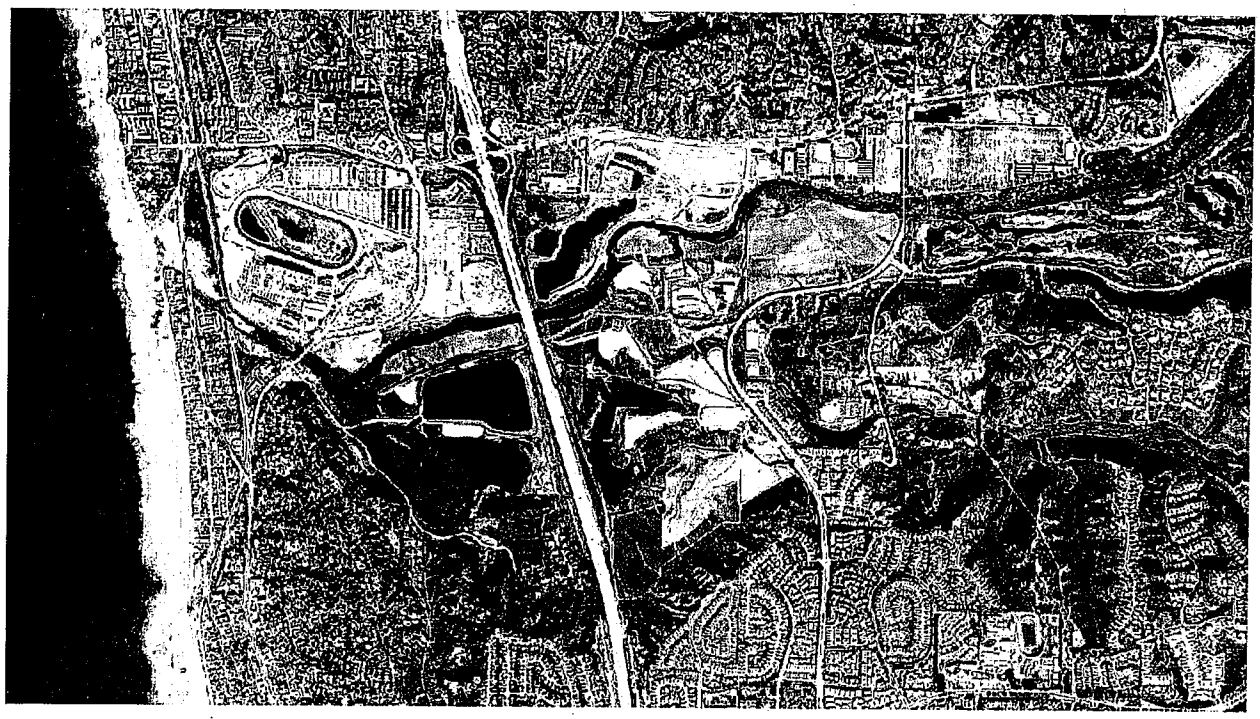
INTERSTATE 5 NORTH COAST FLOODPLAIN STUDIES

SECTION 4 – San Dieguito River Amendment



February 2009

SECTION 4

San Dieguito River Location Hydraulic Study

1. **Declaration of Responsible Charge**

This Location Hydraulic Study has been prepared under the direction of the following Registered Engineer. The Registered Civil Engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

Waldo R. Lopez/C58085
Registered Civil Engineer.

02/18/2009
Date

REGISTERED PROFESSIONAL ENGINEER
WALDO R. LOPEZ
No. C58085
Exp. 6/30/2010
CIVIL
STATE OF CALIFORNIA

SECTION 4: SAN DIEGUITO RIVER LOCATIO HYDRAULIC STUDY

4.0 PROJECT PURPOSE AND VICINITY MAP

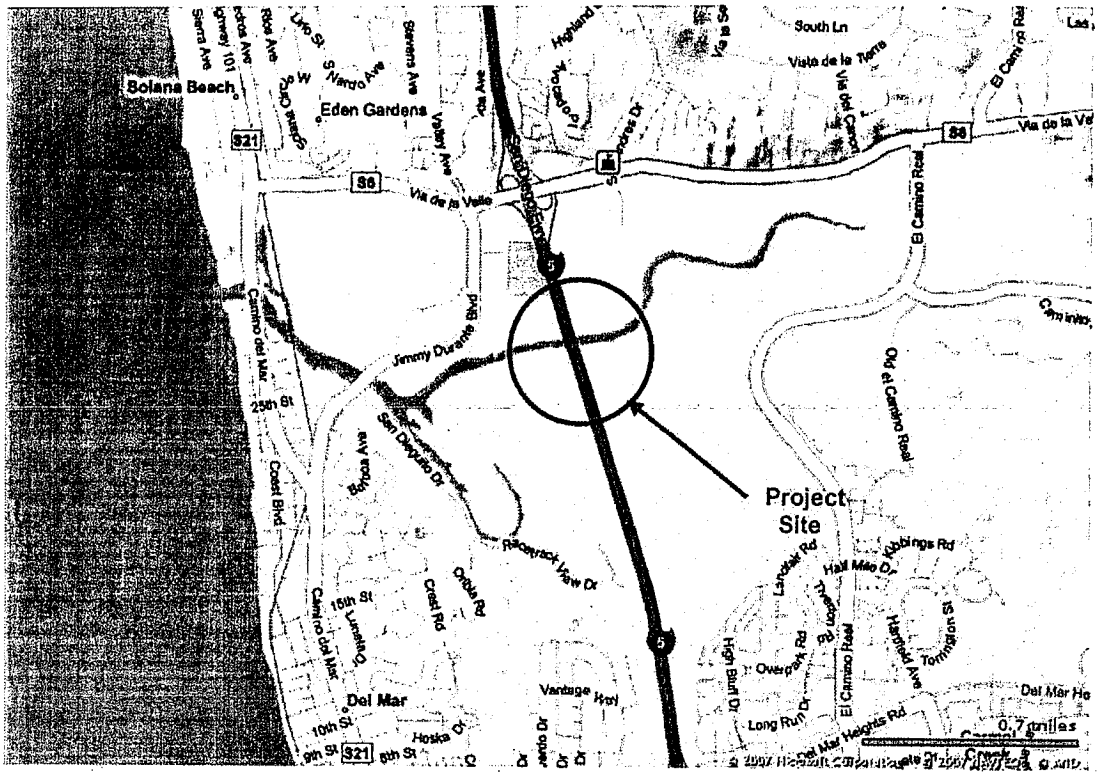


Figure 1: Project Vicinity Map

The I-5 Bridge crossing over the San Dieguito River is located in the city of Del Mar in the west-central region of San Diego County. (Thomas Bros. Page 1187-H2).

This study was prepared by the California Department of Transportation for the purpose of determining impacts to the San Dieguito River base (100-year) flood from the proposed improvements to the Interstate-5 (I-5) freeway.

This study specifically addresses the following:

1. The San Dieguito River 100-year floodplain as it presently exists,
2. The San Dieguito River 100-year floodplain after the I-5 Bridge widening,
3. Perform a risk assessment associated with any possible floodplain encroachment.

This project requires the existing I-5 bridge (No 57-0488) to be widen from 179 feet to 253 feet. 10 pier walls support the existing bridge, with widths ranging from 1.5 to 2.5 feet in diameter. The pier wall will be extended for the bridge widening.

4.1 DESCRIPTION OF WATERSHED:

The San Dieguito River basin occupies an area of approximately 346 square miles, including portions of the cities of Del Mar, Escondido, Poway, San Diego, Solana Beach, and unincorporated areas of San Diego County (Figure 2). Starting from Santa Ysabel, the watershed expands northwest to San Pasqual, southwest to Ramona, and west o the cities of Del Mar and Solana Beach with three major water bodies: San Dieguito River, Sna Dieguito Lagoon, and Lake Hodges. Approximately 88%, of the total drainage area is controlled by Hodges Dam.

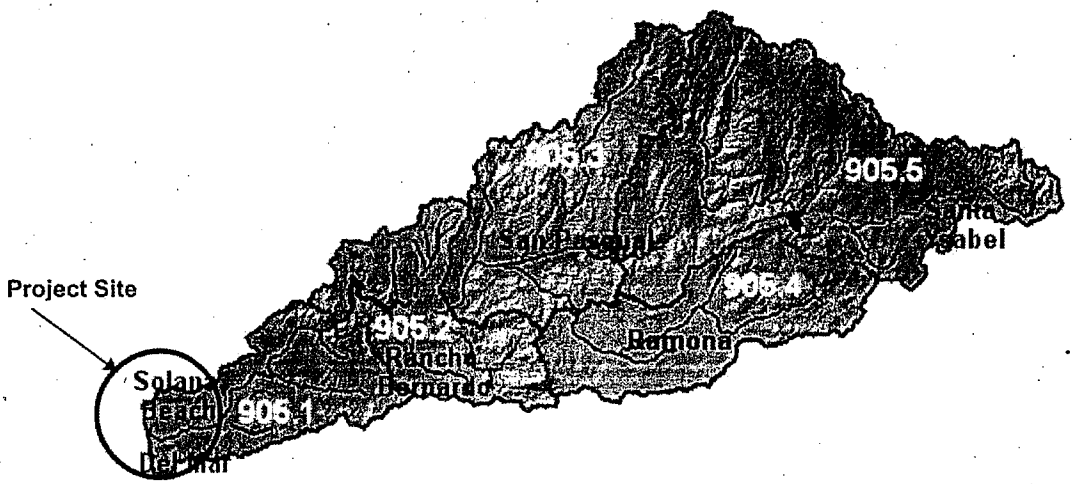


Figure 2: Regional Basin Area

The watershed extends through a divers array of habitats from its eastern headwaters in the Volcan Mountains to its outlet at the Pacific Ocean. There are several important natural areas within the watershed that sustain a number of threatened and endangered species. Among these are the 55-mile long, 80,000 acre San Dieguito River Park, the 150 acre San Dieguito Lagoon, and water storage reservoirs including Lake Hodges, Lake Sutherland, and Lake Poway.

The San Dieguito Lagoon is currently undergoing extensive re-grading and restoration as mitigation for the San Onofre Nuclear Generation Station. The project began in mid-September 2006 and is slated for completion late 2009.

4.2 FLOODPLAIN MODELING METHODOLOGY:

The area of analysis ranges from 6,500 feet upstream to 1,500 feet downstream of the I-5 Bridge. In this region, 42,800 cfs of water passes through the opening beneath the I-5 Bridge from a 5,000 foot wide floodplain. During a 100-year storm event, a broad slow moving river would flow through the floodplain with the I-5 Bridge serving as the only major constriction point. Downstream of the I-5 Bridge, the floodplain opens up to the north and floods the Del Mar Fairgrounds. Within the floodplain study limits, the

floodplain bottom elevations range from 9 to –4 feet, using the North American Vertical Datum of 1988 (NAVD 1988).

4.3 HEC-RAS INPUT

The HEC-RAS River Analysis System is a graphically based computer program, which has been developed by the U.S. Army Corps of Engineers Hydrologic Engineering Center. Input required by the software included channel cross sectional geometry, channel roughness coefficients, starting water surface elevations, and a 100-year storm event discharge.

4.3.1 Cross Sectional Geometry. No change see page 4-3

4.3.1.1 Bridges.

The existing I-5 Bridge is at cross section #7000. The Momentum Equation was used to calculate water surface elevations under the bridge. The primary concern of modeling the proposed encroachment into the San Dieguito River, from the I-5 Bridge widening was the extension of the pier walls into the floodplain. The as-builts and the Advance Planning study used to model the I-5 Bridge are included in Appendix C. A clogging factor of +25% was added to the bridge piers to account for debris, which could catch on the piers and provide additional blockage to the flow of the river.

The propose I-5 Bridge will be approximately 74 feet wider than the existing bridge. The existing channel (figure 3) is proposed to remain.

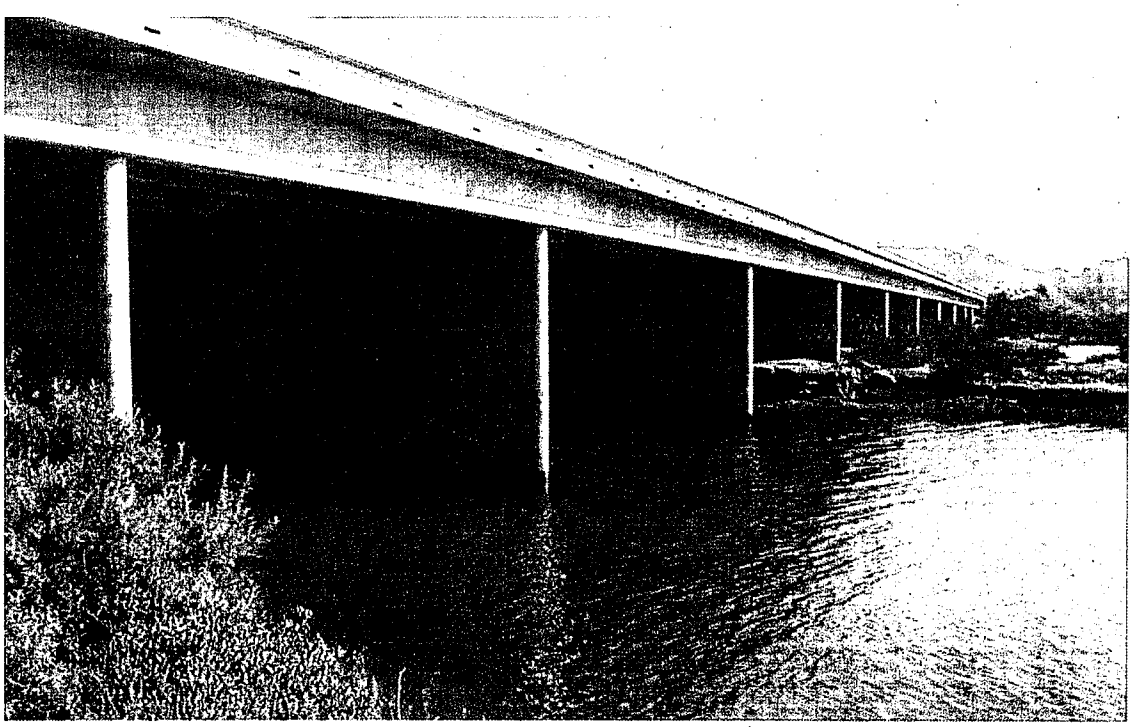


Figure 3: Existing San Dieguito River/I-5 Bridge Crossing

4.3.1.2 Ineffective Flow Areas.

The cross section exhibits in Appendix A. Show the ineffective flow areas for the post project conditions. The constriction and expansion zones upstream and downstream of the I-5 Bridge are modeled as areas of ineffective flow.

4.3.1.3 Flood Insurance Study Cross Sections.

A detailed hydraulic analysis has been performed downstream of the I-5 Bridge, as shown on the Flood Insurance Rate Map (FIRM) in Appendix 'A'. The water surface elevation from cross section "E" in the FIRM was used as the furthest downstream cross section of the floodplain analysis, cross section #5333. The project is located in a designated 100-year floodplain, Zone A, where no base flood elevations have been determined. The extents of the floodplain in the project vicinity were determined by FEMA by approximate means.

4.3.1.4 Existing Floodplain Conditions.

Several hydraulic models were developed to determine the most accurate methods in which to depict the floodplain of the San Dieguito River. The floodplain in the vicinity of the I-5 Bridge is a Zone A. No backup data is available for the original development of the floodplain, and no base flood elevations have been established by FEMA for Zone A floodplains. An existing HEC-RAS model performed by Chang Consultants, September 1998 was originally used as the existing model. This existing model was updated to show the proposed grading plan for the San Dieguito Lagoon Restoration Plan as the existing condition, because it is currently under construction and will be completed before the proposed I-5 Bridge would be constructed. This updated existing conditions model was used for comparison with the proposed bridge improvements. This existing model may need to be updated at the completion of the San Dieguito Restoration project.

4.3.2 Manning's Roughness Coefficient:

Each cross section contains a left overbank, main channel, and right overbank, which represent different regions of the waterway in terms of roughness coefficients. The main channel is the base of the river, typically the low flow region of the river. The left and right overbanks represent the more vegetated area on the sides of the river. The north side, or the right overbank, contains mostly light brush with trees (0.05). On the south side or left overbank, there are two different channel types, though they yield the same Manning's value. Downstream of the I-5 has similar vegetation to the right over bank while upstream consists of row crops (both 0.05). The main channel consists of wide floodplain with high grass (0.035).

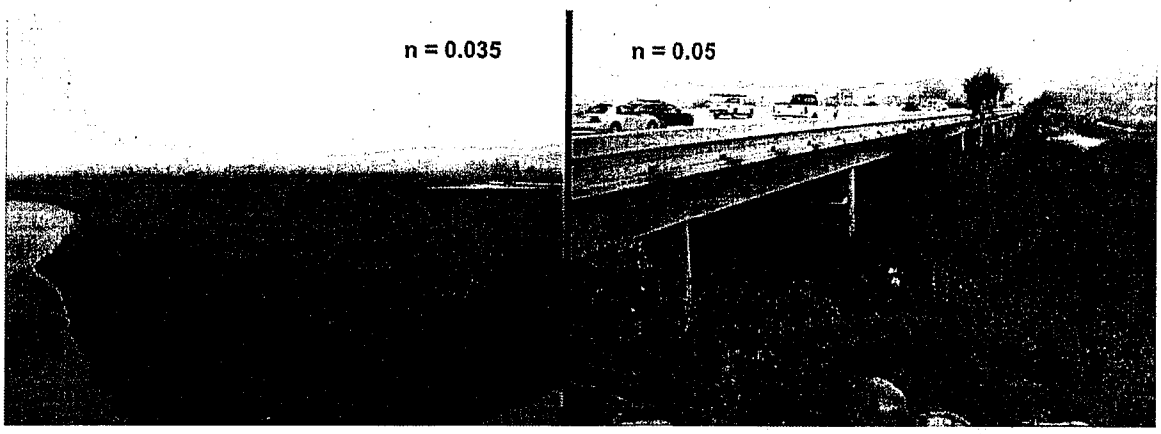


Figure 4: Floodplain with high grass Figure 5: Light Brush and trees

4.3.3 Starting Water Surface Elevation:

The model was analyzed in a subcritical flow regime. A FEMA Zone AE floodplain has been established downstream of the I-5 Bridge. The furthest downstream cross section was placed at this location to connect with FEMA floodplain information. The FIS establishes this elevation at 20.65 feet as the starting water surface elevation from the Floodway Data Table (Appendix A).

4.3.4 Discharge:

Based on FIS data, Table 4 –Summary of Discharge: *San Dieguito River – Upsteram of U.S. Interstate 5 Bridge*, 42,800 cfs was selected as the 100-year flood discharge (Appendix A).

4.4 HEC-RAS OUPUT

The water surface elevations which are displayed in the appendices and output of this study are based on flooding that would occur during the 100-year storm. Appendix 'B' contains the water surface elevations of each cross section, channel velocities, top widths, Froude numbers, and bottom elevations. Since the I-5 Bridge widening would maintain the same column layout the water surface elevation would increase upstream slightly (no more than 0.03'). The San Dieguito River has a flat channel bottom, which produces low velocity flows during the 100-year storm event. It is the flatness of the lagoon which produces the small change to flood levels, which extends thousands of feet upstream.

Table A: Floodplain Comparison

FEMA Cross Section	River Station	River Station Description	Existing W.S. Elevation (ft)	Proposed W.S. Elevation (ft)	Change in Elevation (ft)	Existing Top Width (ft)	Proposed Top Width (ft)	Change it Top Width (ft)
	13555	Furthest Upstream Cross Section	21.90	21.92	**0.02**	1545.94	1550.39	**4.45**
	11854		21.57	21.59	**0.02**	2384.79	2385.45	**0.66**
	10577		21.43	21.46	**0.03**	1983.64	1983.80	**0.16**
	9777		21.43	21.45	**0.02**	2926.93	2927.13	**0.2**
	9274		21.41	21.44	**0.03**	3139.81	3140.49	**0.68**
	8043		21.39	21.41	**0.02**	4324.42	4324.78	**0.36**
	7554		21.34	21.36	**0.02**	5852.95	5853.13	**0.18**
	7286		20.98	21.00	**0.02**	5229.85	5230.40	**0.55**
	7000	I-5 Bridge						
	6809		20.54	20.54	**0**	4479.15	4479.15	**0**
	6661		20.61	20.61	**0**	4474.32	4474.32	**0**
	6437		20.65	20.65	**0**	4397.55	4397.55	**0**
	5926		20.65	20.65	**0**	4615.28	4615.28	**0**
E	5333	Furthest Downstream Cross Section	20.65	20.65	**0**	4385.2	4385.2	**0**

4.4.1 Warning Messages

Warning messages encountered during the proposed model include the following: ***The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections,*** displayed at cross #5926, #6661, #6809, #7000, #7286, #7554, #8043, #10577, #11854 and #13555. Portions of the San Dieguito River were relatively uniform and allowed for cross spacing of these sections.

The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections, displayed at cross section #13555. This message is occurring because of the considerable change in floodplain width.

Divided flow computed for this cross section, displayed at cross section #8043 and #13555. Along these cross sections, divided flow is expected due to the restoration of the lagoon and the flow diversion berm being constructed in the floodplain.

4.5 RISK ASSESSMENT:

Within the San Dieguito River, the widening to the I-5 Bridge would cause a slight increase to the water elevations upstream (0.03' maximum). The impacts to the floodplain would not be considered a significant or longitudinal encroachment. The increase risk to life or property associated with the proposed project would be minimal. No transportation routes will be interrupted or terminated beyond existing conditions. In addition, the County of San Diego ordinance #9830 (New Series), which states that the increase shall be no more than 2/10 of 1 foot the floodway of the San Dieguito River is satisfied.

Additionally, no floodplain values will be adversely impacted without mitigation. Natural and beneficial flooplain values, as define in Chapter 17 "Definitions" in the Caltrans Standard Environmental Reference (SER), include fish, wildlife, plants, outdoor recreation, aquaculture, forestry, etc., that are found within a designated floodplain. Listed below are the beneficial uses of the San Dieguito Lagoon obtained from the Water Quality Control Plan for the San Diego Basin along with a short description and determination of impacts.

- Contact and non-contact water recreation. Includes the uses of water for recreational activities involving proximity to water an contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, diving, surfing, white water activities, fishing, use of natural hot springs, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with t above activities. The I-5 bridge widening will not have any effect on the lagoon's recreational uses aside from during the construction phase. There is a hiking trail passes underneath the I-5 Bridge which may be closed periodically during construction.

- Preservation of biological habitats of special significance. Included uses of water that support designated areas of habitats, such as established refuges, parks, sanctuaries, ecological reserves, or Areas of Special Biological Significance (ASBS), where the preservation or enhancement of natural resources requires special protection. The construction areas associated with the bridge replacement may impact a limited amount of biological habitats. Currently, a Natural Environmental Study (NES) is being prepared to support the I-5 North Coast Widening project. The NES will assess if any biological habitats of special significance may be impacted and what mitigation measures, if any, are needed.

- Estuarine habitat. Includes uses of water that support estuarine ecosystems including, but no limited to, preservations or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds). The construction areas associated with the bridge widening may impact a limited amount of estuarine habitat. The NES will assess if any wildlife habitat may be impacted and what mitigation measures, if any, are needed.

- Wildlife habitat. This includes uses of water that terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife, or wildlife water and food sources. The NES will assess if any wildlife habitat may be impacted and what mitigation measures, are needed.

- Rare, threatened, or endangered species. Includes uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under the state or federal law as rare, threatened or endangered. The NES will assess if any rare, threatened or endangered species may be impacted and what mitigation measures, if any, are needed.

- Marine habitat. Included uses of water that support marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds.) The NES will assess if any marine habitat may be impacted an what mitigation measures, if any, are needed.

- Migration of aquatic organisms. Includes uses of water that support habitats necessary for migration, acclimatization between fresh and salt water, or other temporary activities by aquatic organisms, such as anadromous fish. The NES will assess if any migration of aquatic organisms may be impacted and what mitigation measures, if any, are needed.

- Spawning, reproduction, and/or early development. Includes uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish. This use is applicable only for the protection of anadromous fish. The NES will assess if any spawning, reproduction, or early development may be impacted and what mitigation measures, if any, are needed.

The proposed bridge widening has being designed to minimize disturbance to the floodplain. The bridge design has been through several iterations to select an alternative which is compatible with floodplain development and least harmful to the environment, while maintaining feasibility for improving I-5. Efforts should be made to limit the footprint of the construction site and reduce construction time in order to minimize impacts to natural and beneficial floodplain values, hazards to human life, and property loss.

