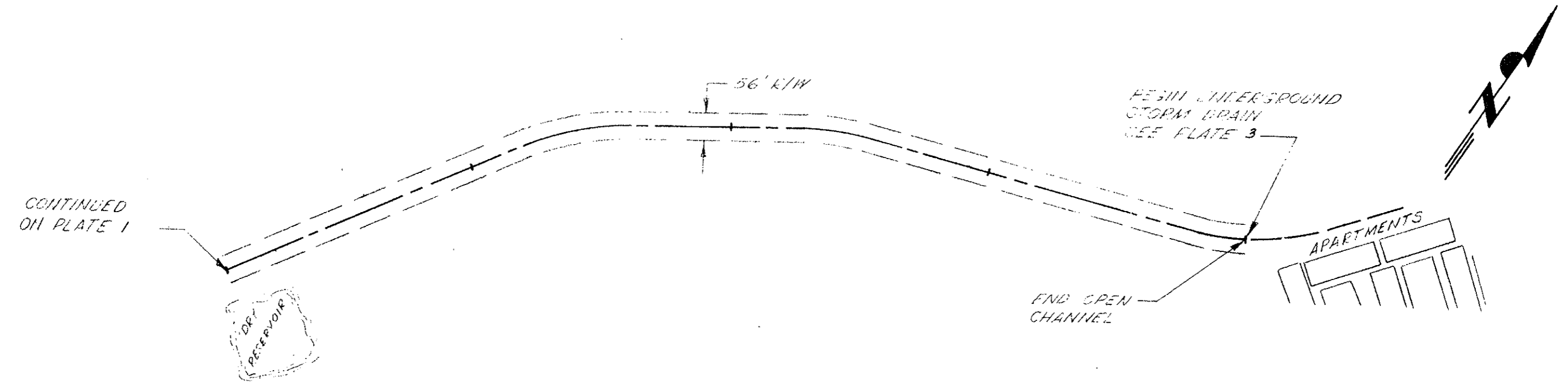
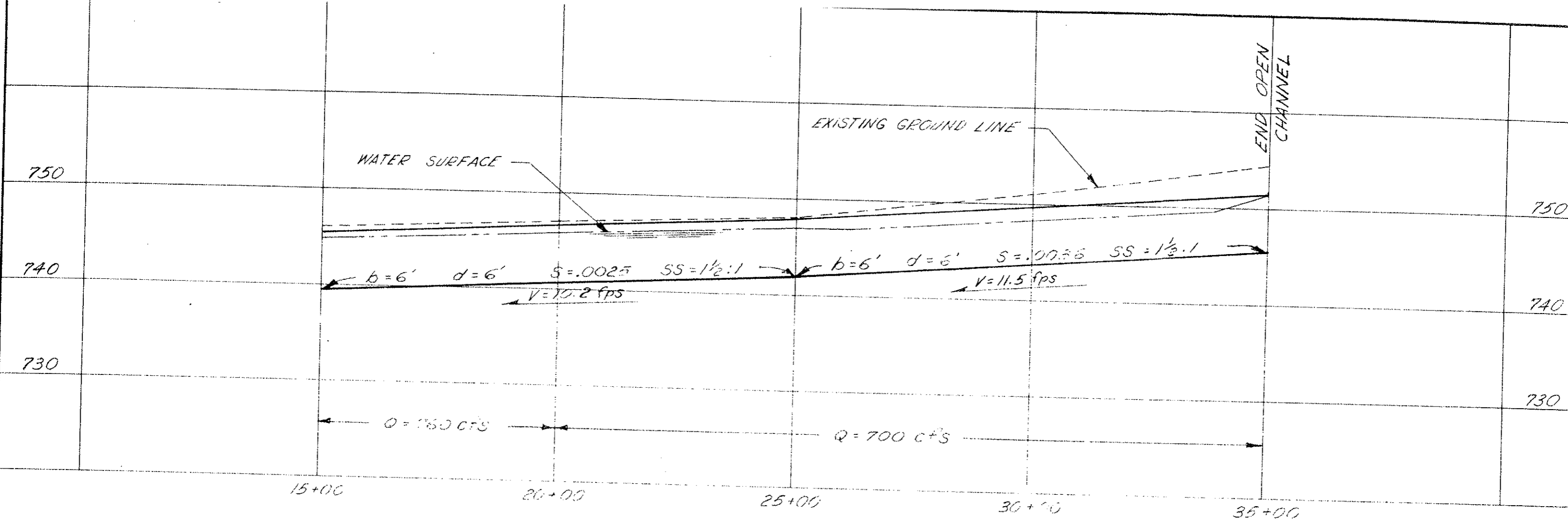
0+40 0+00 5+00 10+00 15+00



SCALE
 HORIZ. 1" = 200'
 VERT. 1" = 10'

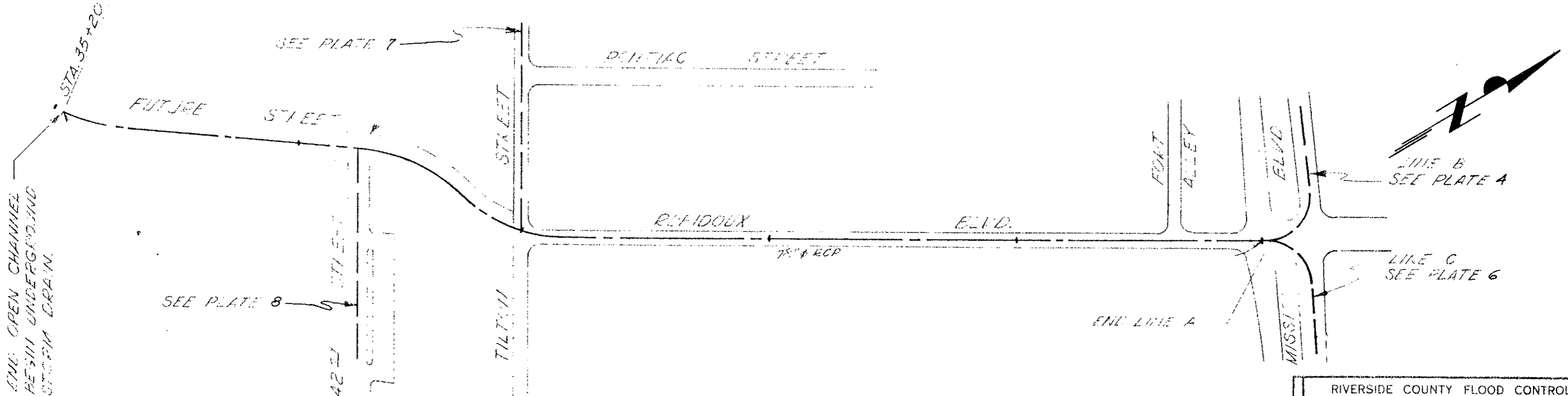
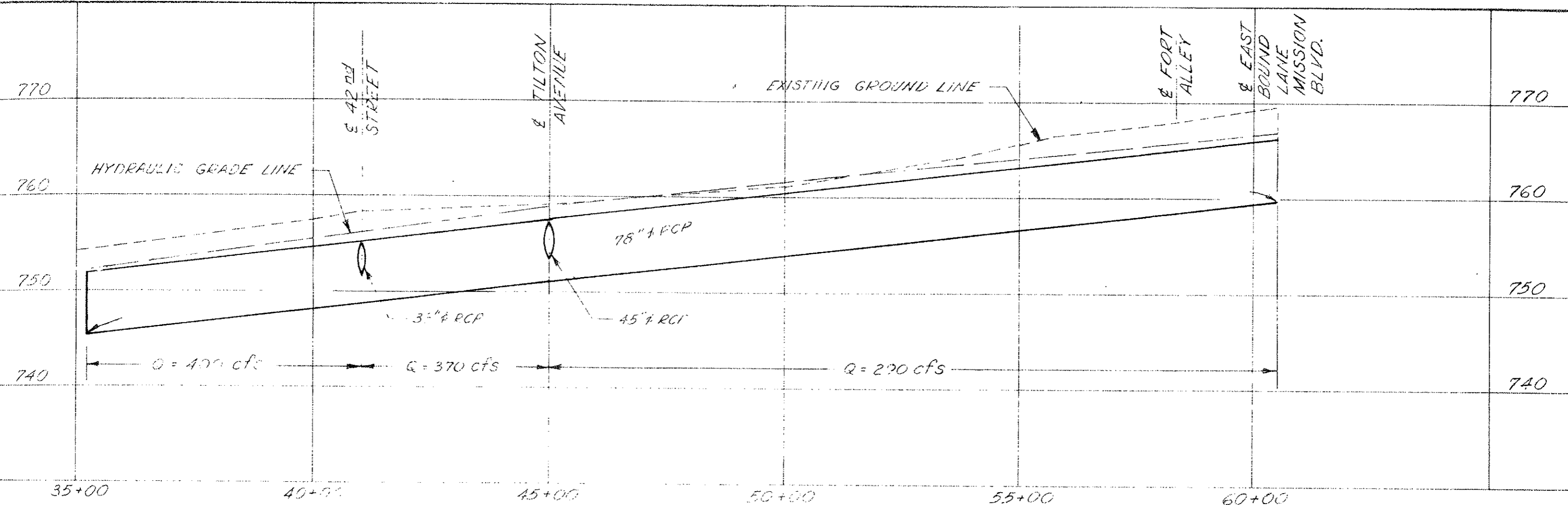
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT			
RUBIDOUX MASTER DRAINAGE PLAN			
LINE A			
PRELIMINARY PLAN AND PROFILE			
APPROVED	DESIGNED BY	CHECKED BY	DATE
	R.A.S.		
DATE	DATE DRAWN	DATE	DATE