4.6 SUMMARY AND CONCLUSION:

Results provided in this study demonstrate that a minimal increase to water surface elevations would occur to the existing San Dieguito River 100-year floodplain if the I-5 Bridge is widened. Hydrological and hydraulic data was obtained from a Flood Insurance Study (FIS), and HEC-RAS software was used to perform the hydraulic

computations. The floodplain can be described as a slow moving water body with relatively no additional change in water surface elevations during the 100-year storm. The existing and proposed I-5 Bridge widening were both modeled and analyzed under the 100-yr flood conditions. It was determined that the resulting upstream water surface elevation would increase approximately 0.03 feet with the proposed widening (See Table A: Floodplain Comparison).

APPENDIX 'A'

Cross Section Locations Exhibits

Grading Plan

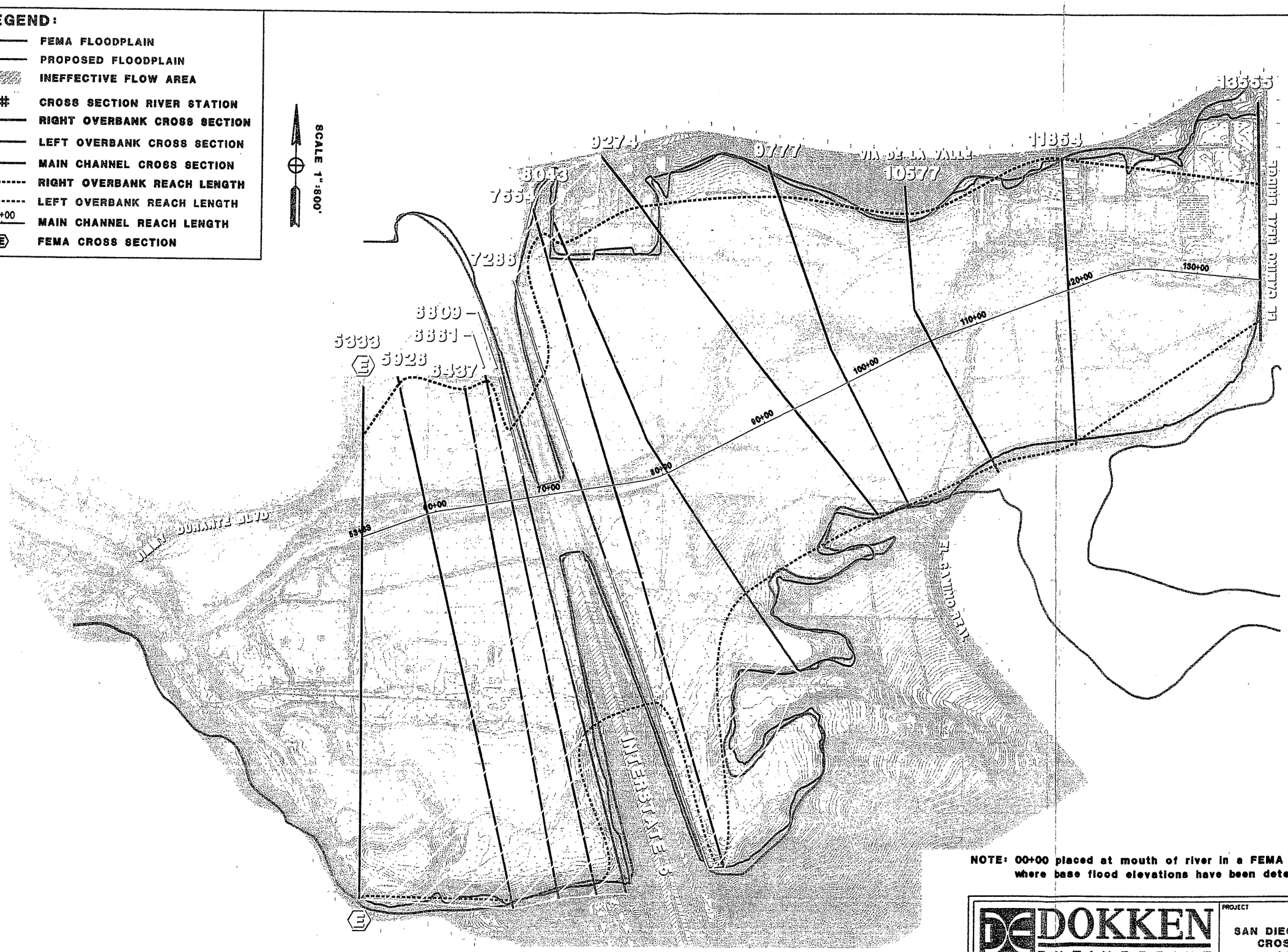
Flood Insurance Rate Maps (FIRM)

Flood Insurance Study (FIS)

Summary of Discharges

LEGEND:

- FEMA FLOODPLAIN
- PROPOSED FLOODPLAIN
- INEFFECTIVE FLOW AREA
- # CROSS SECTION RIVER STATION
- RIGHT OVERBANK CROSS SECTION
- LEFT OVERBANK CROSS SECTION
- MAIN CHANNEL CROSS SECTION
- RIGHT OVERBANK REACH LENGTH
- LEFT OVERBANK REACH LENGTH
- 00+00 MAIN CHANNEL REACH LENGTH
- (E) FEMA CROSS SECTION



NOTE: 00+00 placed at mouth of river in a FEMA Zone AE where base flood elevations have been determined

DOKKEN ENGINEERING
5675 RUFFIN ROAD
SUITE 250
SAN DIEGO, CA 92123
(858) 514-8377

PROJECT

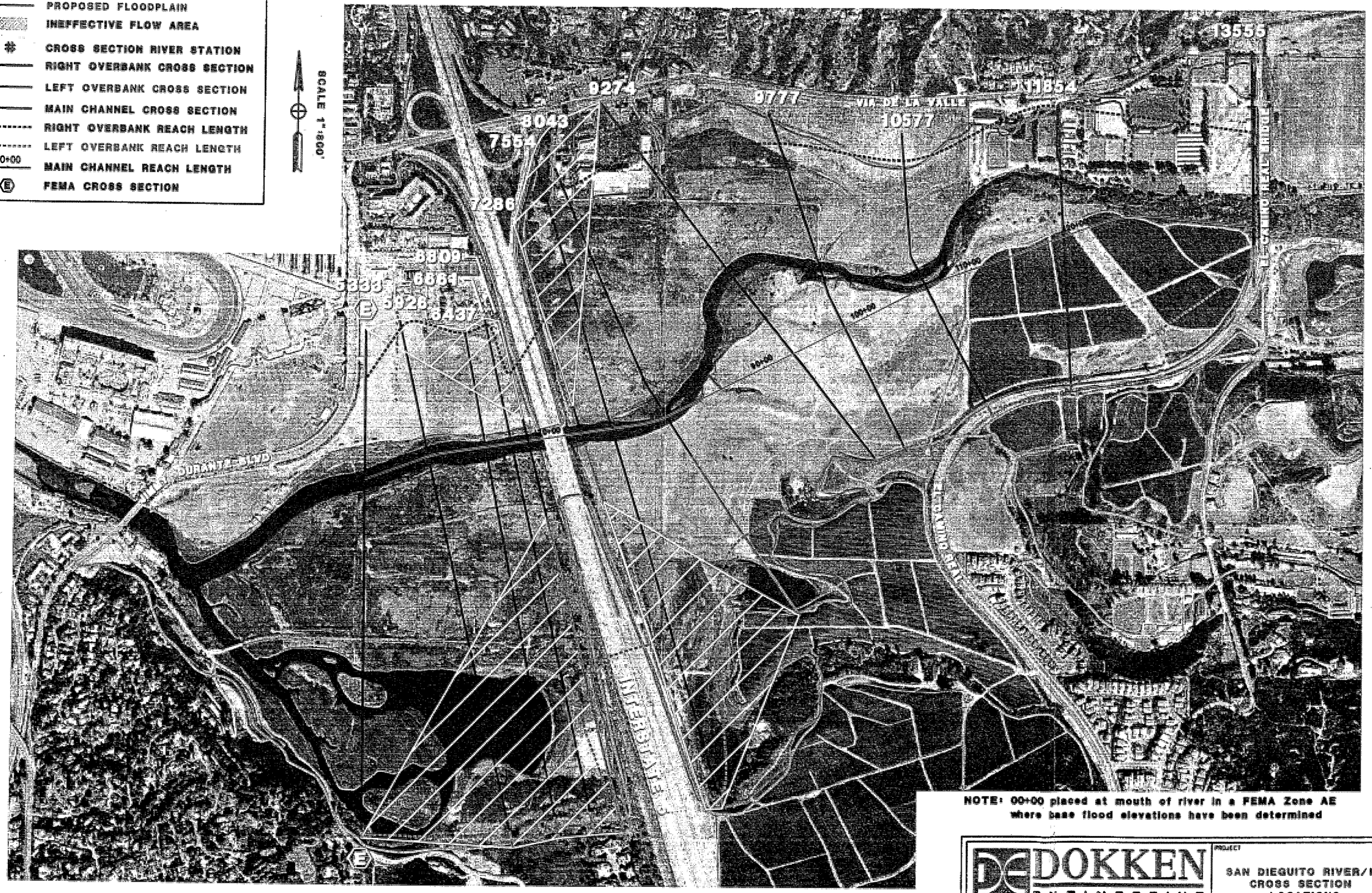
SAN DIEGUITO RIVER/I-5 CROSS SECTION LOCATIONS

NOVEMBER 2007

LEGEND:

- FEMA FLOODPLAIN
- PROPOSED FLOODPLAIN
- INEFFECTIVE FLOW AREA
- # CROSS SECTION RIVER STATION
- RIGHT OVERBANK CROSS SECTION
- LEFT OVERBANK CROSS SECTION
- MAIN CHANNEL CROSS SECTION
- RIGHT OVERBANK REACH LENGTH
- LEFT OVERBANK REACH LENGTH
- 00+00 MAIN CHANNEL REACH LENGTH
- (E) FEMA CROSS SECTION

SCALE 1" = 800'



NOTE: 00+00 placed at mouth of river in a FEMA Zone AE where base flood elevations have been determined

DEDOKKEN ENGINEERING
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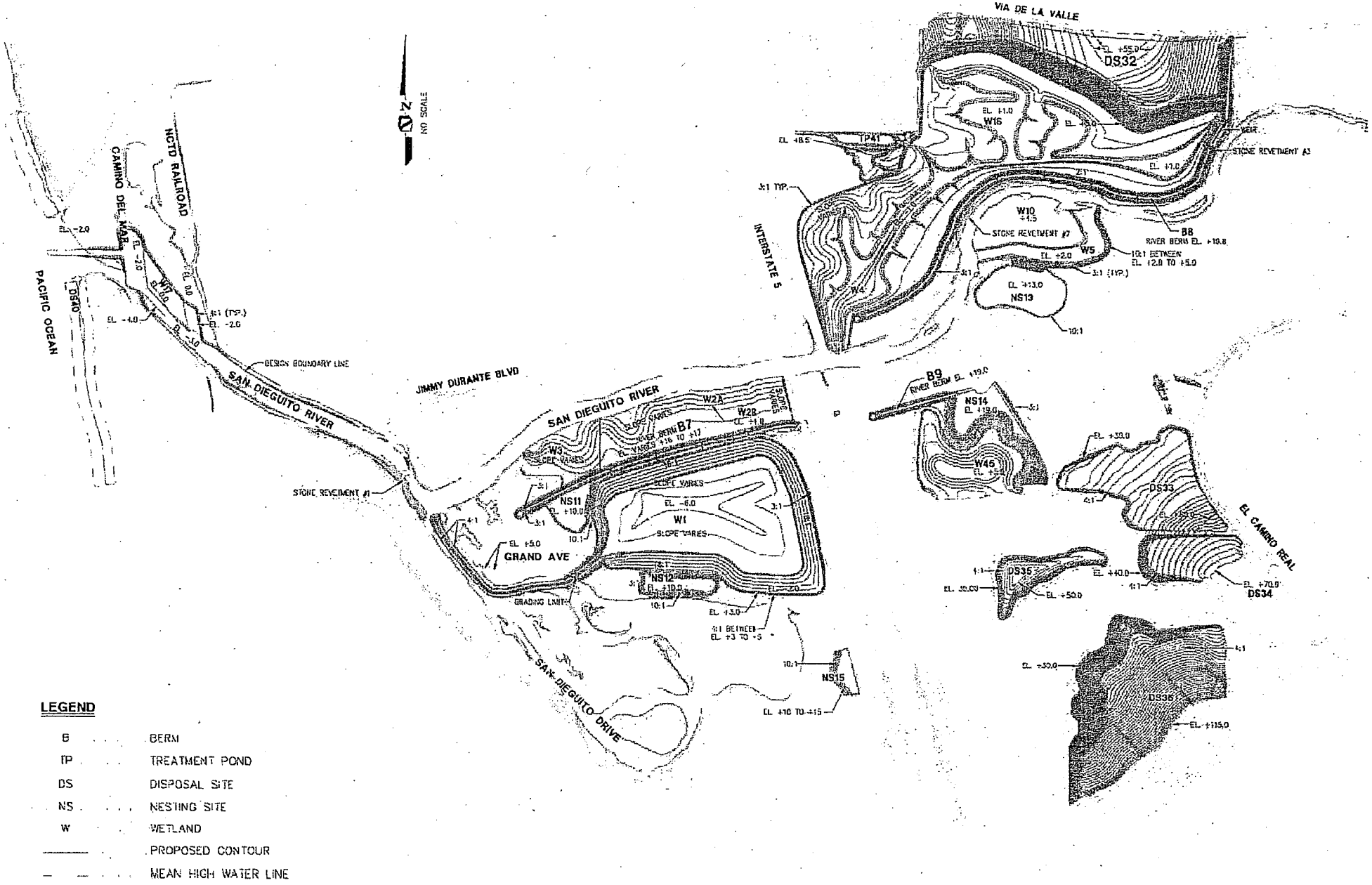
SUITE 250
SAN DIEGO, CA 92123
(858) 514-8377

PROJECT

SAN DIEGUITO RIVER/I-5
CROSS SECTION
LOCATIONS

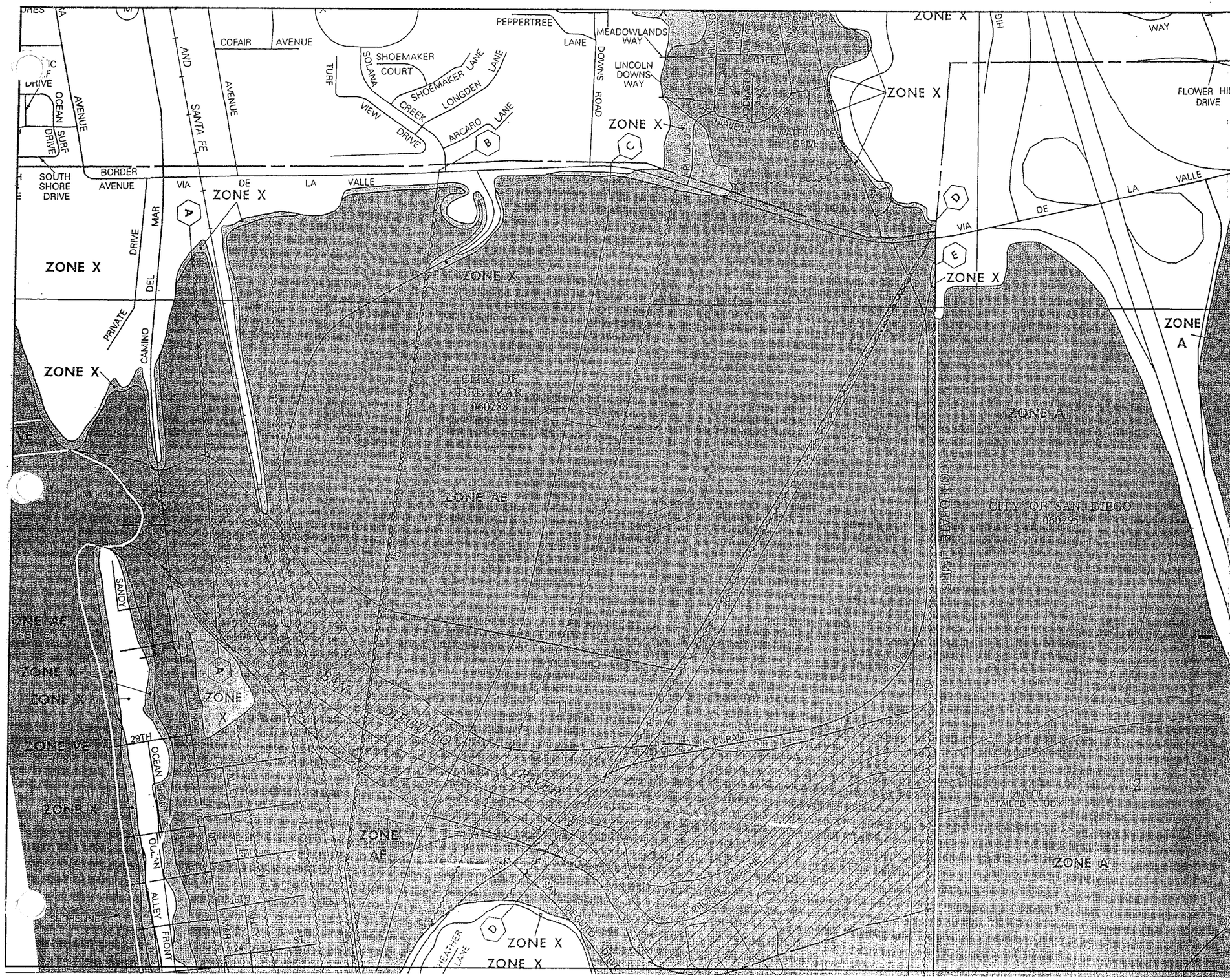
NOVEMBER 2007



LEGEND

B	BERM
TP	TREATMENT POND
DS	DISPOSAL SITE
NS	NESTING SITE
W	WETLAND
———	PROPOSED CONTOUR
— — —	MEAN HIGH WATER LINE

Figure 4.2. San Dieguito Wetlands Restoration Project - Grading Plan



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 1307 OF 2375
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

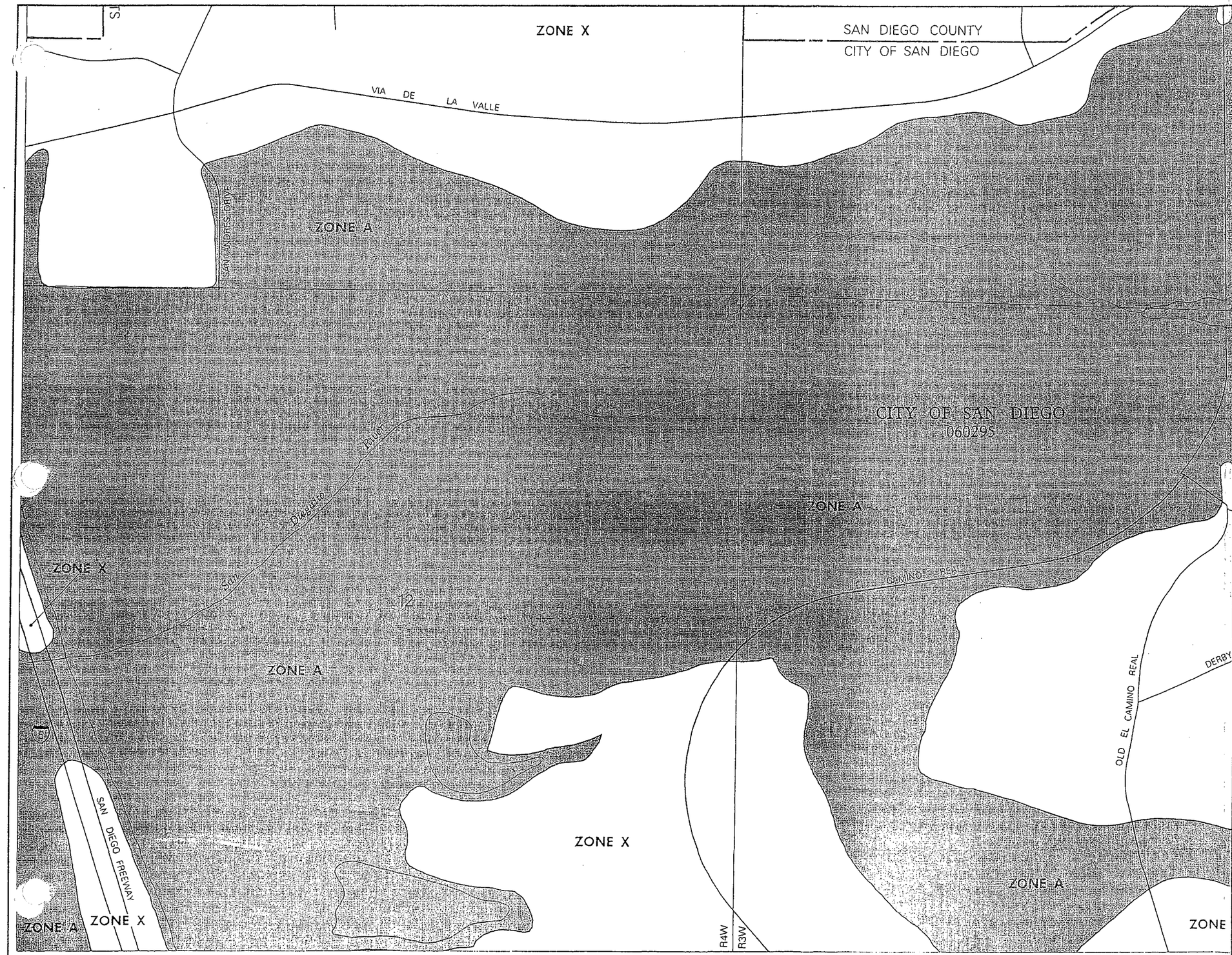
COMMUNITY	NUMBER	PANEL	SUFFIX
DEL MAR, CITY OF	060288	1307	F
ENCINITAS, CITY OF	060726	1307	F
SAN DIEGO, CITY OF	060295	1307	F
SOLANA BEACH, CITY OF	060725	1307	F

MAP NUMBER
06073C1307 F

EFFECTIVE DATE:
JUNE 19, 1997

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



APPROXIMATE SCALE IN FEET

500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 1326 OF 2375

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SAN DIEGO COUNTY, UNINCORPORATED AREAS	060284	1326	F
SAN DIEGO, CITY OF	060295	1326	F
SOLANA BEACH, CITY OF	060725	1326	F

MAP NUMBER
06073C1326 F

EFFECTIVE DATE:
JUNE 19, 1997

Federal Emergency Management Agency

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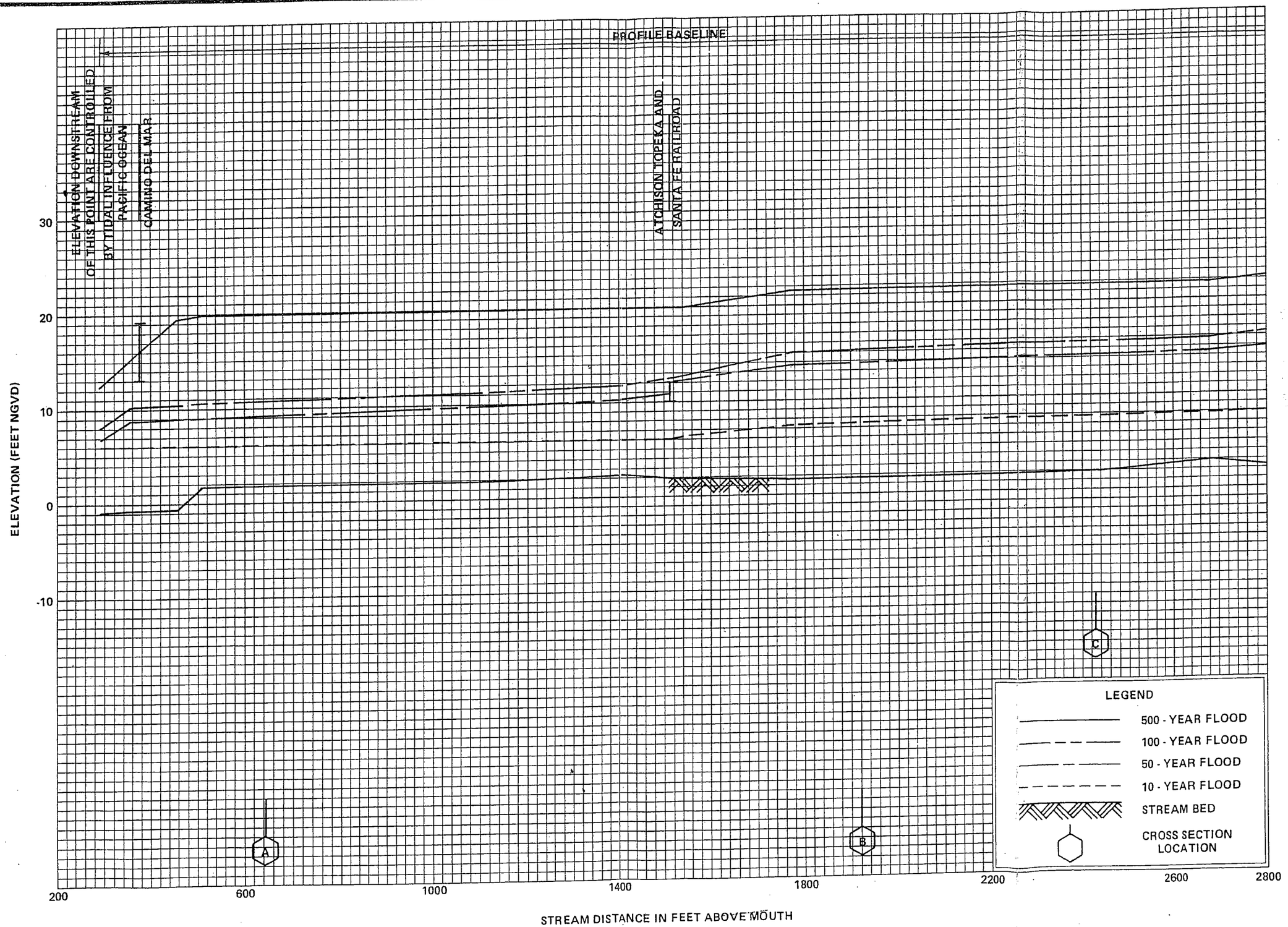