PLATE 1



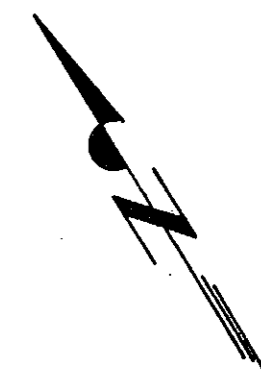
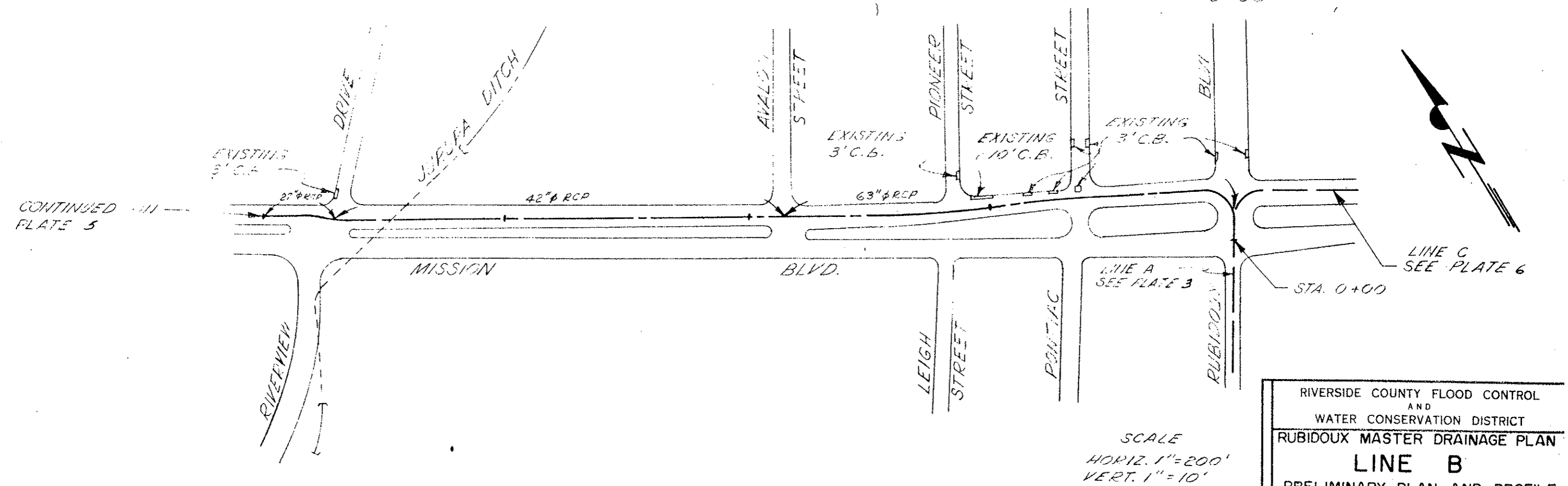
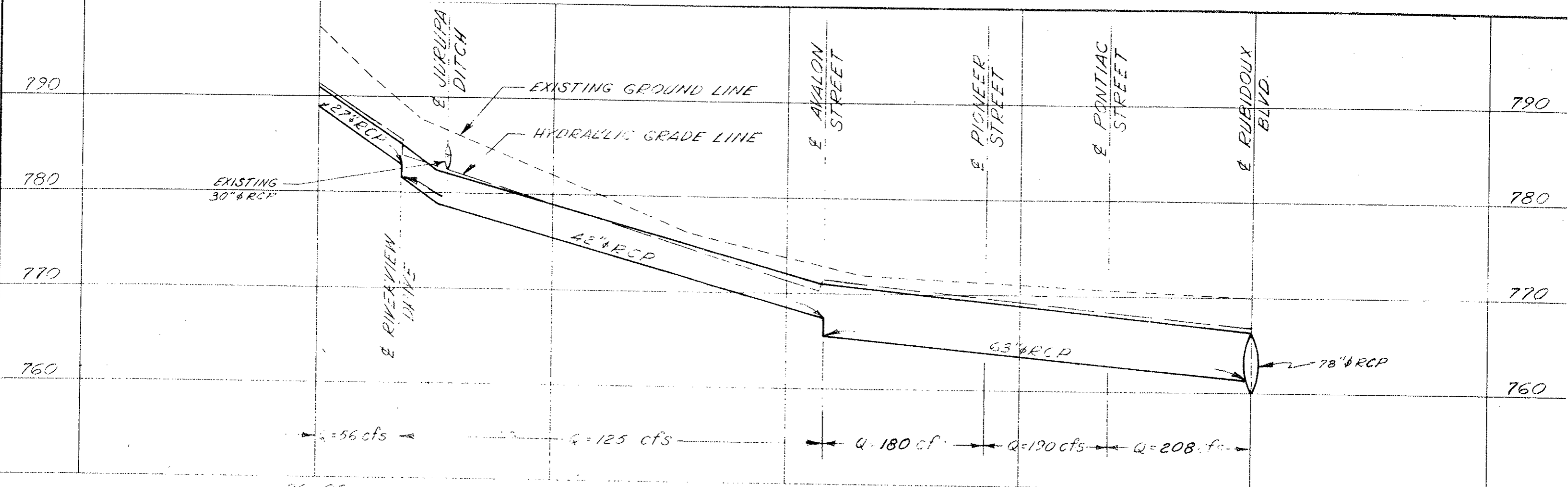
SCALE
 HORIZ. 1" = 200'
 VERT. 1" = 10'

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT			
RUBIDOUX MASTER DRAINAGE PLAN			
LINE A			
PRELIMINARY PLAN AND PROFILE			
APPROVED	CHIEF ENGINEER A.E. NO. 5923	DRAWN BY	R.P.S.
DATE		CHECKED BY	
		DATE DRAWN	
REVIEWED		DATE	
		SHEET NO.	
		OF NO.	



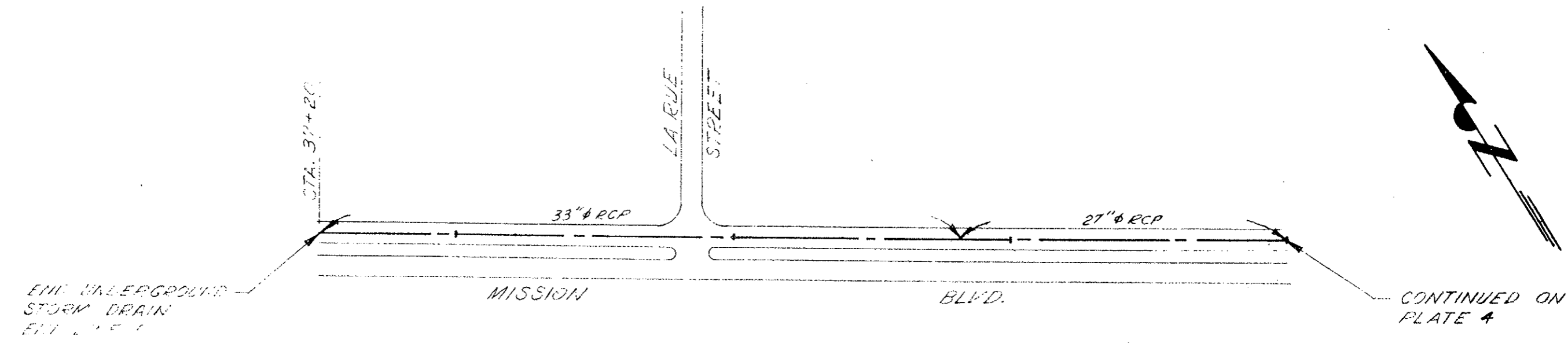
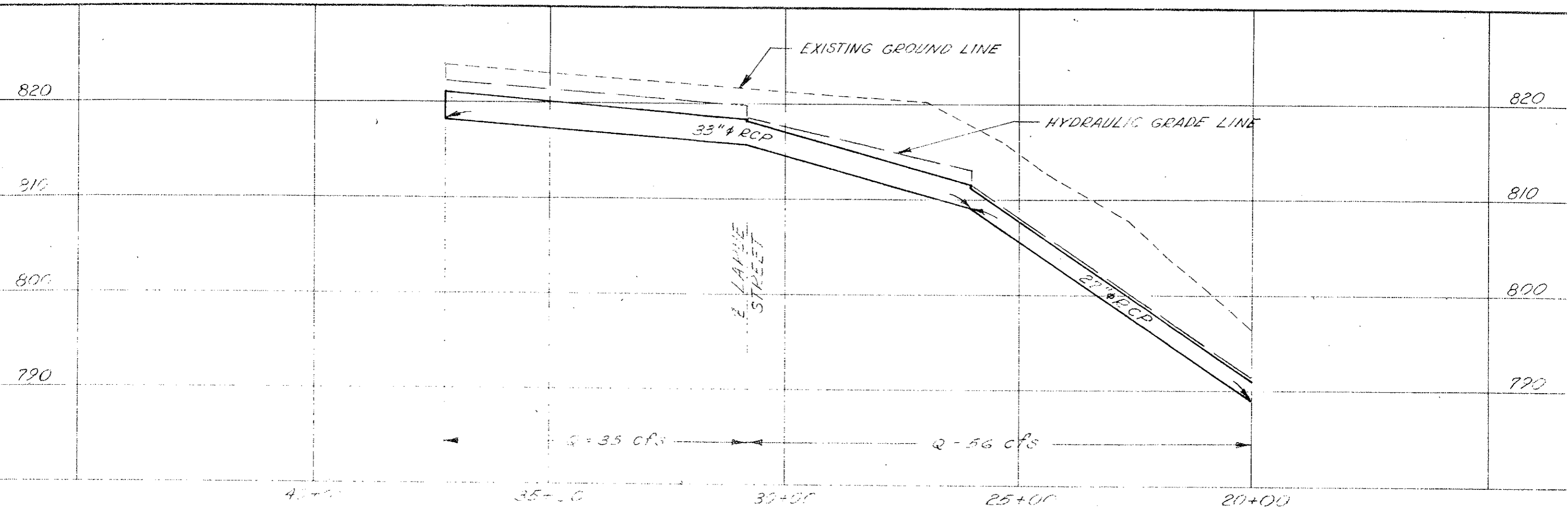
SCALE
 HORIZ. 1" = 200'
 VERT. 1" = 10'

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT			
RUBIDOUX MASTER DRAINAGE PLAN			
LINE A			
PRELIMINARY PLAN AND PROFILE			
APPROVED:	DATE:	DRAWN BY:	SHEET NO:
CHIEF ENGINEER P.E. NO. 8881		R.A.S.	
DATE:	DATE DRAWN:	CHECKED BY:	DR. NO.:



SCALE
 HORIZ. 1"=200'
 VERT. 1"=10'

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT			
RUBIDOUX MASTER DRAINAGE PLAN			
LINE B			
PRELIMINARY PLAN AND PROFILE			
APPROVED	DATE	DRAWN BY	SHEET NO.
CHIEF ENGINEER R.E. NO. 8822		R.A.S.	
CHECKED BY	DATE DRAWN		DR. NO.