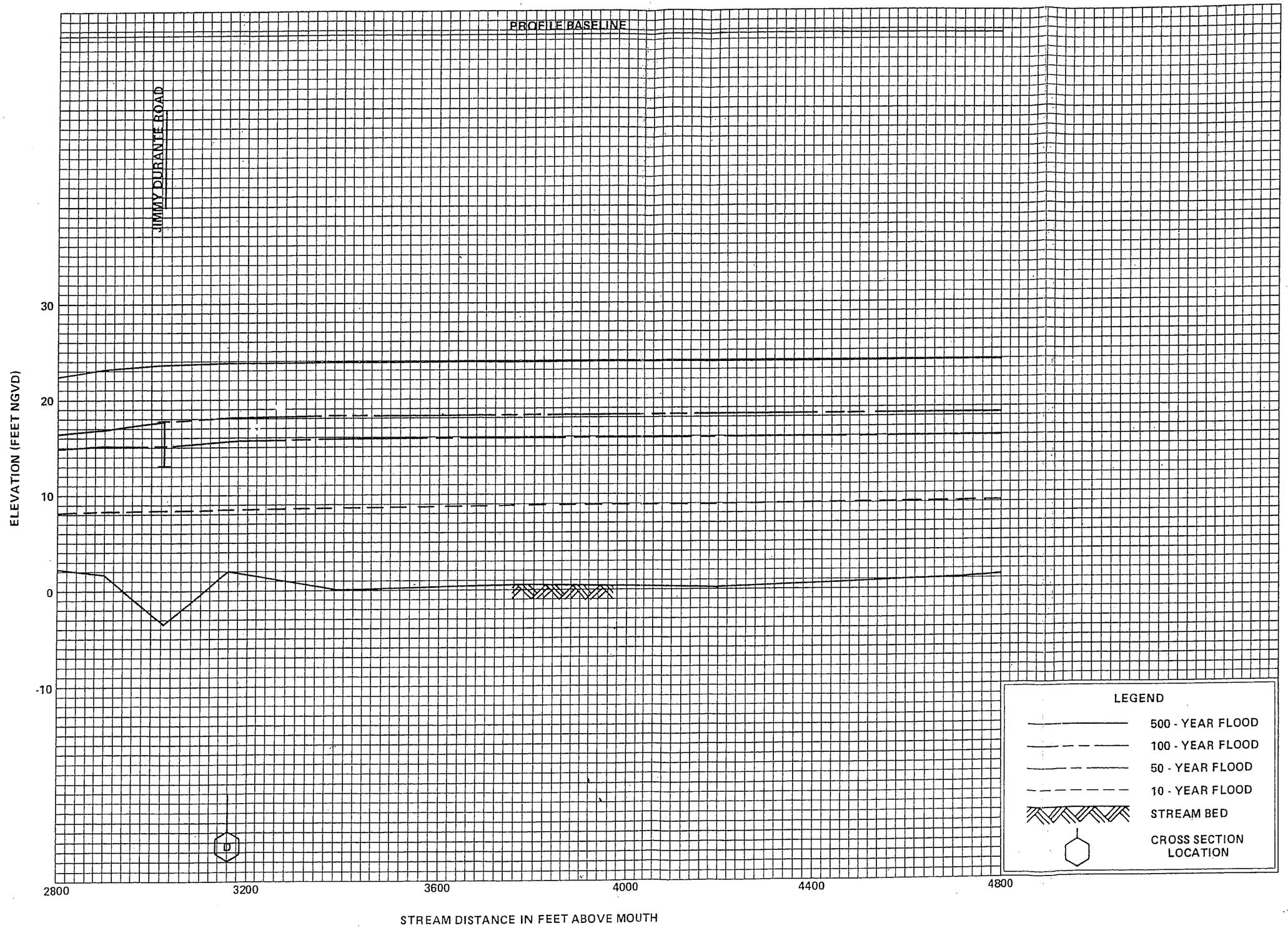
FLOOD PROFILES

SAN DIEGUITO RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA
AND INCORPORATED AREAS

307P

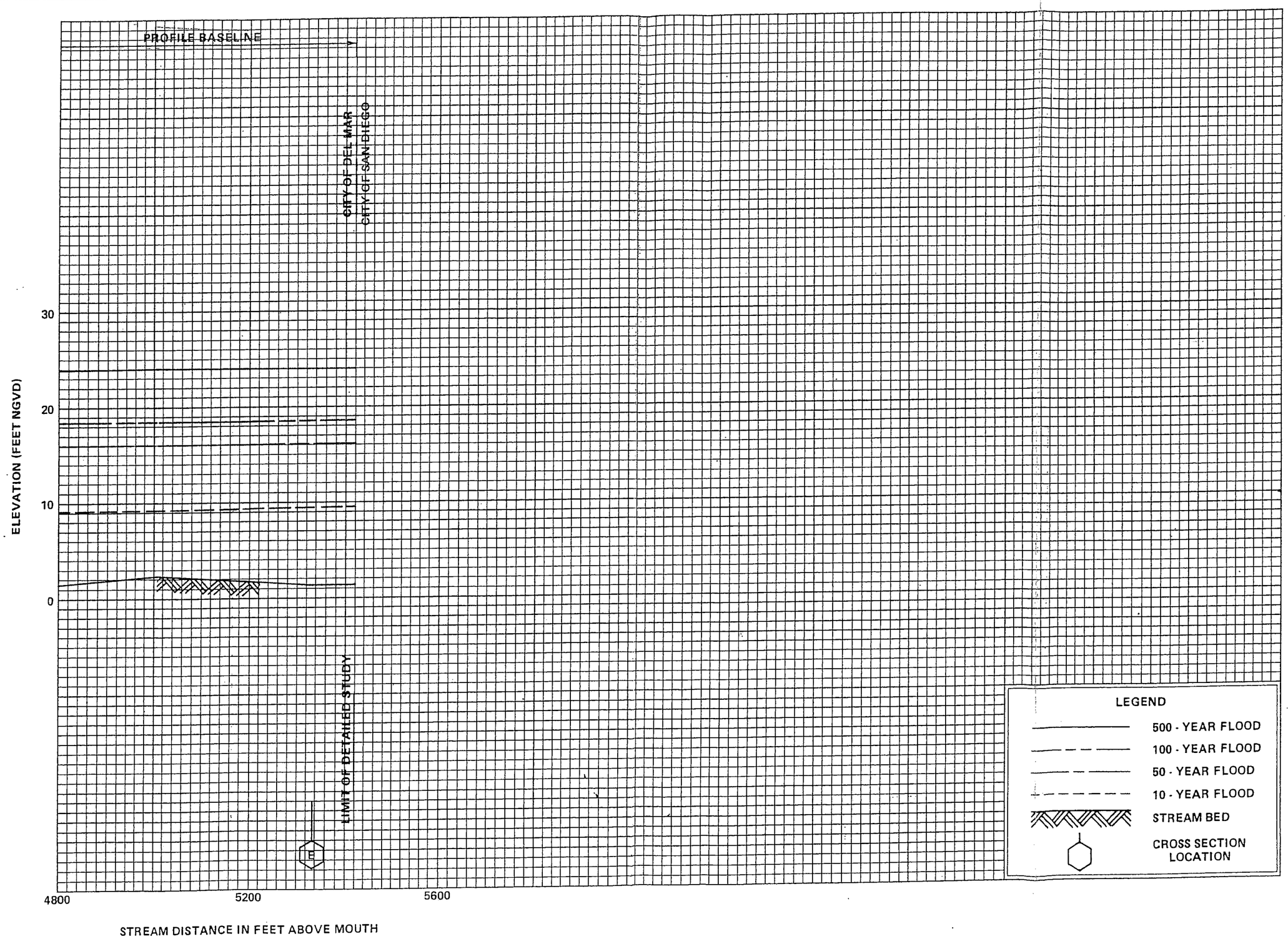


FLOOD PROFILES

SAN DIEGUITO RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA
AND INCORPORATED AREAS



FLOOD PROFILES

SAN DIEGUITO RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA AND INCORPORATED AREAS

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
San Dieguito River								
A	642	920	6,206	7.1	10.7	10.7	10.7	0.0
B	1,918	541	5,247	9.1	15.0	15.0	15.0	0.0
C	2,428	469	5,168	9.7	15.6	15.6	15.6	0.0
D	3,156	772	10,328	4.5	18.1	18.1	18.7	0.6
E	5,333	1,082	13,465	3.7	18.5	18.5	19.2	0.7

[1]Feet Above Mouth

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA
AND INCORPORATED AREAS

FLOODWAY DATA

SAN DIEGUITO RIVER

Table 4. Summary of Discharges (Cont'd)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
Samagutuma Creek					
At Mouth	6.4	900	2,600	4,000	7,000
San Clemente Canyon Creek					
Upstream of Confluence with Rose Canyon Creek	18.4	1,400	4,200	6,900	16,000
Upstream of Genesee Avenue	15.3	1,200	3,600	5,600	12,000
Upstream of Interstate Highway 805	12.5	1,000	3,100	4,900	11,000
San Diego River					
At Confluence with Murphy Canyon Creek	420.0	3,100	17,000	36,000	112,000
Just Downstream of Confluence of San Vicente Creek	290.0	2,500	--[1]	31,000	--[1]
San Dieguito River					
Upstream of Camino Del Mar Bridge	--[1]	5,700	31,400	41,800	90,000
Upstream of Atchison, Topeka & Santa Fe Railway Bridge	--[1]	5,700	31,400	41,800	90,000
Upstream of Jimmy Durante Bridge	--[1]	5,800	32,100	42,400	90,000
Upstream of U.S. Interstate Highway 5 Bridge	--[1]	5,900	32,500	42,800	90,000
San Elijo Creek					
0.1 Mile Upstream of El Camino Road	5.4	500	1,600	2,100	5,500
San Luis Rey River					
At Mouth	560.0	6,600	31,000	51,000	120,000
Downstream of Confluence with Moosa Canyon	355.6	6,200	30,000	48,000	110,000
Downstream of Confluence with Keys Canyon	252.3	5,000	25,000	41,000	98,000
Upstream of Confluence with Keys Canyon	180.4	4,000[2]	20,000	33,000	85,000
Downstream of Palma	167.3	4,000[2]	18,000	30,000	78,000
Downstream of Confluence with Puma Creek	126.7	4,000[2]	16,800	28,000	72,800
Upstream of Confluence with Puma Creek	71.5	5,000	15,000	24,500	64,000

[1]Data Not Available
[2]Discharge Decreases With Increasing Area Due to Breakouts From the Low Flow Channel

APPENDIX 'B'

Results Summary

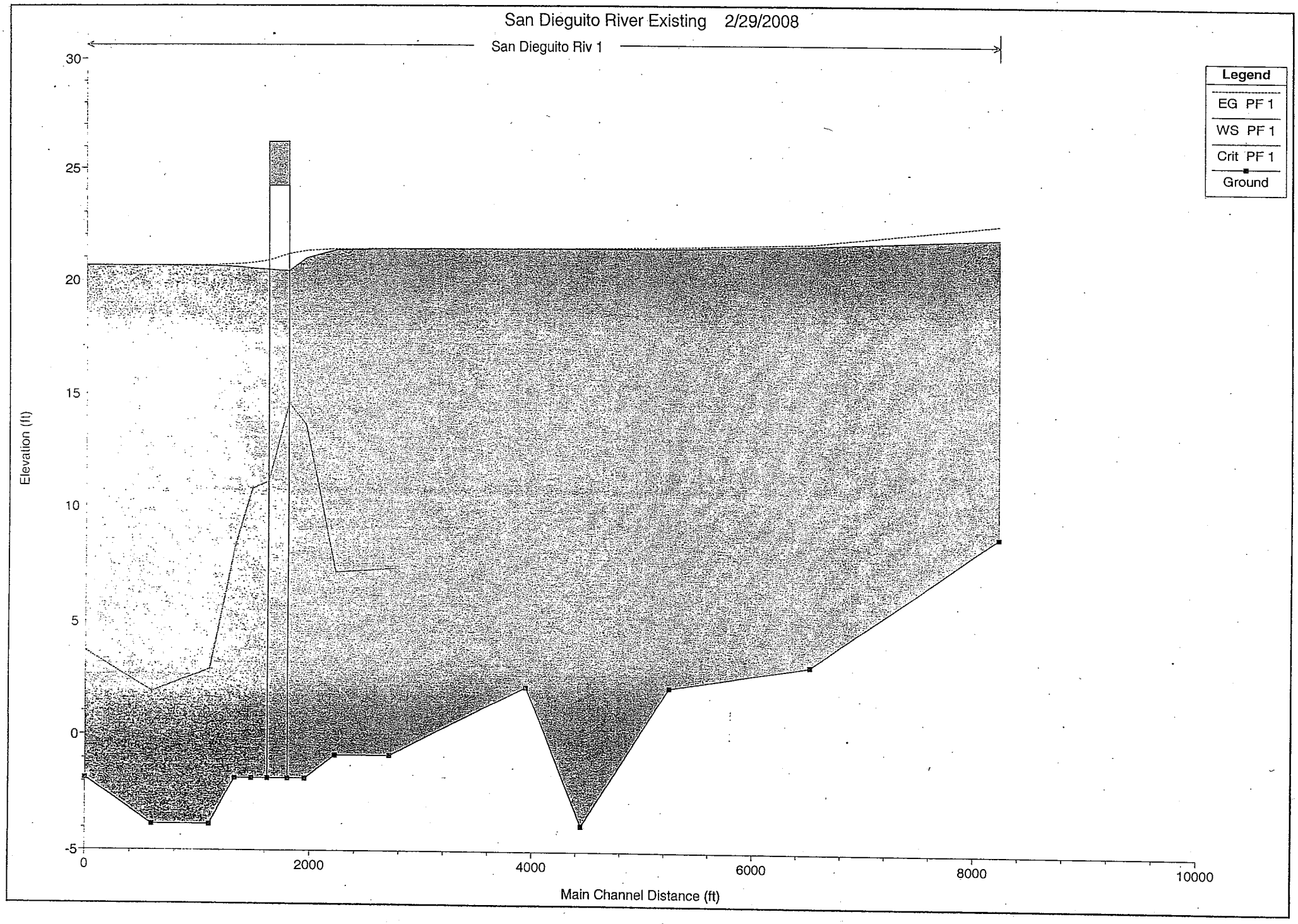
HEC-RAS Cross Section Input/Output

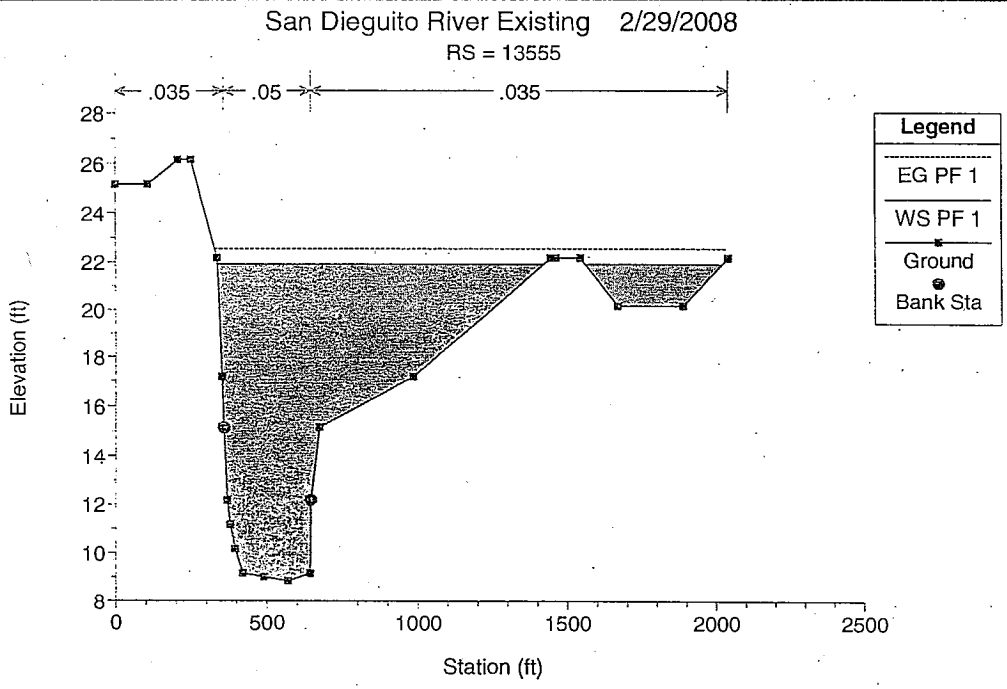
Existing

Proposed

HEC-RAS Plan: SD_Existing River: San Dieguito Riv Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	13555	PF 1	42800.00	8.82	21.90		22.53	0.002097	7.30	7327.79	1545.94	0.36
1	11854	PF 1	42800.00	3.15	21.57		21.65	0.000172	2.24	19146.98	2384.79	0.14
1	10577	PF 1	42800.00	2.15	21.43		21.49	0.000084	1.96	22075.41	1983.64	0.10
1	9777	PF 1	42800.00	-3.85	21.43		21.45	0.000023	1.14	37899.54	2926.93	0.06
1	9274	PF 1	42800.00	2.15	21.41		21.44	0.000029	1.20	36388.65	3139.81	0.06
1	8043	PF 1	42800.00	-0.85	21.39	7.34	21.41	0.000019	1.11	45839.52	4324.42	0.05
1	7554	PF 1	42800.00	-0.85	21.34	7.18	21.38	0.000049	1.67	25614.39	5852.95	0.08
1	7286	PF 1	42800.00	-1.85	20.98	13.65	21.31	0.000405	5.25	10598.38	5229.85	0.24
1	7000		Bridge									
1	6809	PF 1	42800.00	-1.85	20.54	10.81	20.78	0.000287	3.96	11083.44	4479.15	0.19
1	6661	PF 1	42800.00	-1.85	20.61	8.37	20.71	0.000106	2.55	16776.90	4474.32	0.12
1	6437	PF 1	42800.00	-3.85	20.65	2.90	20.68	0.000031	1.54	27770.76	4397.55	0.07
1	5926	PF 1	42800.00	-3.85	20.65	1.88	20.67	0.000015	1.04	41152.88	4615.28	0.05
1	5333	PF 1	42800.00	-1.85	20.65	3.71	20.66	0.000007	0.73	62839.10	4385.20	0.03


San Dieguito River Existing 2/29/2008
San Dieguito Riv 1
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
30
25
20
15
10
5
0
-5
0
2000
4000
6000
8000
10000
Main Channel Distance (ft)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.05
.035
Legend
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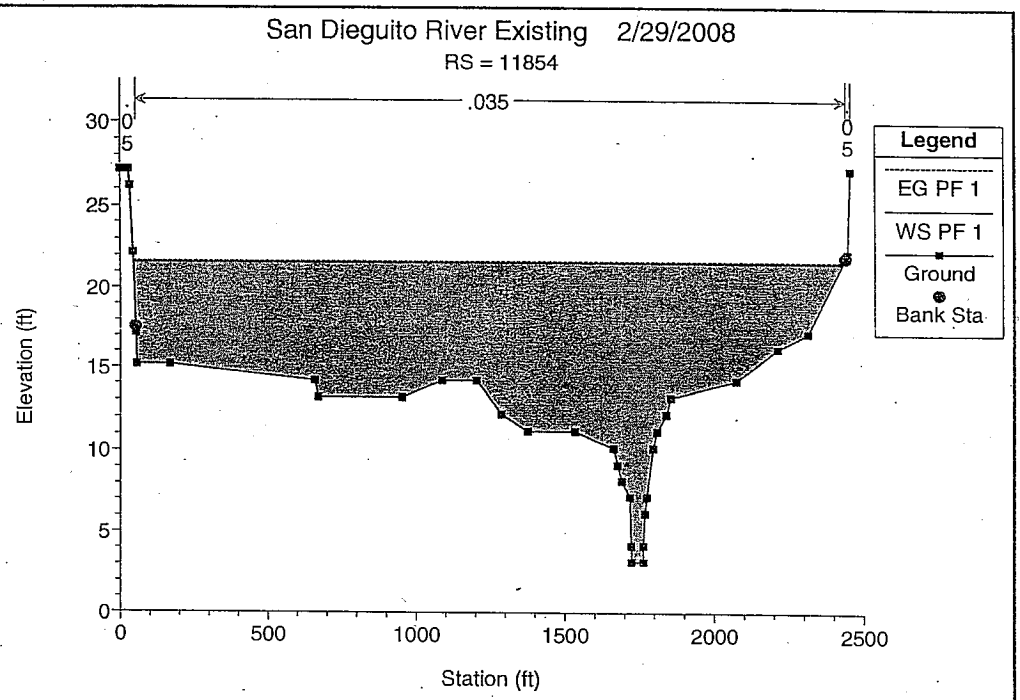
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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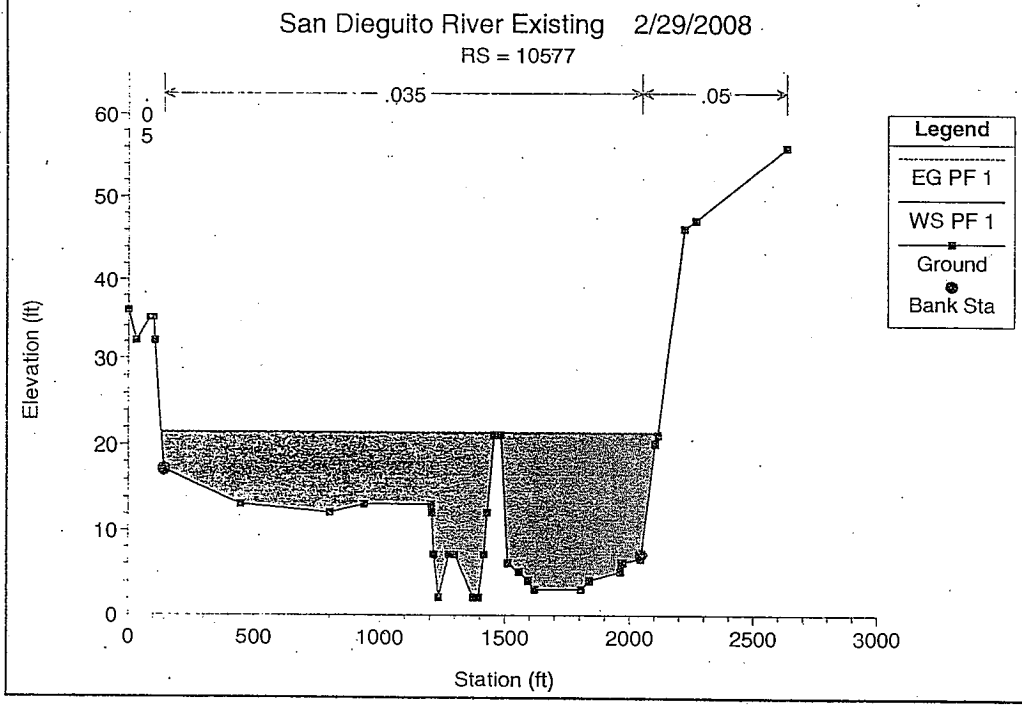
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