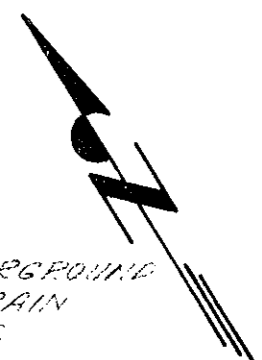
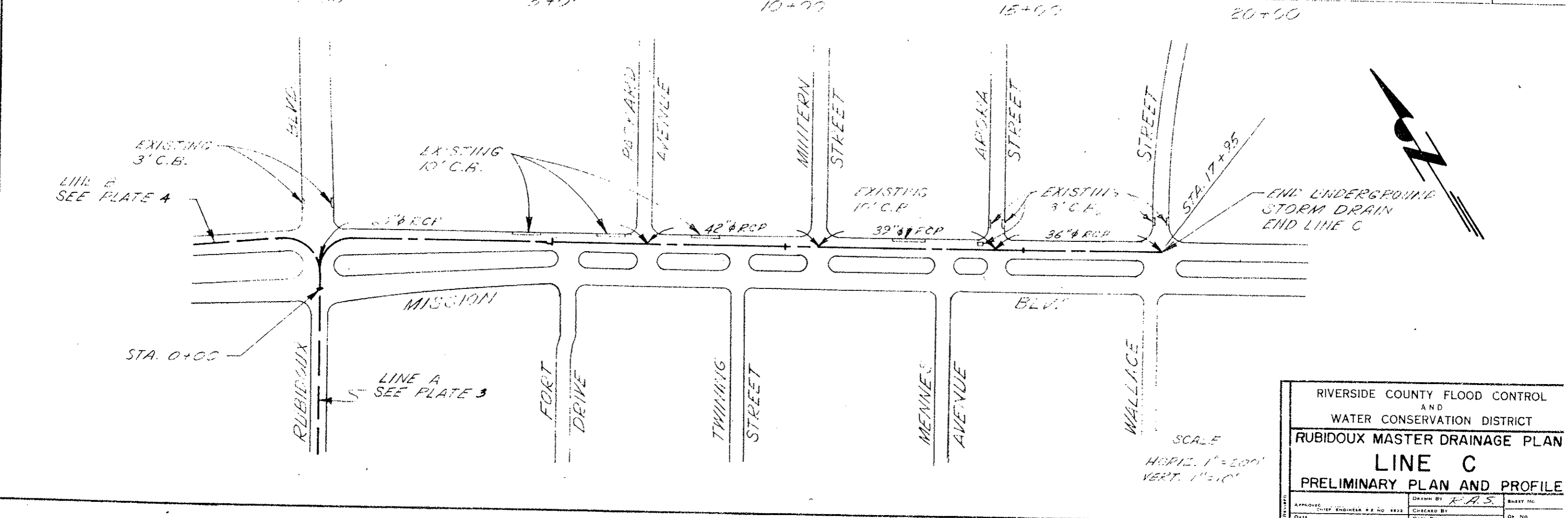
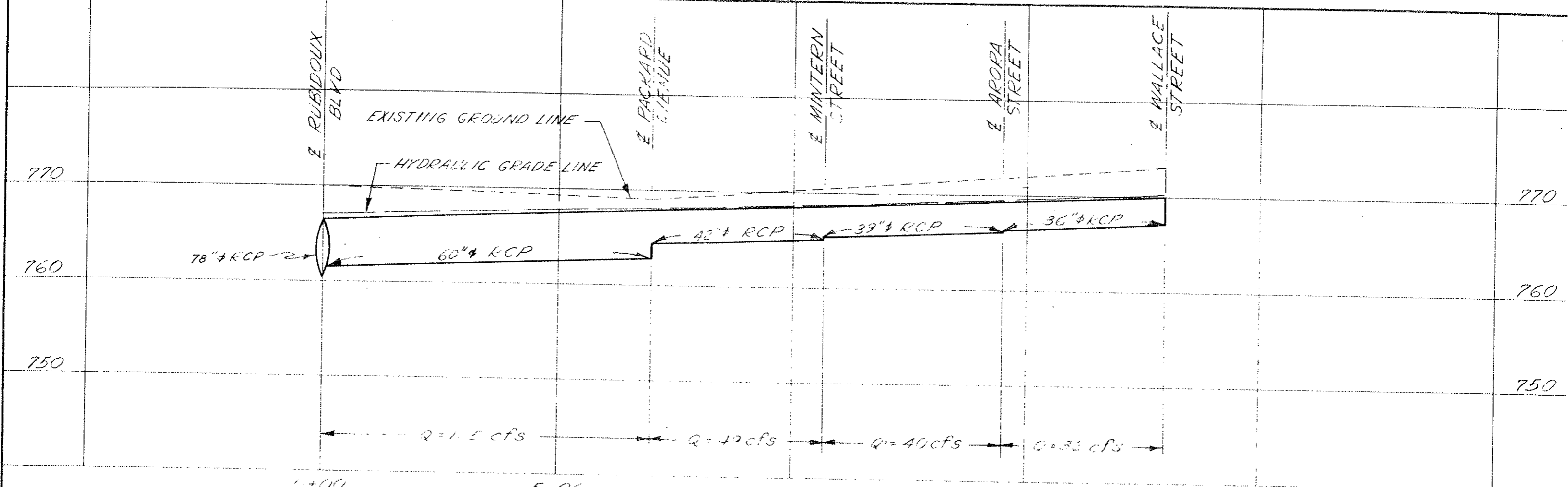
END UNDERGROUND
STORM DRAIN
E.L. 795.0

CONTINUED ON
PLATE 4

SCALE
HORIZ. 1" = 200'
VERT. 1" = 10'

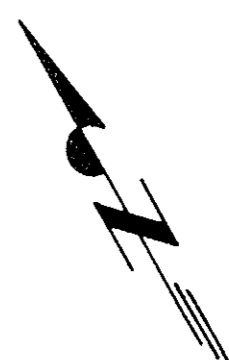
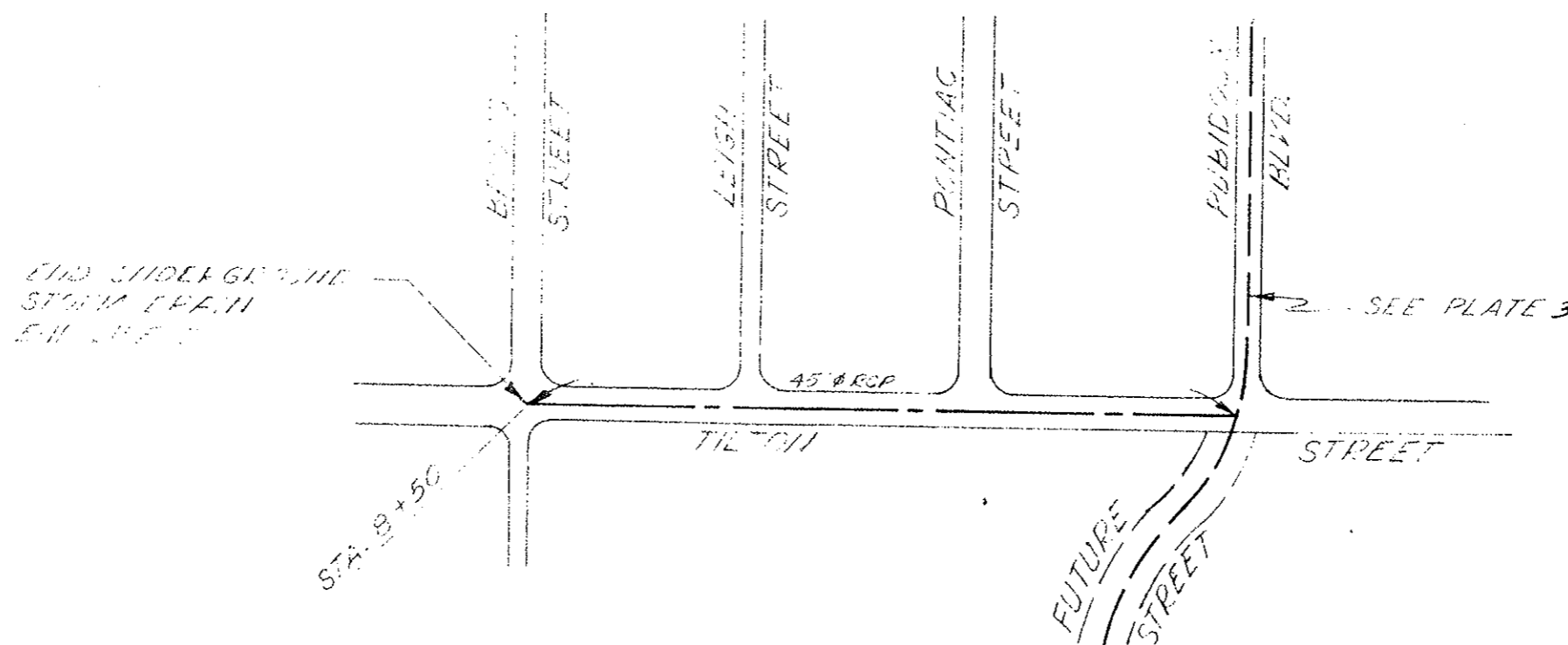
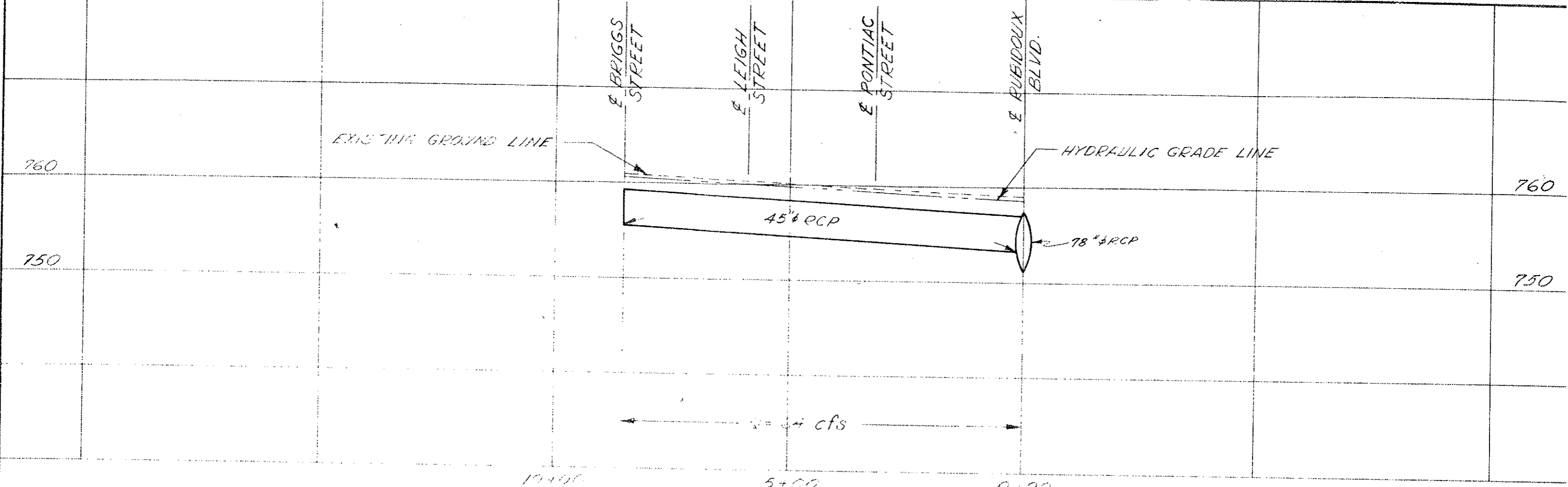
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT			
RUBIDOUX MASTER DRAINAGE PLAN			
LINE B			
PRELIMINARY PLAN AND PROFILE			
APPROVED	DATE	DRAWN BY R.P.S.	SHEET NO.
CHIEF ENGINEER R.E. NO. 8821		CHECKED BY	DA NO.
		DATE DRAWN	