San Dieguito River Existing 2/29/2008
RS = 10577
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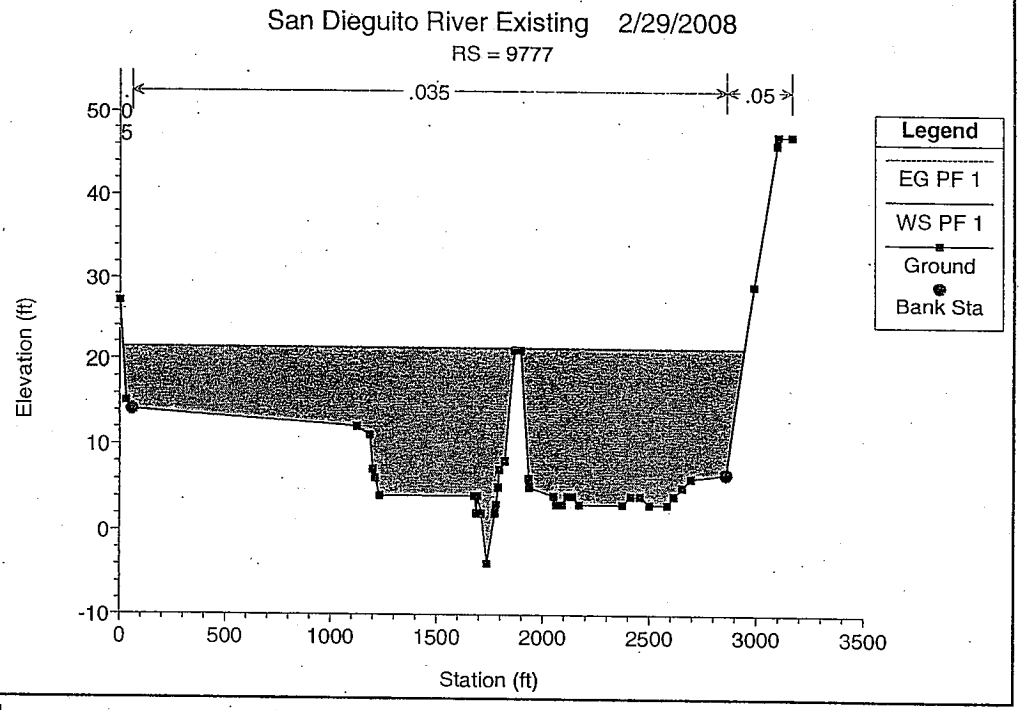
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


San Dieguito River Existing 2/29/2008
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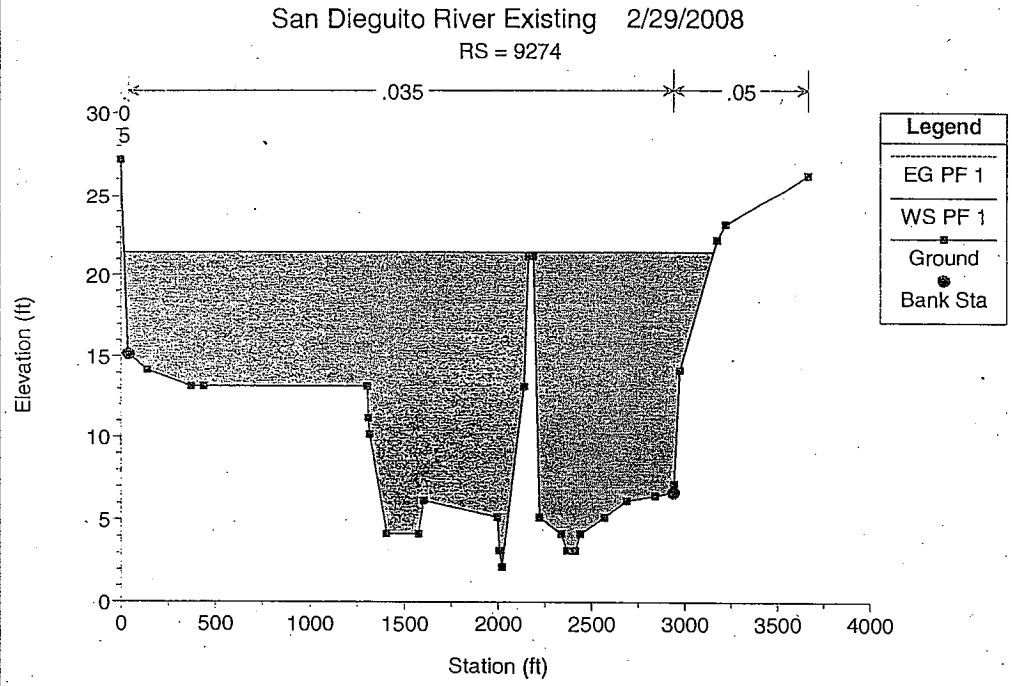
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
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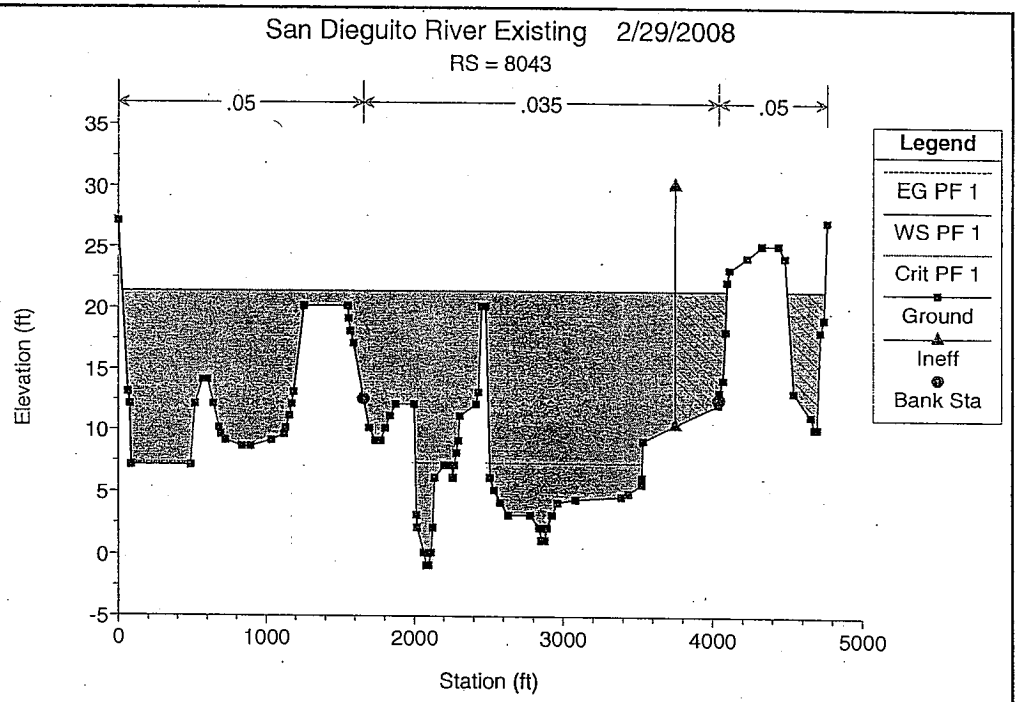
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


San Dieguito River Existing 2/29/2008
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Legend
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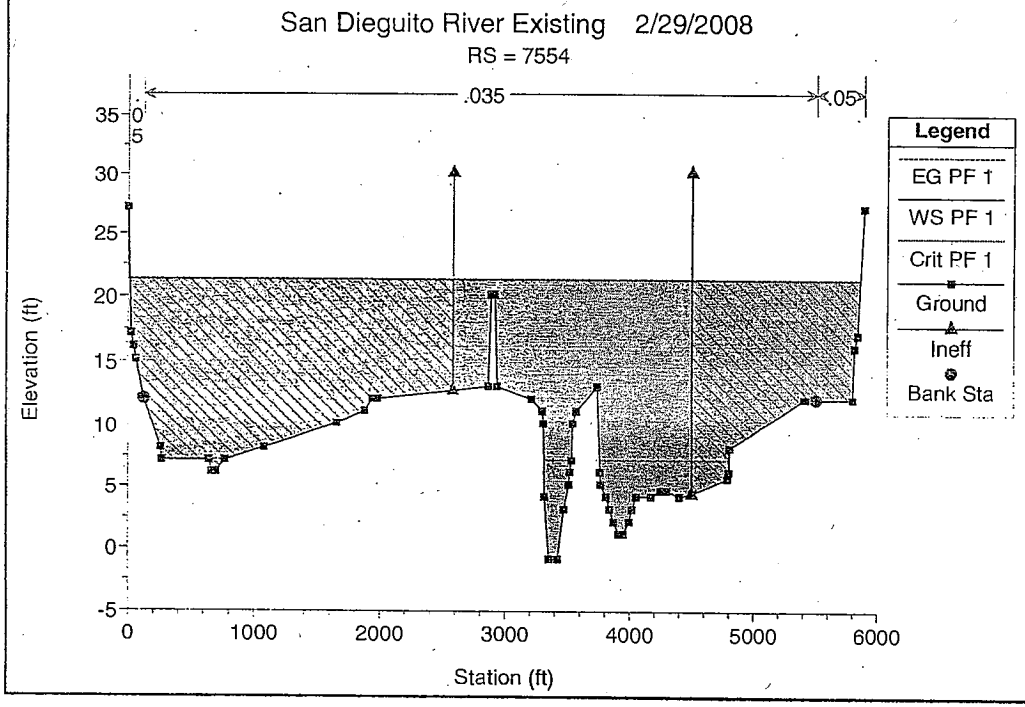
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


San Dieguito River Existing 2/29/2008
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.05
Legend
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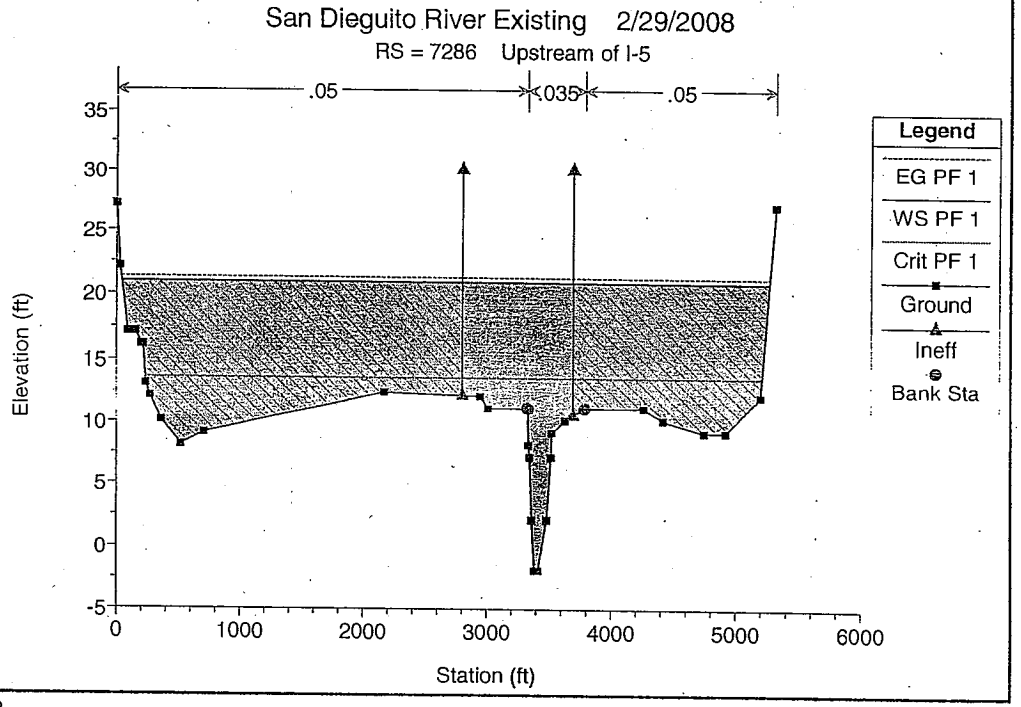
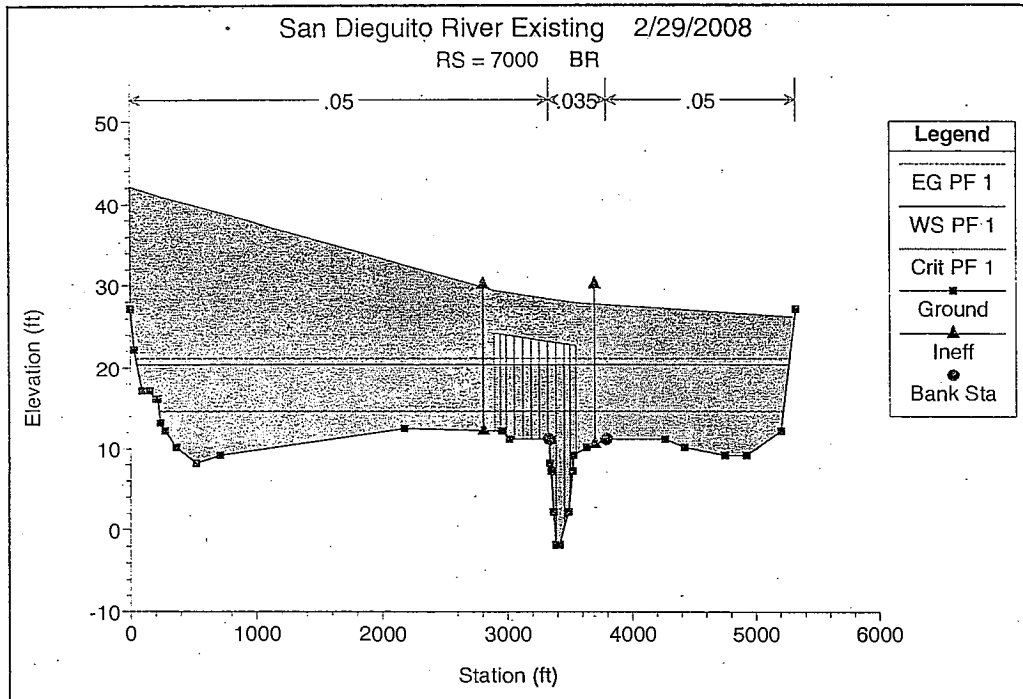
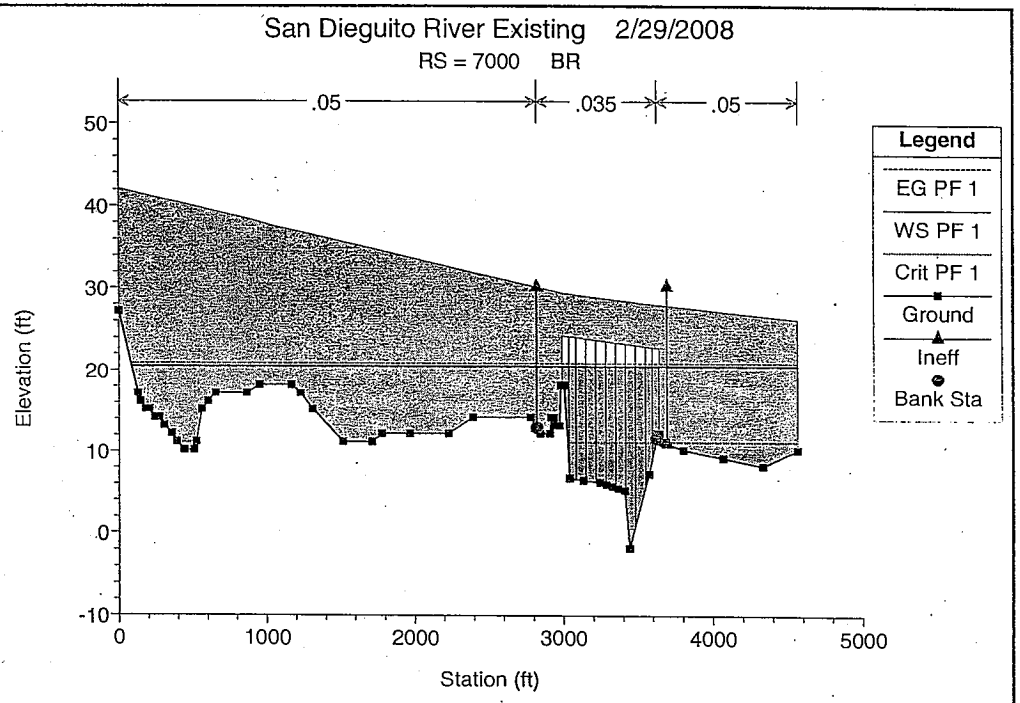
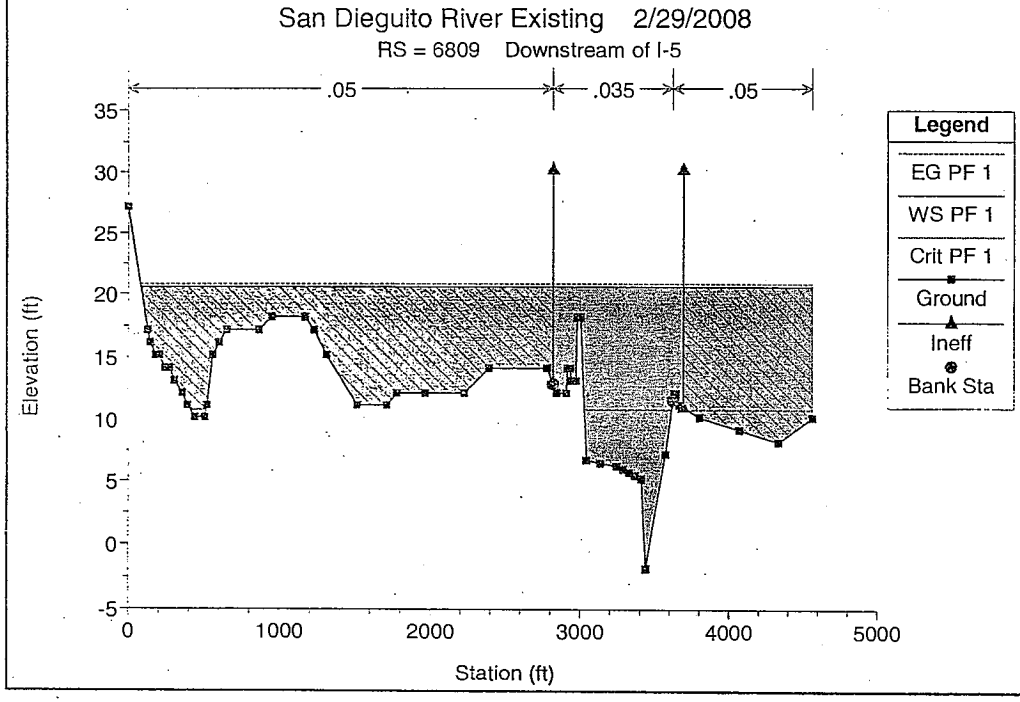
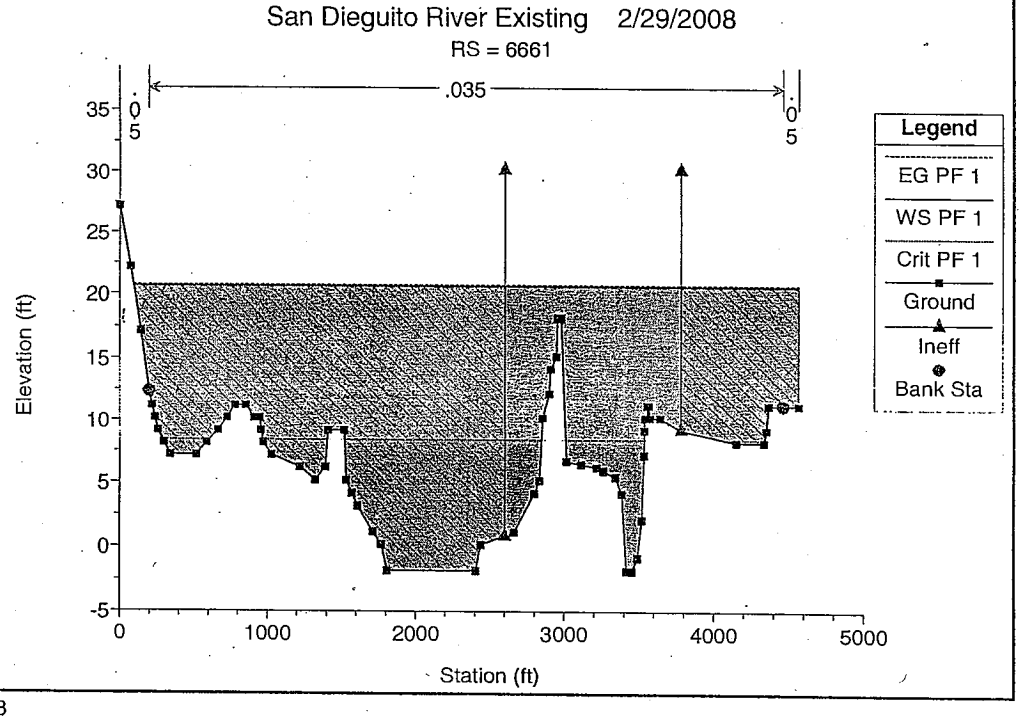
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


San Dieguito River Existing 2/29/2008
RS = 7286 Upstream of I-5
.05
.035
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


San Dieguito River Existing 2/29/2008
RS = 7000 BR
.05
.035
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


San Dieguito River Existing 2/29/2008
RS = 7000 BR
.05
.035
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


San Dieguito River Existing 2/29/2008
RS = 6809 Downstream of I-5
.05
.035
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


San Dieguito River Existing 2/29/2008
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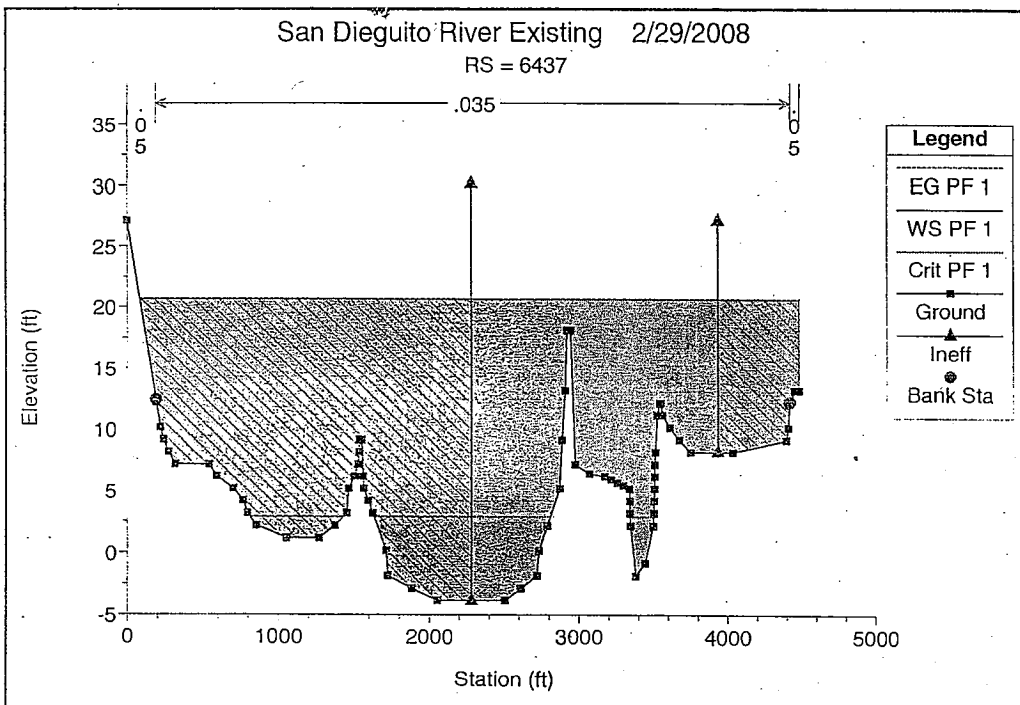
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