PLATE 5



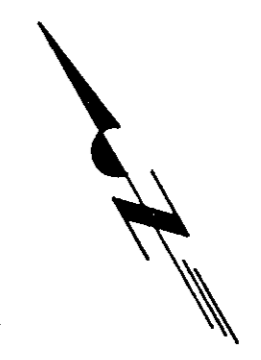
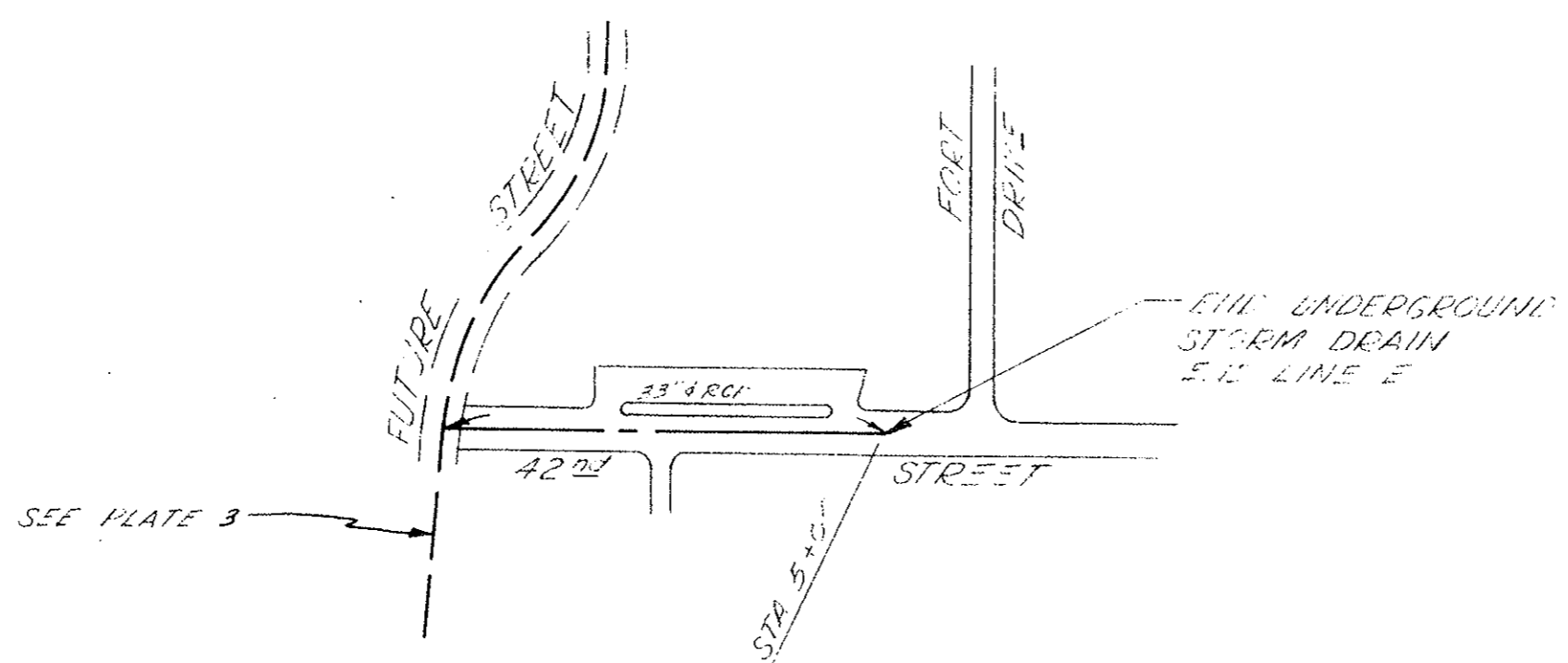
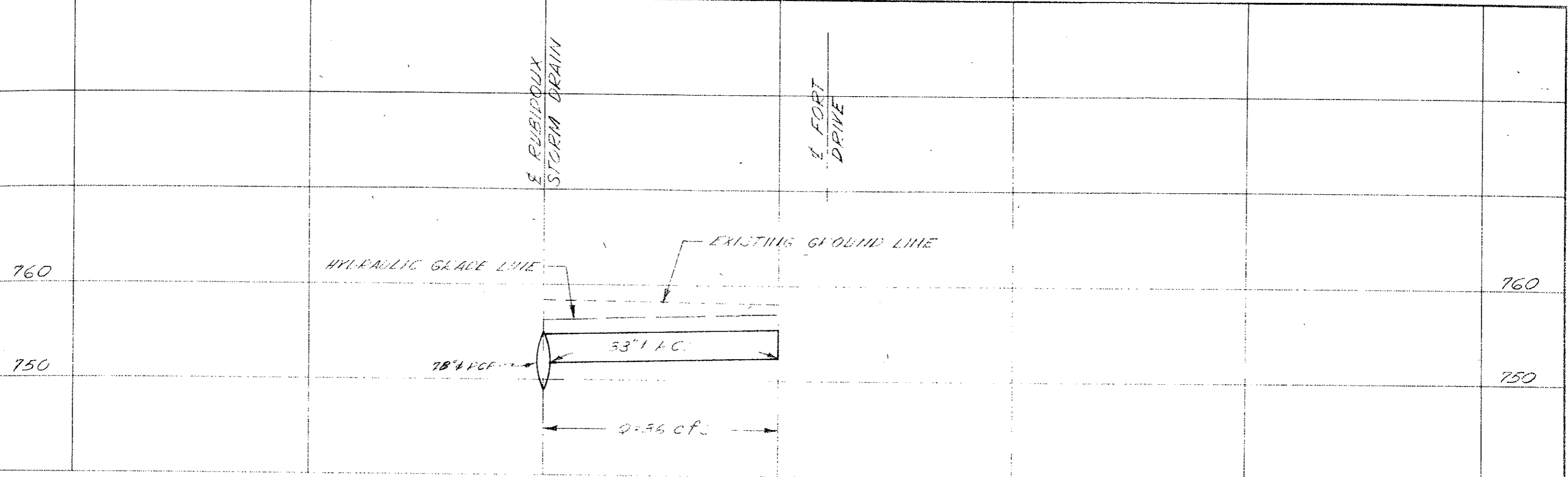
SCALE
 HORIZ. 1" = 200'
 VERT. 1" = 10'

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT			
RUBIDOUX MASTER DRAINAGE PLAN			
LINE C			
PRELIMINARY PLAN AND PROFILE			
APPROVED	DATE	DRAWN BY R.A.S.	SHEET NO.
CHEF ENGINEER # 2 NO. 8822	CHECKED BY	DATE DRAWN	OF NO.