San Dieguito River Existing 2/29/2008
RS = 6437
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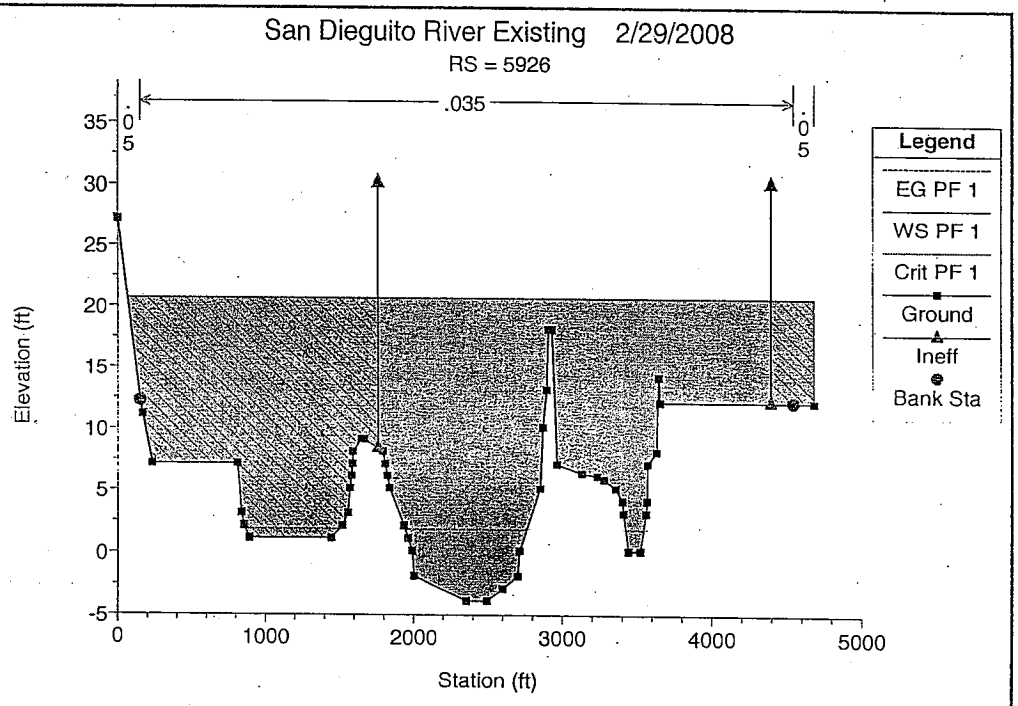
0.5
0.5
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


San Dieguito River Existing 2/29/2008
RS = 5926
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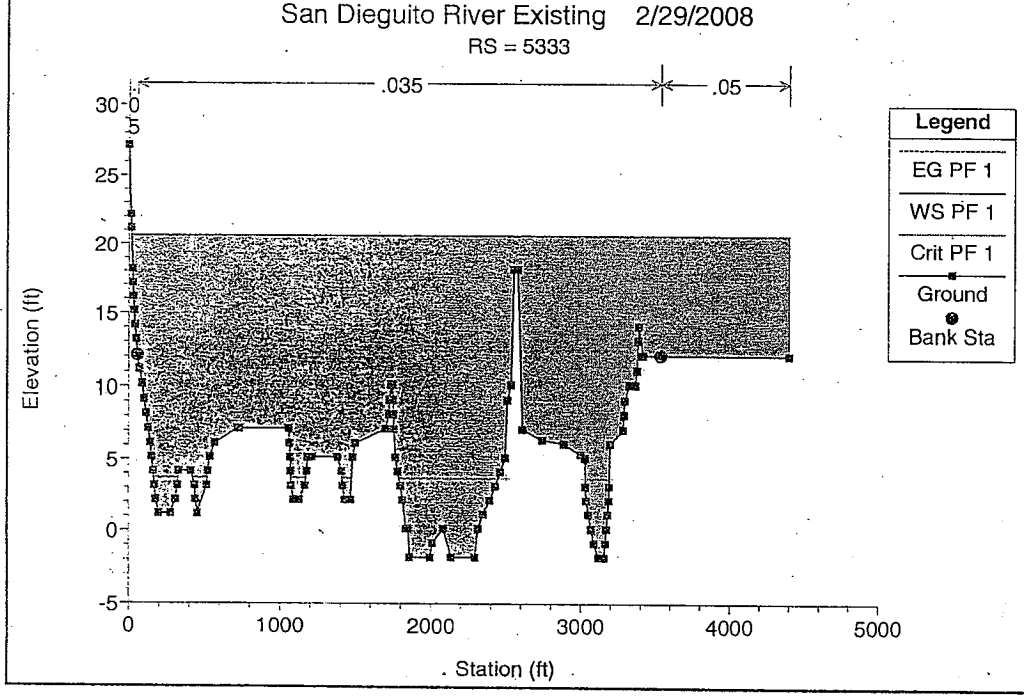
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


San Dieguito River Existing 2/29/2008
RS = 5333
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.05
0.5
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

SDR_Exist.rep

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
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PROJECT DATA
Project Title: SanDieguitoRiver_Existing
Project File : SDR_Exist.prj
Run Date and Time: 2/29/2008 4:24:43 PM

Project in English units

Project Description:
San Diego River Existing Conditions Model

PLAN DATA

Plan Title: San Dieguito River Existing
Plan File : p:\1683_T064_I5_Floodplain\420_Env_ Stud\San Dieguito\HEC-RAS\Final\Existing\SDR_Exist.p01

Geometry Title: San Dieguito Geometry
Geometry File : p:\1683_T064_I5_Floodplain\420_Env_ Stud\San Dieguito\HEC-RAS\Final\Existing\SDR_Exist.g02

Flow Title : 100-yr Storm
Flow File : p:\1683_T064_I5_Floodplain\420_Env_ Stud\San Dieguito\HEC-RAS\Final\Existing\SDR_Exist.f01

Plan Summary Information:

Number of:	Cross Sections =	13	Multiple Openings =	0
	Culverts =	0	Inline Structures =	0
	Bridges =	1	Lateral Structures =	0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: 100-yr Storm
Flow File : p:\1683_T064_I5_Floodplain\420_Env_ Stud\San Dieguito\HEC-RAS\Final\Existing\SDR_Exist.f01

Flow Data (cfs)

River	Reach	RS	PF 1
San Dieguito	Riv1	13555	42800

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
San Dieguito	Riv1	PF 1	Normal S = 0.003491	Known WS = 20.65

GEOMETRY DATA

Geometry Title: San Dieguito Geometry
Geometry File : p:\1683_T064_I5_Floodplain\420_Env_ Stud\San Dieguito\HEC-RAS\Final\Existing\SDR_Exist.g02

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 13555

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	25.15	107.46	25.15	206.93	26.15	250.4	26.15	335.53	22.15
351.26	17.15	358.1	15.12	368.13	12.15	378.5	11.15	394.04	10.15
420.06	9.15	490.28	8.99	570.6	8.82	643.38	9.15	646.03	12.15
646.14	12.16	673.89	15.15	985.5	17.15	1443.3	22.15	1460.3	22.15
1542.76	22.15	1668.5	20.15	1886.9	20.15	2038.21	22.15		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	358.1	.05	646.14	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
358.1	646.14	1909.77	1701.26	1796	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	22.53	Element	Left OB	Channel

Right OB

Vel Head (ft)	0.63	Wt. n-Val.	0.035	0.050	0.035
W.S. Elev (ft)	21.90	Reach Len. (ft)	1909.77	1701.26	1796.00
Crit W.S. (ft)		Flow Area (sq ft)	75.02	3599.55	3653.22
E.G. Slope (ft/ft)	0.002097	Area (sq ft)	75.02	3599.55	3653.22
Q Total (cfs)	42800.00	Flow (cfs)	322.36	26264.62	16213.02
Top Width (ft)	1545.94	Top Width (ft)	21.80	288.04	1236.10
Vel Total (ft/s)	5.84	Avg. Vel. (ft/s)	4.30	7.30	4.44
Max Chl Dpth (ft)	13.08	Hydr. Depth (ft)	3.44	12.50	2.96
Conv. Total (cfs)	934661.5	Conv. (cfs)	7039.6	573563.8	354058.1
Length Wtd. (ft)	1720.01	Wetted Per. (ft)	22.83	289.92	1236.32
Min Ch El (ft)	8.82	Shear (lb/sq ft)	0.43	1.63	0.39
Alpha	1.18	Stream Power (lb/ft s)	1.85	11.86	1.72
Frctn Loss (ft)	0.72	Cum Volume (acre-ft)	1588.27	5973.66	580.01
C & E Loss (ft)	0.16	Cum SA (acres)	188.14	467.01	81.46

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 11854

INPUT
Description:
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	28.1	27.15	32.14	26.15	42.95	22.15	51.82	17.53
52.56	17.15	55.9	15.15	168.07	15.15	658.24	14.15	669.88	13.15
952.46	13.15	1088.3	14.15	1203.7	14.15	1286.3	12.15	1375.8	11.15
1534.6	11.15	1662.7	10.15	1676.7	9.15	1690.7	8.15	1718.1	7.15
1722.5	4.15	1722.9	3.15	1762.7	3.15	1763.3	4.15	1768.6	6.15
1775.5	7.15	1795.9	10.15	1808.6	11.15	1840.3	12.15	1854.8	13.15
2072.8	14.15	2211.7	16.15	2312	17.15	2437.3	21.89	2444.1	22.15
2453.2	27.15								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	51.82	.035	2437.3	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
51.82	2437.3	743.4	1277.32	1429.64	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	21.65	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.08	Wt. n-Val.	0.050	0.035
W.S. Elev (ft)	21.57	Reach Len. (ft)	743.40	1277.32
1429.64				
Crit W.S. (ft)		Flow Area (sq ft)	15.67	19131.31
E.G. Slope (ft/ft)	0.000172	Area (sq ft)	15.67	19131.31
Q Total (cfs)	42800.00	Flow (cfs)	9.02	42790.98
Top Width (ft)	2384.79	Top Width (ft)	7.76	2377.03
Vel Total (ft/s)	2.24	Avg. Vel. (ft/s)	0.58	2.24
Max Chl Dpth (ft)	18.42	Hydr. Depth (ft)	2.02	8.05
Conv. Total (cfs)	3259139.0	Conv. (cfs)	687.1	3258452.0
Length Wtd. (ft)	1277.90	Wetted Per. (ft)	8.75	2380.87
Min Ch El (ft)	3.15	Shear (lb/sq ft)	0.02	0.09
Alpha	1.00	Stream Power (lb/ft s)	0.01	0.19
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	1586.28	5529.78
504.70				
C & E Loss (ft)	0.01	Cum SA (acres)	187.49	414.96
55.98				

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 10577

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	36.15	31.06	32.15	85.1	35.15	99.31	35.15	105.25	32.15
140.4	17.15	141.3	17.14	447.3	13.15	801.3	12.15	937.27	13.15
1204.85	13.15	1206.5	12.15	1214.63	7.15	1234.32	2.15	1276.78	7.15
1299.53	7.15	1373.48	2.15	1395.61	2.15	1416.5	7.15	1429.3	12.15
1456.45	21.15	1481.4	21.15	1511.6	6.15	1557.57	5.15	1593.2	4.15
1620.1	3.15	1805.7	3.15	1838.5	4.15	1963.8	5.15	1968.5	6.15
1974.81	6.19	2046.4	6.65	2048.6	7.15	2102.2	20.15	2112.8	21.15
2218.1	46.15	2265.5	47.15	2631.9	55.9				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	141.3	.035	2048.6	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
141.3	2048.6	809.4	800.27	1102.6	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	21.49	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.06	Wt. n-Val.	0.050	0.035
0.050				
W.S. Elev (ft)	21.43	Reach Len. (ft)	809.40	800.27
1102.60				
Crit W.S. (ft)		Flow Area (sq ft)	25.37	21624.33
425.71				
E.G. Slope (ft/ft)	0.000084	Area (sq ft)	25.37	21624.33
425.71				
Q Total (cfs)	42800.00	Flow (cfs)	11.52	42390.20
398.29				
Top Width (ft)	1983.64	Top Width (ft)	10.94	1907.30
65.40				
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)	0.45	1.96
0.94				
Max Chl Dpth (ft)	19.28	Hydr. Depth (ft)	2.32	11.34
6.51				
Conv. Total (cfs)	4662501.0	Conv. (cfs)	1254.5	4617858.0
43388.1				
Length Wtd. (ft)	802.86	Wetted Per. (ft)	11.82	1916.84
67.03				
Min Ch El (ft)	2.15	Shear (lb/sq ft)	0.01	0.06
0.03				
Alpha	1.01	Stream Power (lb/ft s)	0.01	0.12
0.03				
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	1585.93	4932.24
497.71				
C & E Loss (ft)	0.01	Cum SA (acres)	187.33	352.15
54.91				

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 9777

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	30.95	15.15	54.91	14.15	58.3	14.14	1123.5	12.15
1184.5	11.15	1197.24	7.15	1209.17	6.15	1231.8	4.15	1677.1	4.15
1688	2.15	1692.1	4.15	1710.9	2.15	1737.4	-3.85	1774.96	2.15
1781	3.15	1789.4	5.15	1794.75	7.15	1820.72	8.15	1866.86	21.15

1895.9	21.15	1933.7	6.15	1936.23	5.15	2050.3	4.15	2063.4	3.15
2089.7	3.15	2115.8	4.15	2138.5	4.15	2170.15	3.15	2373.15	3.15
2412.9	4.15	2454.8	4.15	2499.7	3.15	2583.1	3.15	2613.6	4.15
2653.2	5.15	2694.5	6.15	2858.2	6.65	2985.3	29.15	3093.6	46.15
3099.4	47.15	3162.5	47.15						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	58.3	.035	2858.2	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
58.3	2858.2	275.06	502.66	1232.3	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	21.45	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.02	Wt. n-Val.	0.050	0.035
0.050				
W.S. Elev (ft)	21.43	Reach Len. (ft)	275.06	502.66
1232.30				
Crit W.S. (ft)		Flow Area (sq ft)	237.98	37044.61
616.95				
E.G. Slope (ft/ft)	0.000023	Area (sq ft)	237.98	37044.61
616.95				
Q Total (cfs)	42800.00	Flow (cfs)	103.98	42363.84
332.18				
Top Width (ft)	2926.93	Top Width (ft)	43.55	2799.90
83.49				
Vel Total (ft/s)	1.13	Avg. Vel. (ft/s)	0.44	1.14
0.54				
Max Chl Dpth (ft)	25.28	Hydr. Depth (ft)	5.47	13.23
7.39				
Conv. Total (cfs)	8870754.0	Conv. (cfs)	21550.1	8780356.0
68847.9				
Length Wtd. (ft)	509.12	Wetted Per. (ft)	44.74	2808.25
84.79				
Min Ch El (ft)	-3.85	Shear (lb/sq ft)	0.01	0.02
0.01				
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.02
0.01				
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	1583.48	4393.31
484.51				
C & E Loss (ft)	0.00	Cum SA (acres)	186.83	308.91
53.02				

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 9274

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	35.56	15.15	39.41	15.11	140.5	14.15	371.23	13.15
439.61	13.15	1303.78	13.15	1308.9	11.15	1315.5	10.15	1404.87	4.15
1576.24	4.15	1603.44	6.15	1995.8	5.15	2007.7	3.15	2020.86	2.15
2139.86	13.15	2163.86	21.15	2187.6	21.15	2221.67	5.15	2336.54	4.15

2367.4	3.15	2413.2	3.15	2439.73	4.15	2569.23	5.15	2690.41	6.15
2842.6	6.45	2941.04	6.65	2943.34	7.15	2975.22	14.15	3175.2	22.15
3221.3	23.15	3667.16	26.15						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	39.41	.035	2941.04	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
39.41	2941.04	1312.7	1232.14	731.7	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	21.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	21.41	Reach Len. (ft)	1312.70	1232.14	731.70
Crit W.S. (ft)		Flow Area (sq ft)	82.33	35270.25	1036.07
E.G. Slope (ft/ft)	0.000029	Area (sq ft)	82.33	35270.25	1036.07
Q Total (cfs)	42800.00	Flow (cfs)	30.26	42302.13	467.62
Top Width (ft)	3139.81	Top Width (ft)	22.41	2901.63	215.77
Vel Total (ft/s)	1.18	Avg. Vel. (ft/s)	0.37	1.20	0.45
Max Chl Dpth (ft)	19.26	Hydr. Depth (ft)	3.67	12.16	4.80
Conv. Total (cfs)	7997617.0	Conv. (cfs)	5653.7	7904584.0	87378.7
Length Wtd. (ft)	1237.72	Wetted Per. (ft)	23.44	2907.99	216.72
Min Ch El (ft)	2.15	Shear (lb/sq ft)	0.01	0.02	0.01
Alpha	1.03	Stream Power (lb/ft s)	0.00	0.03	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	1582.47	3976.08	461.13
C & E Loss (ft)	0.00	Cum SA (acres)	186.62	276.01	48.79

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 8043

INPUT
Description:
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	62.22	13.15	74.73	12.15	85.25	7.15	487.65	7.15
518.99	12.15	569.67	14.15	603.2	14.15	641.2	12.15	680.13	10.15
694.2	9.65	723.27	9.15	835.32	8.65	895.2	8.65	1035.07	9.15
1122.48	9.65	1133.08	10.15	1157.48	11.15	1173.42	12.15	1186.2	13.15
1258.6	20.15	1554.5	20.15	1558.15	19.15	1569.75	18.15	1589.55	17.15
1658.12	12.61	1695.25	10.15	1737.04	9.15	1773.32	9.15	1804.64	10.15

1837.5	11.15	1874.73	12.15	1999	12.15	2013.6	3.15	2018.66	2.15
2064.02	.15	2081.34	-.85	2095.44	-.85	2114	.15	2124.8	2.15
2135.93	6.15	2201.8	7.15	2254.16	7.15	2257.7	6.15	2261.5	6.15
2269.6	7.15	2283.66	8.15	2297.74	9.15	2306.7	11.15	2416.28	12.15
2433.2	13.15	2454.9	20.15	2479.9	20.15	2508.7	6.15	2536.9	5.15
2577.1	4.15	2631.8	3.15	2778.9	3.15	2838.7	2.15	2851.6	1.15
2876.3	1.15	2892	2.15	2925.8	3.15	2963	4.15	3082.9	4.4
3390.5	4.65	3438.4	4.9	3525.7	5.65	3527.9	6.15	3536.9	9.15
4040.3	12.15	4041.93	12.52	4044.7	13.15	4070.5	14.15	4089	18.15
4099.1	22.15	4113.6	23.15	4233	24.15	4329.3	25.15	4440.4	25.15
4482.8	24.15	4540.3	13.15	4654.9	11.15	4679.5	10.15	4698.2	10.15
4720	18.15	4744.7	19.15	4763.9	27.15				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	1658.12	.035	4041.93	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1658.12	4041.93	2307.4	488.53	209.2	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
3751.6	4763.9	30.15	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	21.41	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.02	Wt. n-Val.	0.050	0.035
W.S. Elev (ft)	21.39	Reach Len. (ft)	2307.40	488.53
209.20				
Crit W.S. (ft)	7.34	Flow Area (sq ft)	15240.09	30599.43
E.G. Slope (ft/ft)	0.000019	Area (sq ft)	15240.09	33529.96
2275.70				
Q Total (cfs)	42800.00	Flow (cfs)	8803.81	33996.20
Top Width (ft)	4324.42	Top Width (ft)	1632.52	2383.81
308.09				
Vel Total (ft/s)	0.93	Avg. Vel. (ft/s)	0.58	1.11
Max Chl Dpth (ft)	22.24	Hydr. Depth (ft)	9.34	14.62
Conv. Total (cfs)	9748341.0	Conv. (cfs)	2005199.0	7743143.0
Length Wtd. (ft)	675.60	Wetted Per. (ft)	1635.95	2102.80
Min Ch El (ft)	-0.85	Shear (lb/sq ft)	0.01	0.02
Alpha	1.20	Stream Power (lb/ft s)	0.01	0.02
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	1351.60	3003.03
433.32				
C & E Loss (ft)	0.00	Cum SA (acres)	161.68	201.26
44.39				

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross

sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 7554

INPUT
Description:
Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	24.6	17.15	43.18	16.15	61.65	15.15	123.29	12.15
124.7	12.11	260.4	8.15	267.1	7.15	643.5	7.15	664.43	6.15
700.15	6.15	770.57	7.15	1082.9	8.15	1658.3	10.15	1883.38	11.15
1941.3	12.15	1982.75	12.15	2869.01	13.15	2890.66	20.15	2916.55	20.15
2937.5	13.15	3213.55	12.15	3298.6	11.15	3309.46	10.15	3316.15	4.15
3351.45	-.85	3422.24	-.85	3475.66	3.15	3512.81	5.15	3522.14	6.15
3533.5	7.15	3543.4	10.15	3572.5	11.15	3740.1	13.15	3761.82	6.15
3768.26	5.15	3810.92	4.15	3839.42	3.15	3875.07	2.15	3912.65	1.15
3951.15	1.15	3998.98	2.15	4020.72	3.15	4055.98	4.15	4175.53	4.15
4251.33	4.65	4298.37	4.65	4402.94	4.15	4505.84	4.4	4792.97	5.65
4801.01	6.15	4807.62	8.15	5412.03	12.15	5422.07	12.15	5510.17	12.15
5806.56	12.15	5820.13	16.15	5846.91	17.15	5895.44	27.15		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	124.7	.035	5510.17	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
124.7	5510.17	1488	268.5	1186.87	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	2585.15	30.15	F
4501.6	5895.44	30.15	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	21.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	21.34	Reach Len. (ft)	1488.00	268.50	1186.87
Crit W.S. (ft)	7.18	Flow Area (sq ft)		25614.39	
E.G. Slope (ft/ft)	0.000049	Area (sq ft)	700.82	67061.90	2989.58
Q Total (cfs)	42800.00	Flow (cfs)		42800.00	
Top Width (ft)	5852.95	Top Width (ft)	110.41	5385.47	357.07
Vel Total (ft/s)	1.67	Avg. Vel. (ft/s)		1.67	
Max Chl Dpth (ft)	22.19	Hydr. Depth (ft)		13.37	
Conv. Total (cfs)	6109598.0	Conv. (cfs)		6109598.0	
Length Wtd. (ft)	458.96	Wetted Per. (ft)		1923.45	

Min Ch El (ft)	-0.85	Shear (lb/sq ft)		0.04
Alpha	1.00	Stream Power (lb/ft s)		0.07
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	929.39	2438.96
420.67				
C & E Loss (ft)	0.03	Cum SA (acres)	115.52	157.69
42.79				

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 7286

INPUT
Description: Upstream of I-5
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	28.7	22.15	90.97	17.15	151.8	17.15	200.45	16.15
214.97	16.15	235.46	13.15	272.24	12.15	362.6	10.15	520.8	8.15
709.55	9.15	2176.6	12.46	2950.71	12.15	3013.37	11.15	3332.23	11.15
3336.33	8.15	3346.62	7.15	3365.89	2.15	3387.5	-1.85	3415.73	-1.85
3487.71	2.15	3521.96	7.15	3527.4	9.15	3632.52	10.15	3792.9	11.15
4264.36	11.15	4420.07	10.15	4747.1	9.15	4922.14	9.15	5200.71	12.15
5323.83	27.15								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	3332.23	.035	3792.9	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3332.23	3792.9	640.24	476.55	543.46	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	2806.4	30.15	F
3698.4	5323.83	30.15	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	21.31	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.33	Wt. n-Val.	0.050	0.035
W.S. Elev (ft)	20.98	Reach Len. (ft)	154.00	154.00
154.00				
Crit W.S. (ft)	13.65	Flow Area (sq ft)	4987.31	5611.08
E.G. Slope (ft/ft)	0.000405	Area (sq ft)	31478.65	6567.53
15211.47				
Q Total (cfs)	42800.00	Flow (cfs)	13368.68	29431.32

Top Width (ft)	5229.85	Top Width (ft)	3288.92	460.67 1480.26
Vel Total (ft/s)	4.04	Avg. Vel. (ft/s)	2.68	5.25
Max Chl Dpth (ft)	22.83	Hydr. Depth (ft)	9.48	15.32
Conv. Total (cfs)	2126126.0	Conv. (cfs)	664100.6	1462025.0
Length Wtd. (ft)	154.00	Wetted Per. (ft)	525.84	369.04
Min Ch El (ft)	-1.85	Shear (lb/sq ft)	0.24	0.38
Alpha	1.30	Stream Power (lb/ft s)	0.64	2.02
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	379.77	2212.04 172.71
C & E Loss (ft)	0.04	Cum SA (acres)	57.46	139.68 17.76

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

BRIDGE

RIVER: San Dieguito Riv
REACH: 1 RS: 7000

INPUT
Description:
Distance from Upstream XS = 154
Deck/Roadway Width = 178.75
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	42.15	2.15	2896.7	29.45	2.15	2896.7	29.45	24.2
3546.2	27.95	22.7	3546.2	27.95	2.15	5400	26.15	2.15

Upstream Bridge Cross Section Data
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	28.7	22.15	90.97	17.15	151.8	17.15	200.45	16.15
214.97	16.15	235.46	13.15	272.24	12.15	362.6	10.15	520.8	8.15
709.55	9.15	2176.6	12.46	2950.71	12.15	3013.37	11.15	3332.23	11.15
3336.33	8.15	3346.62	7.15	3365.89	2.15	3387.5	-1.85	3415.73	-1.85
3487.71	2.15	3521.96	7.15	3527.4	9.15	3632.52	10.15	3792.9	11.15
4264.36	11.15	4420.07	10.15	4747.1	9.15	4922.14	9.15	5200.71	12.15
5323.83	27.15								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	3332.23	.035	3792.9	.05