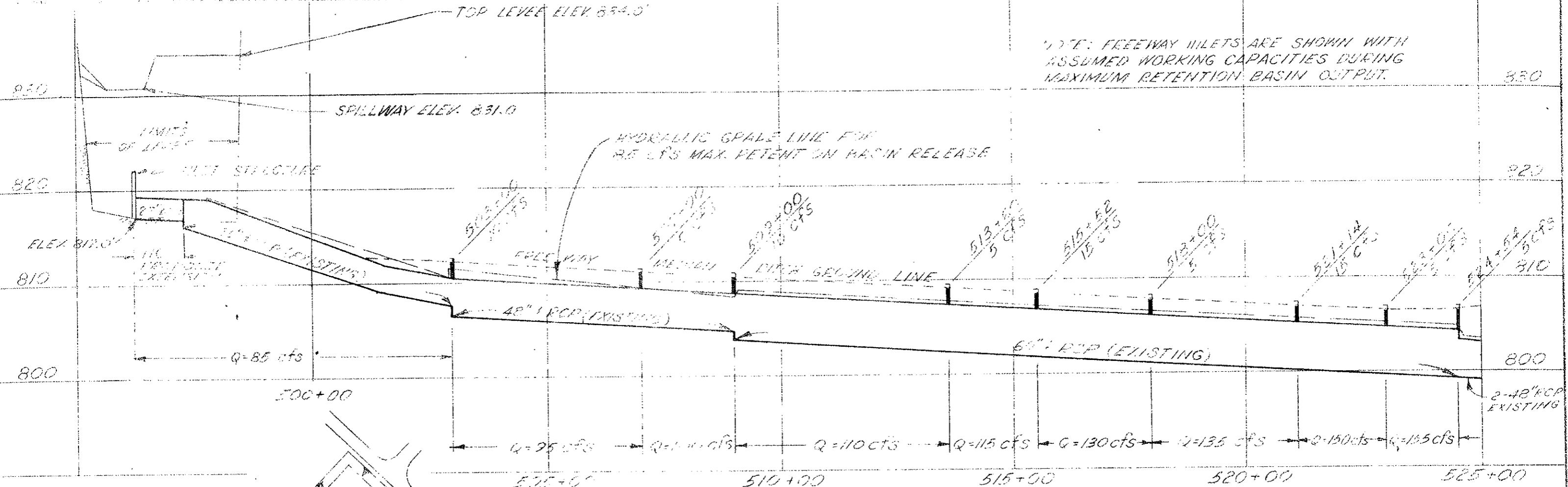
SCALE
 HORIZ. 1" = 200'
 VERT. 1" = 10'

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT			
RUBIDOUX MASTER DRAINAGE PLAN			
LINE D			
PRELIMINARY PLAN AND PROFILE			
APPROVED	CHIEF ENGINEER	DATE	NO. 8812
CHECKED BY	DATE DRAWN	DRAWN BY	RA.S.
REVISION	NO.	DATE	DESCRIPTION



SCALE
 HORIZ. 1" = 200'
 VERT. 1" = 10'

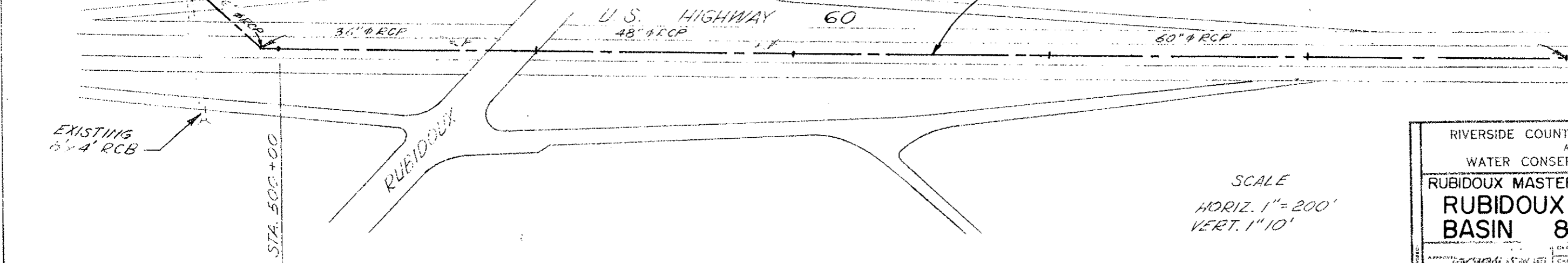
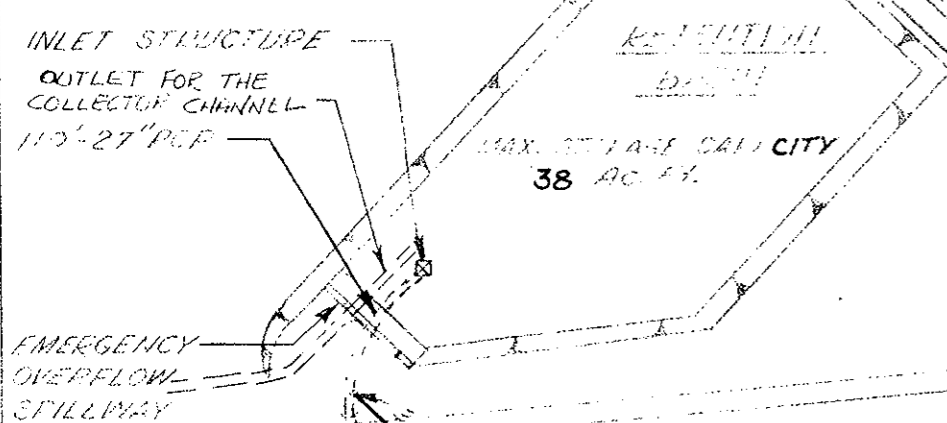
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		
RUBIDOUX MASTER DRAINAGE PLAN		
LINE E		
PRELIMINARY PLAN AND PROFILE		
APPROVED DATE	CHIEF ENGINEER DATE	DRAWN BY R.A.S. DATE SHEET NO. DR. NO.



NOTE: FREEWAY INLETS ARE SHOWN WITH ASSUMED WORKING CAPACITIES DURING MAXIMUM RETENTION BASIN OUTPUT.

DAM DATA
 1. CREST ELEV. = 834.0
 2. SPILLWAY ELEV. = 831.0
 3. STORAGE CAPACITY = 38 AC. FT.

DOUBLE 48" RCP CONTINUES TO STATION 532+62 FLOWING AT NORMAL DEPTH ≈ 2.5' OUTLETING INTO OPEN CHANNEL ALONG FREEWAY.



SCALE
 HORIZ. 1" = 200'
 VERT. 1" = 10'

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT			
RUBIDOUX MASTER DRAINAGE PLAN			
RUBIDOUX RETENTION BASIN & LINE F			
APPROVED	DESIGNED BY	CHECKED BY	DRAWN BY
DATE	DATE	DATE	DATE