Bank Sta: Left Right Coeff Contr. Expan.

```
       3332.23  3792.9                .1        .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
       0  2806.4   30.15        F
  3698.4 5323.83   30.15        F

Downstream  Deck/Roadway Coordinates
    num=        6
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
       0   42.15    2.15     2990   29.45    2.15     2990   29.45    24.2
  3639.5   27.95    22.7   3639.5   27.95    2.15     4600   26.15    2.15

Downstream Bridge Cross Section Data
Station Elevation Data    num=       55
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   27.15   126.5   17.15  145.53   16.15   180.9   15.15  205.46   15.15
  241.63   14.15  273.24   14.15   305.7   13.15   357.1   12.15   390.3   11.15
  439.76   10.15   507.5   10.15  523.23   11.15   561.6   15.15  602.98   16.15
  655.56   17.15  866.67   17.15  953.91   18.15  1168.1   18.15 1230.35   17.15
 1311.71   15.15  1513.9   11.15 1711.72   11.15    1778   12.15 1965.24   12.15
 2228.14   12.15  2391.4   14.15 2778.55   14.15 2820.77   12.86  2843.9   12.15
    2909   12.15 2917.53   14.15  2933.6   14.15 2937.23   13.15  2972.3   13.15
    2982   18.15 3004.52   18.15 3039.74    6.65    3134     6.4 3243.49    6.15
    3287     5.9 3327.81    5.65 3367.54     5.4 3409.64    5.15 3439.04   -1.85
 3441.87   -1.85 3571.57    7.15  3623.2   11.58 3629.85   12.15 3641.07   12.15
  3664.4   11.15 3801.73   10.15  4069.7    9.15    4333    8.15 4562.74   10.15

Manning's n Values        num=        3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05 2820.77    .035  3623.2     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
       2820.77  3623.2                .1        .3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
       0  2819.9   30.15        F
  3693.2 4562.74   30.15        F

Upstream Embankment side slope                =       0 horiz. to 1.0 vertical
Downstream Embankment side slope              =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins           =   28.15
Energy head used in spillway design           =
Spillway height used in design                =
Weir crest shape                              = Broad Crested

Number of Piers =  10

Pier Data
Pier Station     Upstream=  2942.7    Downstream=    3036
Upstream     num=        2
    Width   Elev    Width   Elev
        5   -7.85       5   25.15
Downstream     num=        2
    Width   Elev    Width   Elev
        5   -7.85       5   25.15

Pier Data
Pier Station     Upstream=  2988.7    Downstream=    3082
Upstream     num=        2
    Width   Elev    Width   Elev
        5   -7.85       5   25.15
Downstream     num=        2
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    Width   Elev    Width   Elev
       5   -7.85       5   25.15

Pier Data
Pier Station     Upstream=  3055.2    Downstream=  3148.5
Upstream     num=       2
    Width   Elev    Width   Elev
       5   -7.85       5   25.15
Downstream     num=       2
    Width   Elev    Width   Elev
       5   -7.85       5   25.15

Pier Data
Pier Station     Upstream=  3121.7    Downstream=    3215
Upstream     num=       2
    Width   Elev    Width   Elev
       5   -7.85       5   25.15
Downstream     num=       2
    Width   Elev    Width   Elev
       5   -7.85       5   25.15

Pier Data
Pier Station     Upstream=  3188.2    Downstream=  3281.5
Upstream     num=       2
    Width   Elev    Width   Elev
       5   -7.85       5   25.15
Downstream     num=       2
    Width   Elev    Width   Elev
       5   -7.85       5   25.15

Pier Data
Pier Station     Upstream=  3254.7    Downstream=    3348
Upstream     num=       2
    Width   Elev    Width   Elev
       5   -7.85       5   25.15
Downstream     num=       2
    Width   Elev    Width   Elev
       5   -7.85       5   25.15

Pier Data
Pier Station     Upstream=  3321.2    Downstream=  3414.5
Upstream     num=       2
    Width   Elev    Width   Elev
       5   -7.85       5   25.15
Downstream     num=       2
    Width   Elev    Width   Elev
       5   -7.85       5   25.15

Pier Data
Pier Station     Upstream=  3387.7    Downstream=    3481
Upstream     num=       2
    Width   Elev    Width   Elev
       5   -7.85       5   25.15
Downstream     num=       2
    Width   Elev    Width   Elev
       5   -7.85       5   25.15

Pier Data
Pier Station     Upstream=  3454.2    Downstream=  3547.5
Upstream     num=       2
    Width   Elev    Width   Elev
       5   -7.85       5   25.15
Downstream     num=       2
```

Width	Elev	Width	Elev
5	-7.85	5	25.15

Pier Data
Pier Station Upstream= 3500.2 Downstream= 3593.5
Upstream num= 2

Width	Elev	Width	Elev
5	-7.85	5	25.15

Downstream num= 2

Width	Elev	Width	Elev
5	-7.85	5	25.15

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT Profile #PF 1

E.G. US. (ft)	21.31	Element	Inside BR US
Inside BR DS			
W.S. US. (ft)	20.98	E.G. Elev (ft)	21.16
20.89			
Q Total (cfs)	42800.00	W.S. Elev (ft)	20.43
20.50			
Q Bridge (cfs)	42800.00	Crit W.S. (ft)	14.61
11.11			
Q Weir (cfs)		Max Chl Dpth (ft)	22.28
22.35			
Weir Sta Lft (ft)		Vel Total (ft/s)	5.97
4.99			
Weir Sta Rgt (ft)		Flow Area (sq ft)	7169.34
8568.91			
Weir Submerg		Froude # Chl	0.30
0.23			
Weir Max Depth (ft)		Specif Force (cu ft)	58106.97
72012.66			
Min El Weir Flow (ft)	28.15	Hydr Depth (ft)	11.96
14.29			
Min El Prs (ft)	24.20	W.P. Total (ft)	846.76
896.56			
Delta EG (ft)	0.52	Conv. Total (cfs)	1137647.0
1631328.0			
Delta WS (ft)	0.43	Top Width (ft)	599.50
599.50			
BR Open Area (sq ft)	8978.97	Frctn Loss (ft)	0.17
0.06			
BR Open Vel (ft/s)	5.97	C & E Loss (ft)	0.10
0.05			
Coef of Q		Shear Total (lb/sq ft)	0.75
0.41			

Br Sel Method Energy only Power Total (lb/ft s) 4.47
2.05

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 6809

INPUT
Description: Downstream of I-5
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	126.5	17.15	145.53	16.15	180.9	15.15	205.46	15.15
241.63	14.15	273.24	14.15	305.7	13.15	357.1	12.15	390.3	11.15
439.76	10.15	507.5	10.15	523.23	11.15	561.6	15.15	602.98	16.15
655.56	17.15	866.67	17.15	953.91	18.15	1168.1	18.15	1230.35	17.15
1311.71	15.15	1513.9	11.15	1711.72	11.15	1778	12.15	1965.24	12.15
2228.14	12.15	2391.4	14.15	2778.55	14.15	2820.77	12.86	2843.9	12.15
2909	12.15	2917.53	14.15	2933.6	14.15	2937.23	13.15	2972.3	13.15
2982	18.15	3004.52	18.15	3039.74	6.65	3134	6.4	3243.49	6.15
3287	5.9	3327.81	5.65	3367.54	5.4	3409.64	5.15	3439.04	-1.85
3441.87	-1.85	3571.57	7.15	3623.2	11.58	3629.85	12.15	3641.07	12.15
3664.4	11.15	3801.73	10.15	4069.7	9.15	4333	8.15	4562.74	10.15

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	2820.77	.035	3623.2	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2820.77	3623.2	1290.06	147.74	464.74	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	2819.9	30.15	F
3693.2	4562.74	30.15	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	20.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	20.54	Reach Len. (ft)	1290.06	147.74	464.74
Crit W.S. (ft)	10.81	Flow Area (sq ft)	6.67	10443.93	

632.84				
E.G. Slope (ft/ft)	0.000287	Area (sq ft)	17548.25	10443.93
10385.07				
Q Total (cfs)	42800.00	Flow (cfs)	13.06	41404.71
1382.23				
Top Width (ft)	4479.15	Top Width (ft)	2737.18	802.43
939.54				
Vel Total (ft/s)	3.86	Avg. Vel. (ft/s)	1.96	3.96
2.18				
Max Chl Dpth (ft)	22.39	Hydr. Depth (ft)	7.67	13.02
9.04				
Conv. Total (cfs)	2526088.0	Conv. (cfs)	770.9	2443737.0
81580.2				
Length Wtd. (ft)	153.03	Wetted Per. (ft)	0.87	807.18
70.05				
Min Ch El (ft)	-1.85	Shear (lb/sq ft)	0.14	0.23
0.16				
Alpha	1.03	Stream Power (lb/ft s)	0.27	0.92
0.35				
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	281.27	2138.49
128.17				
C & E Loss (ft)	0.04	Cum SA (acres)	45.60	134.62
13.53				

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 6661

INPUT
Description:
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	73.26	22.15	142.34	17.15	198.2	12.33	200.3	12.15
217.16	11.15	237.34	10.15	256.86	9.15	298.5	8.15	342.19	7.15
519.66	7.15	587.23	8.15	666.14	9.15	727.86	10.15	782.23	11.15
854.16	11.15	910.44	10.15	948.9	10.15	956.1	9.15	970.03	8.15
1025.92	7.15	1219.7	6.15	1323.3	5.15	1392.11	6.15	1411.7	9.15
1519.6	9.15	1532.02	5.15	1571.5	4.15	1609.72	3.15	1713.8	1.15
1769.85	.15	1807.76	-1.85	2408.16	-1.85	2440.8	.15	2663.86	1.15
2799.43	4.15	2835.33	5.15	2856.62	10.15	2901.3	12.15	2911.1	14.15
2950.5	15.15	2956.5	18.15	2979.06	18.15	3013.35	6.65	3114.64	6.4
3217.61	6.15	3261.71	5.9	3341.87	5.4	3386.06	4.15	3416.07	-1.85
3454.32	-1.85	3491.1	-.85	3522.46	2.15	3535.54	7.15	3537.58	9.15
3542.05	10.15	3557.3	10.15	3559.85	11.15	3567.6	11.15	3573.34	10.15
3642.5	10.15	3782.9	9.15	4150.47	8.15	4334.46	8.15	4352.2	9.15
4366.54	11.15	4463.3	11.15	4568.81	11.15				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
        0      .05    198.2     .035  4463.3      .05

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.    Expan.
          198.2  4463.3             321.4  224.95  198.11          .1            .3
Ineffective Flow      num=       2
   Sta L   Sta R    Elev  Permanent
       0  2600.8   30.15       F
  3781.1 4568.81   30.15       F

CROSS SECTION OUTPUT  Profile #PF 1


  E.G. Elev (ft)              20.71    Element                    Left OB    Channel
Right OB
  Vel Head (ft)                0.10    Wt. n-Val.                            0.035

  W.S. Elev (ft)              20.61    Reach Len. (ft)            321.40     224.95
 198.11
  Crit W.S. (ft)               8.37    Flow Area (sq ft)                    16776.90

  E.G. Slope (ft/ft)       0.000106    Area (sq ft)               410.95   63936.86
 998.48
  Q Total (cfs)           42800.00     Flow (cfs)                           42800.00

  Top Width (ft)           4474.32     Top Width (ft)             103.71    4265.10
 105.51
  Vel Total (ft/s)            2.55     Avg. Vel. (ft/s)                        2.55

  Max Chl Dpth (ft)          22.46     Hydr. Depth (ft)                       14.21

  Conv. Total (cfs)       4164467.0     Conv. (cfs)                          4164467.0

  Length Wtd. (ft)          224.95     Wetted Per. (ft)                     1186.67

  Min Ch El (ft)             -1.85     Shear (lb/sq ft)                        0.09

  Alpha                       1.00     Stream Power (lb/ft s)                  0.24

  Frctn Loss (ft)             0.01     Cum Volume (acre-ft)        15.33    2012.35
  67.45
  C & E Loss (ft)             0.02     Cum SA (acres)               3.53     126.03
   7.96


Warning: The cross-section end points had to be extended vertically for the computed
water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross
sections.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid,
         water surface was used.

CROSS SECTION


RIVER: San Dieguito Riv
REACH: 1                    RS: 6437

INPUT
Description:
```

Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	187.11	12.37	189.89	12.15	216.55	10.15	238.46	9.15
270.9	8.15	315.41	7.15	539.57	7.15	587.06	6.15	700.85	5.15
764.94	4.15	796.11	3.15	852.9	2.15	1052.61	1.15	1267.8	1.15
1374.3	2.15	1452.16	3.15	1464.83	5.15	1502.5	6.15	1527.05	7.15
1534.75	8.15	1536.88	9.15	1549.3	9.15	1558.97	6.15	1563.23	5.15
1593.09	4.15	1622.57	3.15	1710.81	.15	1723.2	-1.85	1882.87	-2.85
2052.23	-3.85	2504.34	-3.85	2609.73	-2.85	2719.26	-1.85	2731.25	.15
2786.37	2.15	2868.96	5.15	2883.54	9.15	2905.7	13.15	2916.5	18.15
2938.43	18.15	2971.43	7.15	3066.53	6.4	3169.5	6.15	3213.73	5.9
3254.05	5.65	3293.22	5.4	3333.3	5.15	3337.5	4.15	3338.3	3.15
3341.82	2.15	3378.75	-1.85	3442.34	-.85	3495.5	2.15	3500.85	3.15
3502.14	4.15	3504.38	5.15	3506.07	6.15	3507.55	7.15	3511	8.15
3521.75	11.15	3539.68	12.15	3544.12	12.15	3556.04	11.15	3605.61	10.15
3671.64	9.15	3747.43	8.15	4032.7	8.15	4392.9	9.15	4405.25	10.15
4414.57	12.15	4415.52	12.18	4446.25	13.15	4479.88	13.15		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	187.11	.035	4415.52	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
187.11	4415.52	407.84	510.16	564.9	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	2279.4	30.15	F
3929.86	4479.88		F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	20.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	20.65	Reach Len. (ft)	407.84	510.16	564.90
Crit W.S. (ft)	2.90	Flow Area (sq ft)		27770.76	
E.G. Slope (ft/ft)	0.000031	Area (sq ft)	433.61	72279.49	497.39
Q Total (cfs)	42800.00	Flow (cfs)		42800.00	
Top Width (ft)	4397.55	Top Width (ft)	104.78	4228.41	64.36
Vel Total (ft/s)	1.54	Avg. Vel. (ft/s)		1.54	
Max Chl Dpth (ft)	24.50	Hydr. Depth (ft)		16.83	
Conv. Total (cfs)	7719970.0	Conv. (cfs)		7719970.0	
Length Wtd. (ft)	510.16	Wetted Per. (ft)		1657.44	
Min Ch El (ft)	-3.85	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)		0.05	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	12.21	1660.63	64.05
C & E Loss (ft)	0.01	Cum SA (acres)	2.76	104.09	7.57

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 5926

INPUT
Description:
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	149.15	12.23	149.9	12.15	166.22	11.15	230.5	7.15
807.3	7.15	836.52	3.15	853.84	2.15	890.9	1.15	1444.82	1.15
1519.4	2.15	1557.1	3.15	1569.84	5.15	1582.3	6.15	1588.77	7.15
1591.2	8.15	1649.7	9.15	1664.55	9.15	1791.1	8.15	1807.1	7.15
1821.5	6.15	1836.7	5.15	1933.9	2.15	1962.2	1.15	1989.6	.15
2002.2	-1.85	2354.9	-3.85	2493.3	-3.85	2598.6	-2.85	2701	-1.85
2713.5	.15	2852.92	5.15	2870	10.15	2896.14	13.15	2906.6	18.15
2928.7	18.15	2962.1	7.15	3129.9	6.4	3232.55	6.15	3277.77	5.9
3356.66	5.15	3401.44	4.15	3408.4	3.15	3441.6	.15	3522	.15
3560.44	3.15	3567.4	4.15	3571	7.15	3630.7	8.15	3642	14.15
3644.9	14.15	3653.65	12.15	4540.9	12.15	4680.26	12.15		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	149.15	.035	4540.9	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
149.15	4540.9	1306.04	593.43	542.48	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	1758.1	30.15	F
4392.9	4680.26	30.15	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	20.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	20.65	Reach Len. (ft)	1306.04	593.43	542.48
Crit W.S. (ft)	1.88	Flow Area (sq ft)		41152.88	
E.G. Slope (ft/ft)	0.000015	Area (sq ft)	354.35	67958.23	1184.54
Q Total (cfs)	42800.00	Flow (cfs)		42800.00	
Top Width (ft)	4615.28	Top Width (ft)	84.17	4391.75	139.36
Vel Total (ft/s)	1.04	Avg. Vel. (ft/s)		1.04	
Max Chl Dpth (ft)	24.50	Hydr. Depth (ft)		15.62	
Conv. Total (cfs)	10895820.0	Conv. (cfs)			

10895820.0

Length Wtd. (ft)	592.39	Wetted Per. (ft)			2642.42
Min Ch El (ft)	-3.85	Shear (lb/sq ft)			0.02
Alpha	1.00	Stream Power (lb/ft s)			0.02
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	8.52	839.42	53.14
C & E Loss (ft)	0.00	Cum SA (acres)	1.88	53.62	6.25

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 5333

INPUT
Description:
Station Elevation Data num= 113

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	12.23	22.15	14.59	21.15	23.42	18.15	26.93	17.15
30.68	16.15	34.49	15.15	41.48	14.15	48.41	13.15	56.22	12.15
57.11	12.08	69.03	11.15	87.66	10.15	101.96	9.15	115.82	8.15
129.67	7.15	141.97	6.15	151.79	5.15	161.54	4.15	170.25	3.15
178.96	2.15	198.59	1.15	278.77	1.15	312.94	2.15	326.16	3.15
333.36	4.15	412.15	4.15	438.65	3.15	443.36	2.15	456.16	1.15
521.64	3.15	526.95	4.15	539.2	5.15	573.21	6.15	724.42	7.15
734.29	7.15	1059.37	7.15	1066	6.15	1068.73	5.15	1071.38	4.15
1076.82	3.15	1091.51	2.15	1132.22	2.15	1169	3.15	1182.6	4.15
1186.4	5.15	1214	5.15	1383.6	5.15	1408	4.15	1415.4	3.15
1430.8	2.15	1470.9	2.15	1485.5	5.15	1500.75	6.15	1702.7	7.15
1724	8.15	1729.26	9.15	1736.2	10.15	1745.14	10.15	1749.15	9.15
1752.7	8.15	1755.34	7.15	1765.93	5.15	1781.5	4.15	1799.94	3.15
1812.53	2.15	1833.88	.15	1850.12	.15	1858.45	-1.85	1997.5	-1.85
2012.7	-.85	2083.7	.15	2135.8	-1.85	2295.3	-1.85	2315.42	.15
2349.9	1.15	2397.2	2.15	2433.17	3.15	2466.5	4.15	2497.88	5.15
2513.2	9.15	2536.14	10.15	2553	18.15	2577	18.15	2611.6	7.15
2745	6.4	2888.3	6.15	3001.2	5.4	3029.3	5.15	3033.5	3.15
3039	2.15	3052.25	1.15	3070	.15	3088.8	-.85	3117.6	-1.85
3155.9	-1.85	3164.9	-.85	3173.7	.15	3183.5	1.15	3192.4	2.15
3194.4	3.15	3200.1	6.15	3286.9	7.15	3292	8.15	3297.1	9.15
3327.6	10.15	3369.3	10.15	3380.1	11.15	3385.8	13.15	3389.76	14.15
3418.9	12.15	3536.6	12.15	4401.26	12.15				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	57.11	.035	3536.6	.05

Bank Sta: Left Right Coeff Contr. Expan.

57.11 3536.6 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	20.66	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.050	0.035
0.050				
W.S. Elev (ft)	20.65	Reach Len. (ft)		
Crit W.S. (ft)	3.71	Flow Area (sq ft)	214.30	55275.19
7349.61				
E.G. Slope (ft/ft)	0.000007	Area (sq ft)	214.30	55275.19
7349.61				
Q Total (cfs)	42800.00	Flow (cfs)	51.32	40288.46
2460.22				
Top Width (ft)	4385.20	Top Width (ft)	41.05	3479.49
864.66				
Vel Total (ft/s)	0.68	Avg. Vel. (ft/s)	0.24	0.73
0.33				
Max Chl Dpth (ft)	22.50	Hydr. Depth (ft)	5.22	15.89
8.50				
Conv. Total (cfs)	15723180.0	Conv. (cfs)	18854.9	
14800530.0 903794.3				
Length Wtd. (ft)		Wetted Per. (ft)	42.07	3489.80
873.16				
Min Ch El (ft)	-1.85	Shear (lb/sq ft)	0.00	0.01
0.00				
Alpha	1.09	Stream Power (lb/ft s)	0.00	0.01
0.00				
Frctn Loss (ft)		Cum Volume (acre-ft)		
C & E Loss (ft)		Cum SA (acres)		

SUMMARY OF MANNING'S N VALUES

River:San Dieguito Riv

Reach	River Sta.	n1	n2	n3
1	13555	.035	.05	.035
1	11854	.05	.035	.05
1	10577	.05	.035	.05
1	9777	.05	.035	.05
1	9274	.05	.035	.05
1	8043	.05	.035	.05
1	7554	.05	.035	.05
1	7286	.05	.035	.05
1	7000	Bridge		
1	6809	.05	.035	.05
1	6661	.05	.035	.05
1	6437	.05	.035	.05
1	5926	.05	.035	.05
1	5333	.05	.035	.05

SUMMARY OF REACH LENGTHS

River: San Dieguito Riv

Reach	River Sta.	Left	Channel	Right
1	13555	1909.77	1701.26	1796
1	11854	743.4	1277.32	1429.64
1	10577	809.4	800.27	1102.6
1	9777	275.06	502.66	1232.3
1	9274	1312.7	1232.14	731.7
1	8043	2307.4	488.53	209.2
1	7554	1488	268.5	1186.87
1	7286	640.24	476.55	543.46
1	7000	Bridge		
1	6809	1290.06	147.74	464.74
1	6661	321.4	224.95	198.11
1	6437	407.84	510.16	564.9
1	5926	1306.04	593.43	542.48
1	5333			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: San Dieguito Riv

Reach	River Sta.	Contr.	Expan.
1	13555	.1	.3
1	11854	.1	.3
1	10577	.1	.3
1	9777	.1	.3
1	9274	.1	.3
1	8043	.1	.3
1	7554	.1	.3
1	7286	.1	.3
1	7000	Bridge	
1	6809	.1	.3
1	6661	.1	.3
1	6437	.1	.3
1	5926	.1	.3
1	5333	.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.
E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	
(ft)	(ft/ft)	(ft/s)	(cfs) (sq ft)	(ft) (ft)	(ft)	(ft)
1	13555	PF 1	42800.00	8.82	21.90	
22.53	0.002097	7.30	7327.79	1545.94	0.36	
1	11854	PF 1	42800.00	3.15	21.57	
21.65	0.000172	2.24	19146.98	2384.79	0.14	
1	10577	PF 1	42800.00	2.15	21.43	
21.49	0.000084	1.96	22075.41	1983.64	0.10	
1	9777	PF 1	42800.00	-3.85	21.43	

	21.45	0.000023	1.14	37899.54	2926.93	0.06	
1		9274	PF 1	42800.00	2.15	21.41	
	21.44	0.000029	1.20	36388.65	3139.81	0.06	
1		8043	PF 1	42800.00	-0.85	21.39	7.34
	21.41	0.000019	1.11	45839.52	4324.42	0.05	
1		7554	PF 1	42800.00	-0.85	21.34	7.18
	21.38	0.000049	1.67	25614.39	5852.95	0.08	
1		7286	PF 1	42800.00	-1.85	20.98	13.65
	21.31	0.000405	5.25	10598.38	5229.85	0.24	
1		7000		Bridge			
1		6809	PF 1	42800.00	-1.85	20.54	10.81
	20.78	0.000287	3.96	11083.44	4479.15	0.19	
1		6661	PF 1	42800.00	-1.85	20.61	8.37
	20.71	0.000106	2.55	16776.90	4474.32	0.12	
1		6437	PF 1	42800.00	-3.85	20.65	2.90
	20.68	0.000031	1.54	27770.76	4397.55	0.07	
1		5926	PF 1	42800.00	-3.85	20.65	1.88
	20.67	0.000015	1.04	41152.88	4615.28	0.05	
1		5333	PF 1	42800.00	-1.85	20.65	3.71
	20.66	0.000007	0.73	62839.10	4385.20	0.03	

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : SD_Existing

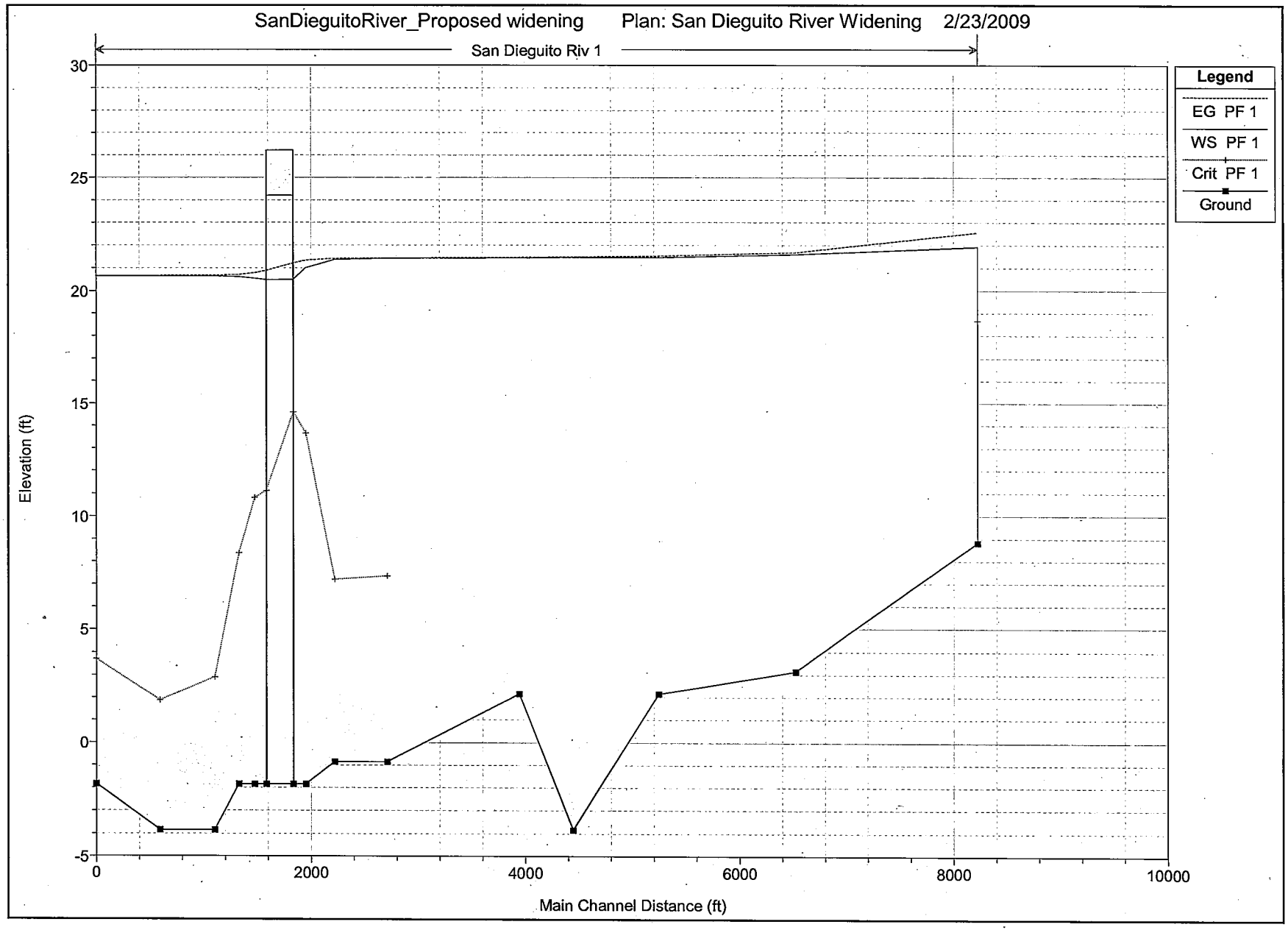
River: San Dieguito Riv Reach: 1 RS: 13555 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: San Dieguito Riv Reach: 1 RS: 11854 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: San Dieguito Riv Reach: 1 RS: 10577 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: San Dieguito Riv Reach: 1 RS: 8043 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: San Dieguito Riv Reach: 1 RS: 7554 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: San Dieguito Riv Reach: 1 RS: 7286 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: San Dieguito Riv Reach: 1 RS: 7000 Profile: PF 1 Upstream
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: San Dieguito Riv Reach: 1 RS: 7000 Profile: PF 1 Downstream
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: San Dieguito Riv Reach: 1 RS: 6809 Profile: PF 1
Warning:The cross-section end points had to be extended vertically for the computed water surface.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: San Dieguito Riv Reach: 1 RS: 6661 Profile: PF 1
Warning:The cross-section end points had to be extended vertically for the computed water surface.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: San Dieguito Riv Reach: 1 RS: 6437 Profile: PF 1
Warning:The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: San Dieguito Riv Reach: 1 RS: 5926 Profile: PF 1
Warning:The cross-section end points had to be extended vertically for the computed water surface.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.

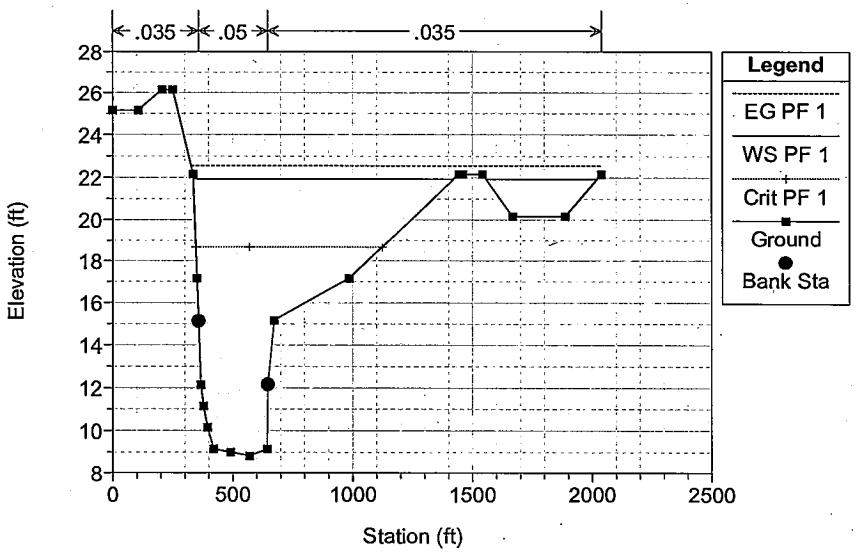
PROSPOSED

HEC-RAS Plan: SD_Widening River: San Dieguito Riv Reach: 1 Profile: PF 1

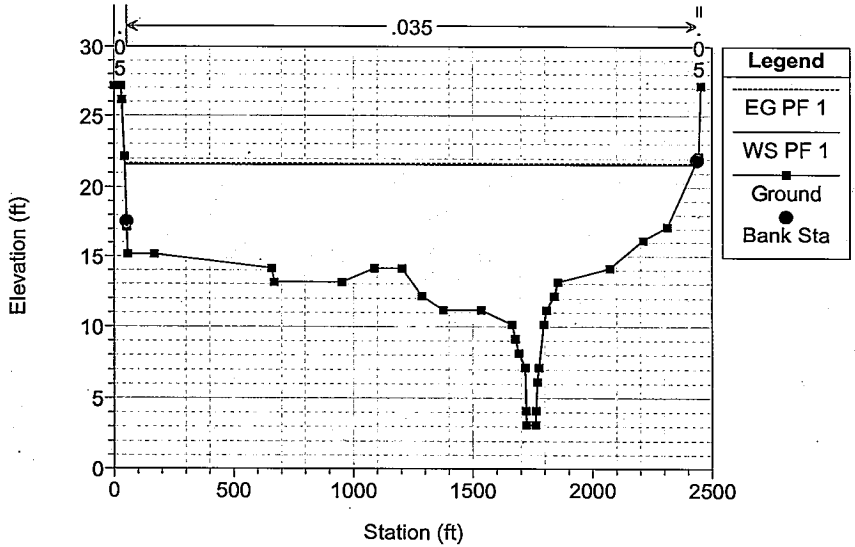
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	13555	PF 1	42800.00	8.82	21.92	18.67	22.54	0.002078	7.27	7357.32	1550.39	0.36
1	11854	PF 1	42800.00	3.15	21.59		21.67	0.000171	2.23	19202.14	2385.45	0.14
1	10577	PF 1	42800.00	2.15	21.46		21.52	0.000084	1.96	22123.38	1983.80	0.10
1	9777	PF 1	42800.00	-3.85	21.45		21.47	0.000023	1.14	37970.54	2927.13	0.06
1	9274	PF 1	42800.00	2.15	21.44		21.46	0.000028	1.20	36465.16	3140.49	0.06
1	8043	PF 1	42800.00	-0.85	21.41	7.34	21.43	0.000019	1.11	45930.93	4324.78	0.05
1	7554	PF 1	42800.00	-0.85	21.36	7.18	21.41	0.000049	1.67	25661.82	5853.13	0.08
1	7286	PF 1	42800.00	-1.85	21.00	13.65	21.33	0.000402	5.23	10622.10	5230.40	0.24
1	7000		Bridge									
1	6809	PF 1	42800.00	-1.85	20.54	10.81	20.78	0.000287	3.96	11083.44	4479.15	0.19
1	6661	PF 1	42800.00	-1.85	20.61	8.37	20.71	0.000106	2.55	16776.90	4474.32	0.12
1	6437	PF 1	42800.00	-3.85	20.65	2.90	20.68	0.000031	1.54	27770.76	4397.55	0.07
1	5926	PF 1	42800.00	-3.85	20.65	1.88	20.67	0.000015	1.04	41152.88	4615.28	0.05
1	5333	PF 1	42800.00	-1.85	20.65	3.71	20.66	0.000007	0.73	62839.10	4385.20	0.03


SanDieguitoRiver_Proposed widening
Plan: San Dieguito River Widening
2/23/2009
San Dieguito Riv 1
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
30
25
20
15
10
5
0
-5
0
2000
4000
6000
8000
10000
Main Channel Distance (ft)

SanDieguitoRiver_Proposed widening Plan: San Dieguito River Widening 2/23/2009



SanDieguitoRiver_Proposed widening Plan: San Dieguito River Widening 2/23/2009



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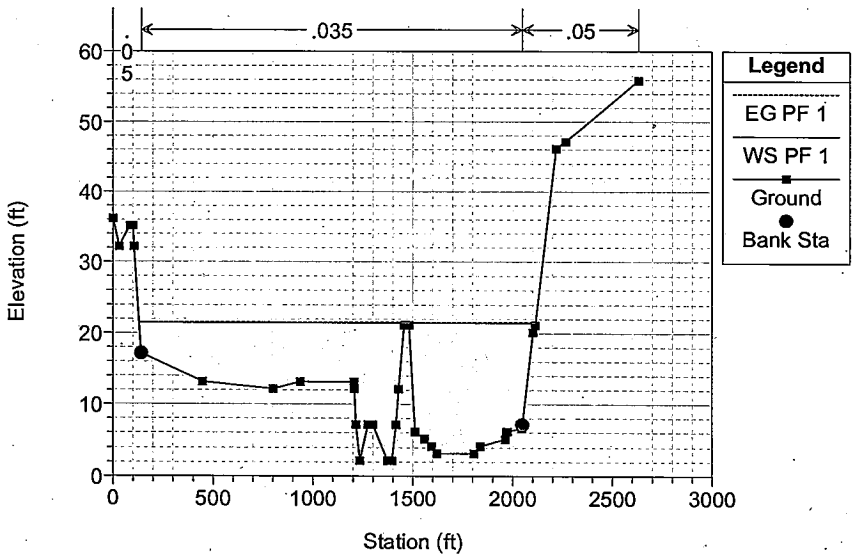

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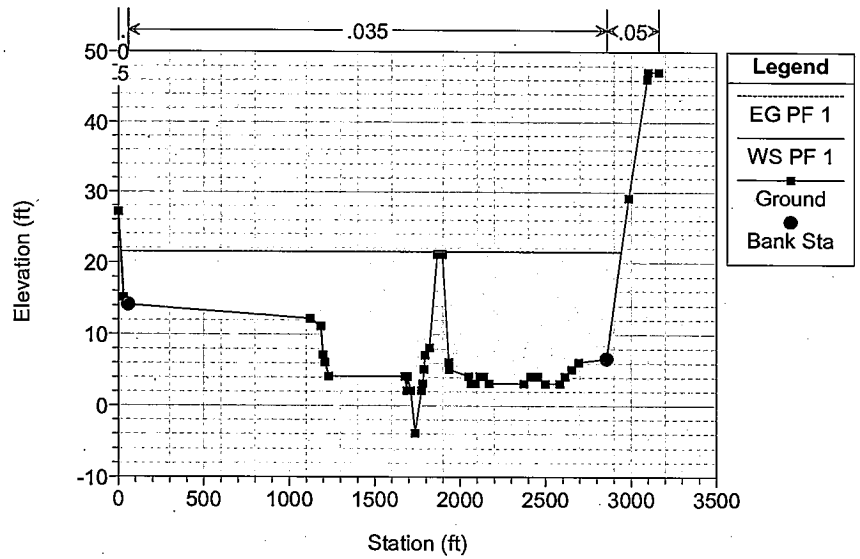

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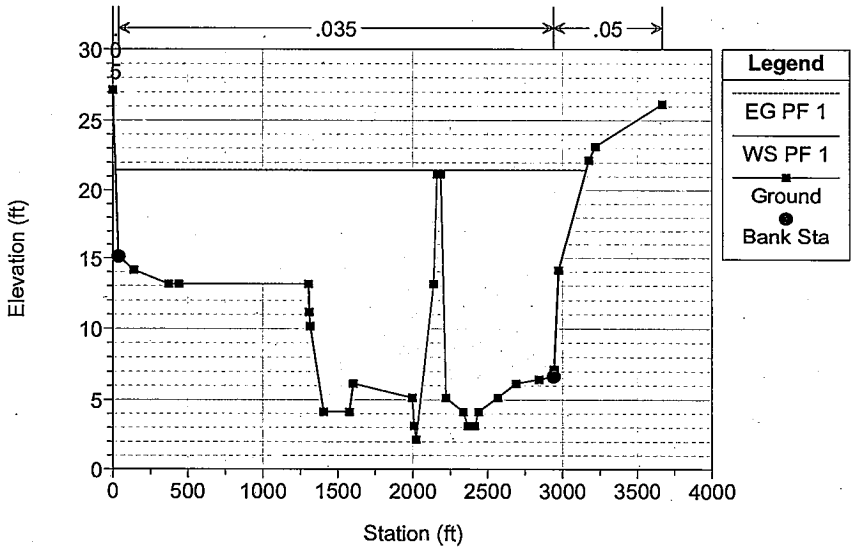

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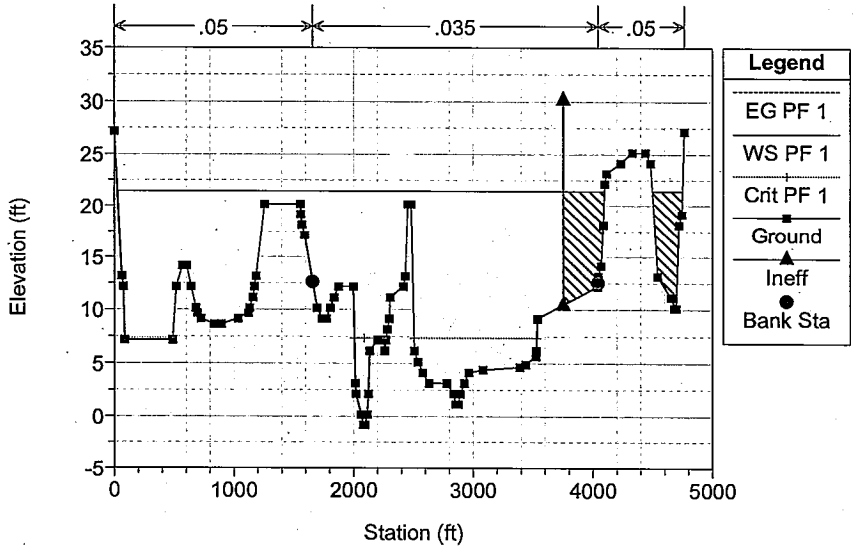
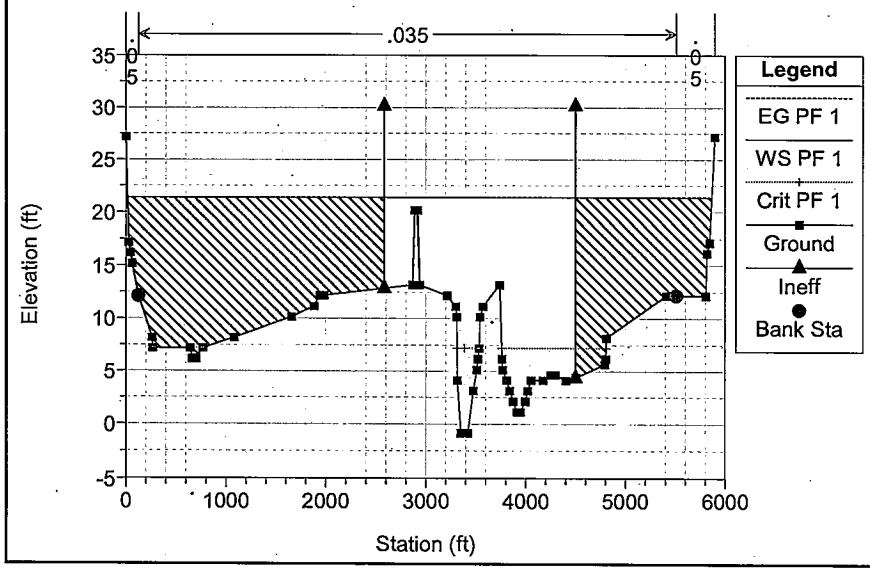
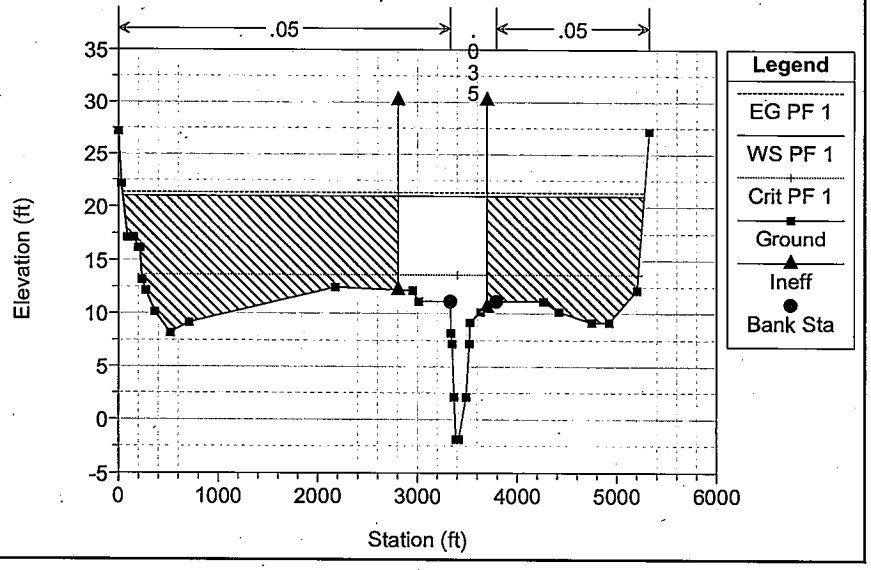


SanDieguitoRiver_Proposed widening Plan: San Dieguito River Widening 2/23/2009

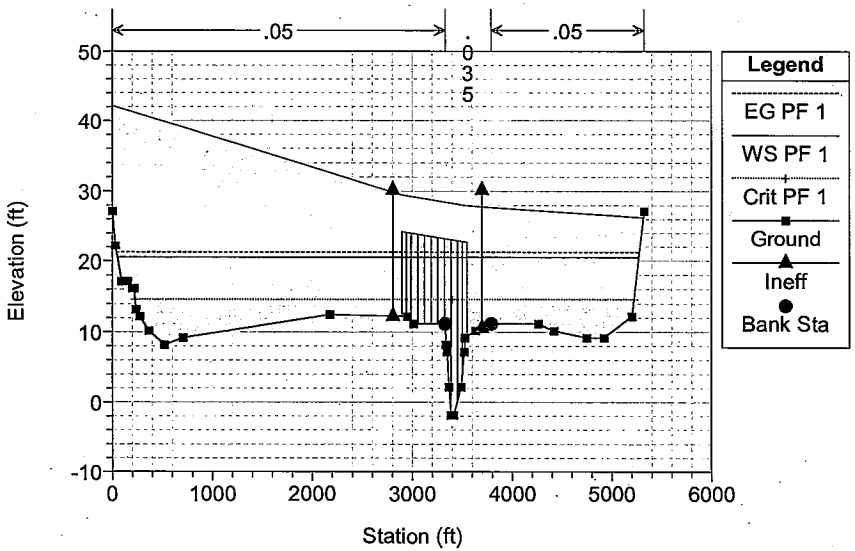


SanDieguitoRiver_Proposed widening Plan: San Dieguito River Widening 2/23/2009

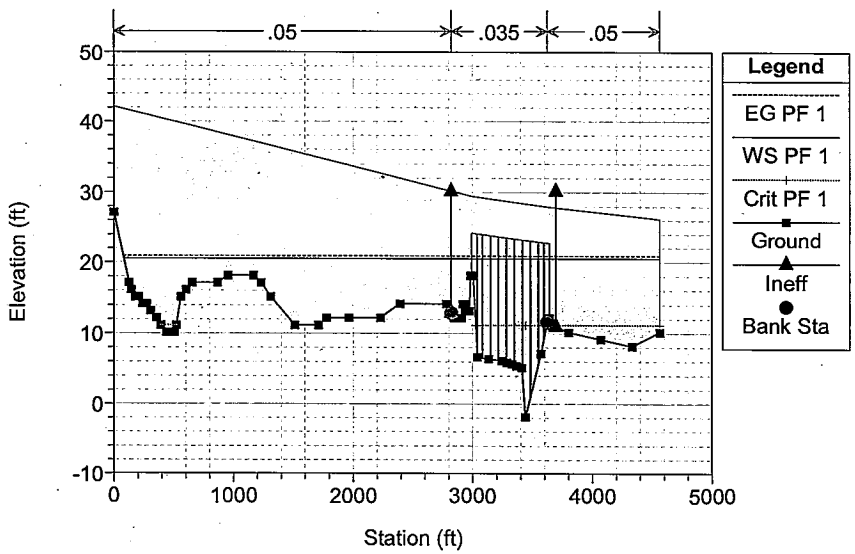
Upstream of I-5



SanDieguitoRiver_Proposed widening Plan: San Dieguito River Widening 2/23/2009

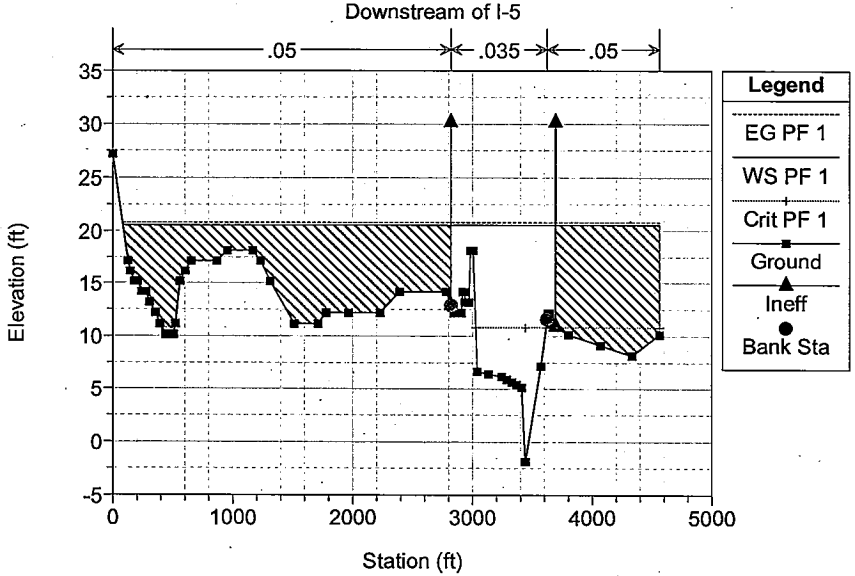


SanDieguitoRiver_Proposed widening Plan: San Dieguito River Widening 2/23/2009



SanDieguitoRiver_Proposed widening Plan: San Dieguito River Widening 2/23/2009

Downstream of I-5



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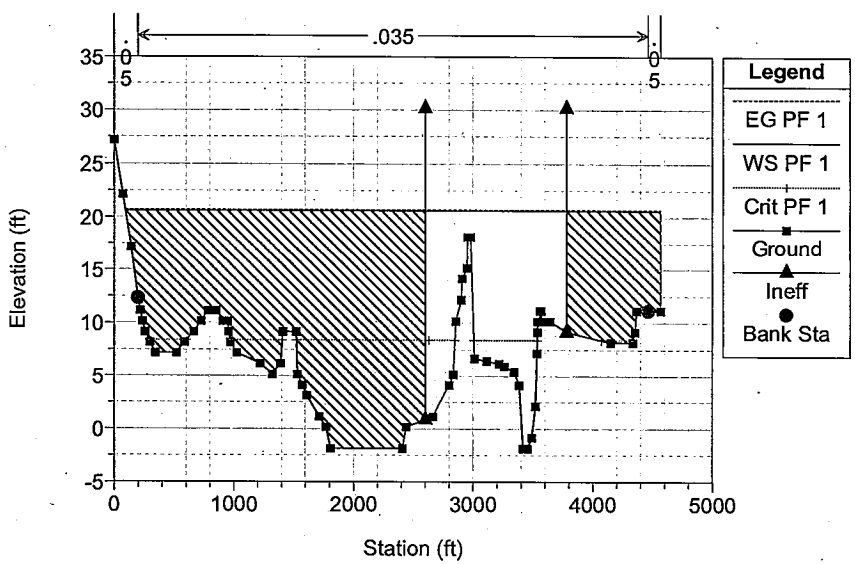
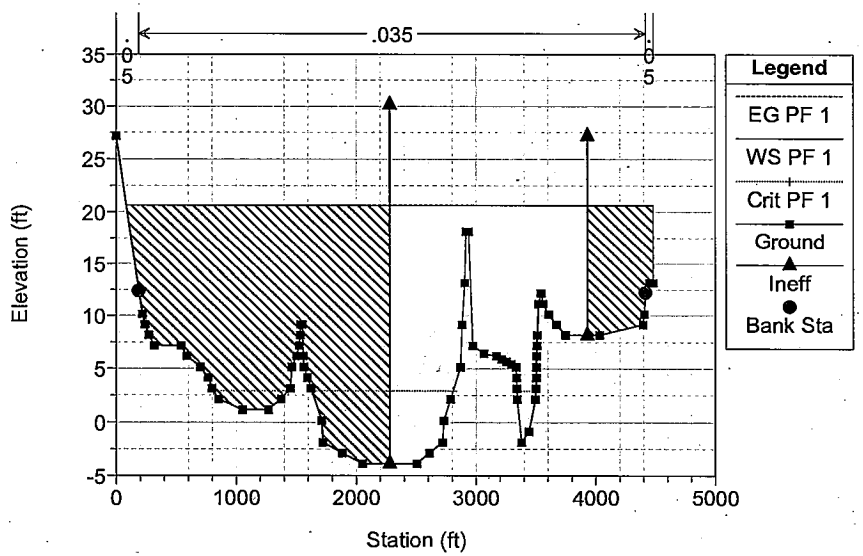


SanDieguitoRiver_Proposed widening Plan: San Dieguito River Widening 2/23/2009



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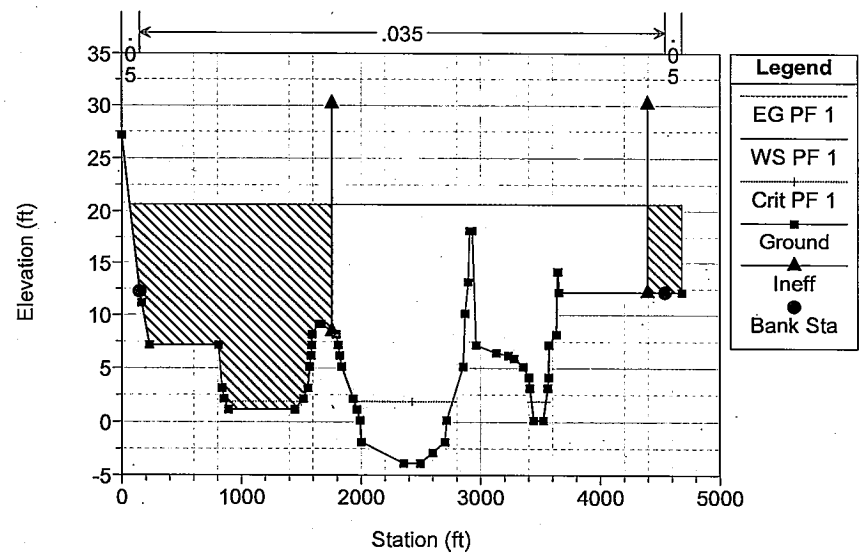

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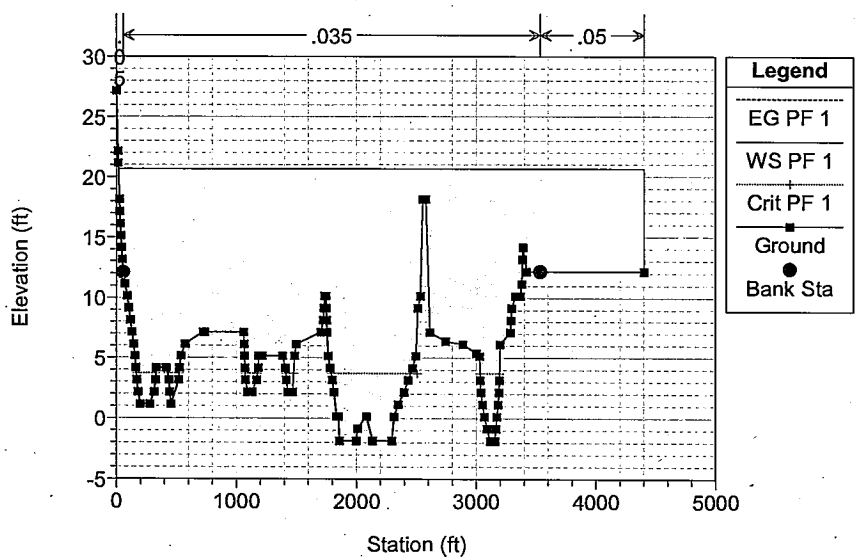

SDR_Prop1.rep

HEC-RAS Version 4.0 Beta
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X       X
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PROJECT DATA
Project Title: SanDieguitoRiver_Proposed widening
Project File : SDR_Prop1.prj
Run Date and Time: 2/23/2009 11:10:38 AM

Project in English units

Project Description:
San Diego River Proposed Conditions Model widening

PLAN DATA

Plan Title: San Dieguito River Widening
Plan File : i:\Hydraulics\Employee folders\Waldo\I-5\235800 San Diegito LHS\Proposed_2008 model\SDR_Prop1.p01

Geometry Title: San Dieguito Geometry
Geometry File : i:\Hydraulics\Employee folders\Waldo\I-5\235800 San Diegito LHS\Proposed_2008 model\SDR_Prop1.g02

Flow Title : 100-yr Storm
Flow File : i:\Hydraulics\Employee folders\Waldo\I-5\235800 San Diegito LHS\Proposed_2008 model\SDR_Prop1.f01

Plan Summary Information:

Number of:	Cross Sections =	13	Multiple Openings =	0
	Culverts =	0	Inline Structures =	0
	Bridges =	1	Lateral Structures =	0

Computational Information

Water surface calculation tolerance =	0.01
Critical depth calculation tolerance =	0.01
Maximum number of iterations =	20
Maximum difference tolerance =	0.3
Flow tolerance factor =	0.001

Computation Options

Critical depth computed only where necessary	
Conveyance Calculation Method:	At breaks in n values only
Friction Slope Method:	Average Conveyance
Computational Flow Regime:	Mixed Flow

FLOW DATA

Flow Title: 100-yr Storm
Flow File : i:\Hydraulics\Employee folders\Waldo\I-5\235800 San Diegito LHS\Proposed_2008 model\SDR_Prop1.f01

Flow Data (cfs)

River	Reach	RS	PF 1
San Dieguito Riv	1	13555	42800

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
San Dieguito Riv	1	PF 1	Normal S = 0.003491	Known WS = 20.65

GEOMETRY DATA

Geometry Title: San Dieguito Geometry
Geometry File : i:\Hydraulics\Employee folders\Waldo\I-5\235800 San Diegito LHS\Proposed_2008 model\SDR_Prop1.g02

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 13555

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	25.15	107.46	25.15	206.93	26.15	250.4	26.15	335.53	22.15
351.26	17.15	358.1	15.12	368.13	12.15	378.5	11.15	394.04	10.15
420.06	9.15	490.28	8.99	570.6	8.82	643.38	9.15	646.03	12.15
646.14	12.16	673.89	15.15	985.5	17.15	1443.3	22.15	1460.3	22.15
1542.76	22.15	1668.5	20.15	1886.9	20.15	2038.21	22.15		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	358.1	.05	646.14	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
358.1	646.14	1909.77	1701.26	1796	.1	.3

CROSS SECTION

RIVER: San Dieguito Riv

REACH: 1 RS: 11854

INPUT
Description:
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	28.1	27.15	32.14	26.15	42.95	22.15	51.82	17.53
52.56	17.15	55.9	15.15	168.07	15.15	658.24	14.15	669.88	13.15
952.46	13.15	1088.3	14.15	1203.7	14.15	1286.3	12.15	1375.8	11.15
1534.6	11.15	1662.7	10.15	1676.7	9.15	1690.7	8.15	1718.1	7.15
1722.5	4.15	1722.9	3.15	1762.7	3.15	1763.3	4.15	1768.6	6.15
1775.5	7.15	1795.9	10.15	1808.6	11.15	1840.3	12.15	1854.8	13.15
2072.8	14.15	2211.7	16.15	2312	17.15	2437.3	21.89	2444.1	22.15
2453.2	27.15								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	51.82	.035	2437.3	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
51.82	2437.3	743.4	1277.32	1429.64	.1	.3

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 10577

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	36.15	31.06	32.15	85.1	35.15	99.31	35.15	105.25	32.15
140.4	17.15	141.3	17.14	447.3	13.15	801.3	12.15	937.27	13.15
1204.85	13.15	1206.5	12.15	1214.63	7.15	1234.32	2.15	1276.78	7.15
1299.53	7.15	1373.48	2.15	1395.61	2.15	1416.5	7.15	1429.3	12.15
1456.45	21.15	1481.4	21.15	1511.6	6.15	1557.57	5.15	1593.2	4.15
1620.1	3.15	1805.7	3.15	1838.5	4.15	1963.8	5.15	1968.5	6.15
1974.81	6.19	2046.4	6.65	2048.6	7.15	2102.2	20.15	2112.8	21.15
2218.1	46.15	2265.5	47.15	2631.9	55.9				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	141.3	.035	2048.6	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
141.3	2048.6	809.4	800.27	1102.6	.1	.3

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 9777

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	30.95	15.15	54.91	14.15	58.3	14.14	1123.5	12.15
1184.5	11.15	1197.24	7.15	1209.17	6.15	1231.8	4.15	1677.1	4.15
1688	2.15	1692.1	4.15	1710.9	2.15	1737.4	-3.85	1774.96	2.15
1781	3.15	1789.4	5.15	1794.75	7.15	1820.72	8.15	1866.86	21.15
1895.9	21.15	1933.7	6.15	1936.23	5.15	2050.3	4.15	2063.4	3.15

2089.7	3.15	2115.8	4.15	2138.5	4.15	2170.15	3.15	2373.15	3.15
2412.9	4.15	2454.8	4.15	2499.7	3.15	2583.1	3.15	2613.6	4.15
2653.2	5.15	2694.5	6.15	2858.2	6.65	2985.3	29.15	3093.6	46.15
3099.4	47.15	3162.5	47.15						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	58.3	.035	2858.2	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
58.3	2858.2	275.06	502.66	1232.3	.1	.3

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 9274

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	35.56	15.15	39.41	15.11	140.5	14.15	371.23	13.15
439.61	13.15	1303.78	13.15	1308.9	11.15	1315.5	10.15	1404.87	4.15
1576.24	4.15	1603.44	6.15	1995.8	5.15	2007.7	3.15	2020.86	2.15
2139.86	13.15	2163.86	21.15	2187.6	21.15	2221.67	5.15	2336.54	4.15
2367.4	3.15	2413.2	3.15	2439.73	4.15	2569.23	5.15	2690.41	6.15
2842.6	6.45	2941.04	6.65	2943.34	7.15	2975.22	14.15	3175.2	22.15
3221.3	23.15	3667.16	26.15						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	39.41	.035	2941.04	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
39.41	2941.04	1312.7	1232.14	731.7	.1	.3

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 8043

INPUT
Description:
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	62.22	13.15	74.73	12.15	85.25	7.15	487.65	7.15
518.99	12.15	569.67	14.15	603.2	14.15	641.2	12.15	680.13	10.15
694.2	9.65	723.27	9.15	835.32	8.65	895.2	8.65	1035.07	9.15
1122.48	9.65	1133.08	10.15	1157.48	11.15	1173.42	12.15	1186.2	13.15
1258.6	20.15	1554.5	20.15	1558.15	19.15	1569.75	18.15	1589.55	17.15
1658.12	12.61	1695.25	10.15	1737.04	9.15	1773.32	9.15	1804.64	10.15
1837.5	11.15	1874.73	12.15	1999	12.15	2013.6	3.15	2018.66	2.15
2064.02	.15	2081.34	-.85	2095.44	-.85	2114	.15	2124.8	2.15
2135.93	6.15	2201.8	7.15	2254.16	7.15	2257.7	6.15	2261.5	6.15
2269.6	7.15	2283.66	8.15	2297.74	9.15	2306.7	11.15	2416.28	12.15
2433.2	13.15	2454.9	20.15	2479.9	20.15	2508.7	6.15	2536.9	5.15
2577.1	4.15	2631.8	3.15	2778.9	3.15	2838.7	2.15	2851.6	1.15
2876.3	1.15	2892	2.15	2925.8	3.15	2963	4.15	3082.9	4.4
3390.5	4.65	3438.4	4.9	3525.7	5.65	3527.9	6.15	3536.9	9.15
4040.3	12.15	4041.93	12.52	4044.7	13.15	4070.5	14.15	4089	18.15
4099.1	22.15	4113.6	23.15	4233	24.15	4329.3	25.15	4440.4	25.15

4482.8	24.15	4540.3	13.15	4654.9	11.15	4679.5	10.15	4698.2	10.15
4720	18.15	4744.7	19.15	4763.9	27.15				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	1658.12	.035	4041.93	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1658.12	4041.93	2307.4	488.53	209.2	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
3751.6	4763.9	30.15	F

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 7554

INPUT
Description:
Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	24.6	17.15	43.18	16.15	61.65	15.15	123.29	12.15
124.7	12.11	260.4	8.15	267.1	7.15	643.5	7.15	664.43	6.15
700.15	6.15	770.57	7.15	1082.9	8.15	1658.3	10.15	1883.38	11.15
1941.3	12.15	1982.75	12.15	2869.01	13.15	2890.66	20.15	2916.55	20.15
2937.5	13.15	3213.55	12.15	3298.6	11.15	3309.46	10.15	3316.15	4.15
3351.45	-.85	3422.24	-.85	3475.66	3.15	3512.81	5.15	3522.14	6.15
3533.5	7.15	3543.4	10.15	3572.5	11.15	3740.1	13.15	3761.82	6.15
3768.26	5.15	3810.92	4.15	3839.42	3.15	3875.07	2.15	3912.65	1.15
3951.15	1.15	3998.98	2.15	4020.72	3.15	4055.98	4.15	4175.53	4.15
4251.33	4.65	4298.37	4.65	4402.94	4.15	4505.84	4.4	4792.97	5.65
4801.01	6.15	4807.62	8.15	5412.03	12.15	5422.07	12.15	5510.17	12.15
5806.56	12.15	5820.13	16.15	5846.91	17.15	5895.44	27.15		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	124.7	.035	5510.17	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
124.7	5510.17	1488	268.5	1186.87	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	2585.15	30.15	F
4501.6	5895.44	30.15	F

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 7286

INPUT
Description: Upstream of I-5
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	28.7	22.15	90.97	17.15	151.8	17.15	200.45	16.15
214.97	16.15	235.46	13.15	272.24	12.15	362.6	10.15	520.8	8.15
709.55	9.15	2176.6	12.46	2950.71	12.15	3013.37	11.15	3332.23	11.15
3336.33	8.15	3346.62	7.15	3365.89	2.15	3387.5	-1.85	3415.73	-1.85
3487.71	2.15	3521.96	7.15	3527.4	9.15	3632.52	10.15	3792.9	11.15
4264.36	11.15	4420.07	10.15	4747.1	9.15	4922.14	9.15	5200.71	12.15

```
 5323.83   27.15

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05 3332.23    .035  3792.9     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       3332.23  3792.9           640.24  476.55  543.46              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  2806.4   30.15        F
  3698.4 5323.83   30.15        F

BRIDGE


RIVER: San Dieguito Riv
REACH: 1                    RS: 7000

INPUT
Description:
Distance from Upstream XS =   116.5
Deck/Roadway Width        =  252.95
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0   42.15    2.15  2896.7   29.45    2.15  2896.7   29.45    24.2
  3546.2   27.95    22.7  3546.2   27.95    2.15    5400   26.15    2.15

Upstream Bridge Cross Section Data
Station Elevation Data    num=      31
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   27.15    28.7   22.15   90.97   17.15   151.8   17.15  200.45   16.15
  214.97   16.15  235.46   13.15  272.24   12.15   362.6   10.15   520.8    8.15
  709.55    9.15  2176.6   12.46 2950.71   12.15 3013.37   11.15 3332.23   11.15
 3336.33    8.15 3346.62    7.15 3365.89    2.15  3387.5   -1.85 3415.73   -1.85
 3487.71    2.15 3521.96    7.15  3527.4    9.15 3632.52   10.15  3792.9   11.15
 4264.36   11.15 4420.07   10.15  4747.1    9.15 4922.14    9.15 5200.71   12.15
 5323.83   27.15

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05 3332.23    .035  3792.9     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
       3332.23  3792.9             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  2806.4   30.15        F
  3698.4 5323.83   30.15        F

Downstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0   42.15    2.15    2990   29.45    2.15    2990   29.45    24.2
  3639.5   27.95    22.7  3639.5   27.95    2.15    4600   26.15    2.15

Downstream Bridge Cross Section Data
Station Elevation Data    num=      55
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   27.15   126.5   17.15  145.53   16.15   180.9   15.15  205.46   15.15
  241.63   14.15  273.24   14.15   305.7   13.15   357.1   12.15   390.3   11.15
```

439.76	10.15	507.5	10.15	523.23	11.15	561.6	15.15	602.98	16.15
655.56	17.15	866.67	17.15	953.91	18.15	1168.1	18.15	1230.35	17.15
1311.71	15.15	1513.9	11.15	1711.72	11.15	1778	12.15	1965.24	12.15
2228.14	12.15	2391.4	14.15	2778.55	14.15	2820.77	12.86	2843.9	12.15
2909	12.15	2917.53	14.15	2933.6	14.15	2937.23	13.15	2972.3	13.15
2982	18.15	3004.52	18.15	3039.74	6.65	3134	6.4	3243.49	6.15
3287	5.9	3327.81	5.65	3367.54	5.4	3409.64	5.15	3439.04	-1.85
3441.87	-1.85	3571.57	7.15	3623.2	11.58	3629.85	12.15	3641.07	12.15
3664.4	11.15	3801.73	10.15	4069.7	9.15	4333	8.15	4562.74	10.15

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	2820.77	.035	3623.2	.05

Bank Sta: Left	Right	Coeff Contr.	Expan.
2820.77	3623.2	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	2819.9	30.15	F
3693.2	4562.74	30.15	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 28.15
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 10

Pier Data
Pier Station Upstream= 2942.7 Downstream= 3036
Upstream num= 2

Width	Elev	Width	Elev
5	-7.85	5	25.15

Downstream num= 2

Width	Elev	Width	Elev
5	-7.85	5	25.15

Pier Data
Pier Station Upstream= 2988.7 Downstream= 3082
Upstream num= 2

Width	Elev	Width	Elev
5	-7.85	5	25.15

Downstream num= 2

Width	Elev	Width	Elev
5	-7.85	5	25.15

Pier Data
Pier Station Upstream= 3055.2 Downstream= 3148.5
Upstream num= 2

Width	Elev	Width	Elev
5	-7.85	5	25.15

Downstream num= 2

Width	Elev	Width	Elev
5	-7.85	5	25.15

Pier Data
Pier Station Upstream= 3121.7 Downstream= 3215
Upstream num= 2

Width	Elev	Width	Elev
5	-7.85	5	25.15

```
Downstream      num=        2
    Width    Elev     Width    Elev
        5   -7.85         5   25.15

Pier Data
Pier Station      Upstream=  3188.2    Downstream=  3281.5
Upstream      num=        2
    Width    Elev     Width    Elev
        5   -7.85         5   25.15
Downstream      num=        2
    Width    Elev     Width    Elev
        5   -7.85         5   25.15

Pier Data
Pier Station      Upstream=  3254.7    Downstream=    3348
Upstream      num=        2
    Width    Elev     Width    Elev
        5   -7.85         5   25.15
Downstream      num=        2
    Width    Elev     Width    Elev
        5   -7.85         5   25.15

Pier Data
Pier Station      Upstream=  3321.2    Downstream=  3414.5
Upstream      num=        2
    Width    Elev     Width    Elev
        5   -7.85         5   25.15
Downstream      num=        2
    Width    Elev     Width    Elev
        5   -7.85         5   25.15

Pier Data
Pier Station      Upstream=  3387.7    Downstream=    3481
Upstream      num=        2
    Width    Elev     Width    Elev
        5   -7.85         5   25.15
Downstream      num=        2
    Width    Elev     Width    Elev
        5   -7.85         5   25.15

Pier Data
Pier Station      Upstream=  3454.2    Downstream=  3547.5
Upstream      num=        2
    Width    Elev     Width    Elev
        5   -7.85         5   25.15
Downstream      num=        2
    Width    Elev     Width    Elev
        5   -7.85         5   25.15

Pier Data
Pier Station      Upstream=  3500.2    Downstream=  3593.5
Upstream      num=        2
    Width    Elev     Width    Elev
        5   -7.85         5   25.15
Downstream      num=        2
    Width    Elev     Width    Elev
        5   -7.85         5   25.15

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
        Energy
Selected Low Flow Methods = Highest Energy Answer
```

High Flow Method
Energy Only

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 6809

INPUT
Description: Downstream of I-5
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	126.5	17.15	145.53	16.15	180.9	15.15	205.46	15.15
241.63	14.15	273.24	14.15	305.7	13.15	357.1	12.15	390.3	11.15
439.76	10.15	507.5	10.15	523.23	11.15	561.6	15.15	602.98	16.15
655.56	17.15	866.67	17.15	953.91	18.15	1168.1	18.15	1230.35	17.15
1311.71	15.15	1513.9	11.15	1711.72	11.15	1778	12.15	1965.24	12.15
2228.14	12.15	2391.4	14.15	2778.55	14.15	2820.77	12.86	2843.9	12.15
2909	12.15	2917.53	14.15	2933.6	14.15	2937.23	13.15	2972.3	13.15
2982	18.15	3004.52	18.15	3039.74	6.65	3134	6.4	3243.49	6.15
3287	5.9	3327.81	5.65	3367.54	5.4	3409.64	5.15	3439.04	-1.85
3441.87	-1.85	3571.57	7.15	3623.2	11.58	3629.85	12.15	3641.07	12.15
3664.4	11.15	3801.73	10.15	4069.7	9.15	4333	8.15	4562.74	10.15

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	2820.77	.035	3623.2	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
2820.77	3623.2	1290.06	147.74	464.74	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	2819.9	30.15	F
3693.2	4562.74	30.15	F

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 6661

INPUT
Description:
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	73.26	22.15	142.34	17.15	198.2	12.33	200.3	12.15
217.16	11.15	237.34	10.15	256.86	9.15	298.5	8.15	342.19	7.15
519.66	7.15	587.23	8.15	666.14	9.15	727.86	10.15	782.23	11.15
854.16	11.15	910.44	10.15	948.9	10.15	956.1	9.15	970.03	8.15
1025.92	7.15	1219.7	6.15	1323.3	5.15	1392.11	6.15	1411.7	9.15
1519.6	9.15	1532.02	5.15	1571.5	4.15	1609.72	3.15	1713.8	1.15
1769.85	.15	1807.76	-1.85	2408.16	-1.85	2440.8	.15	2663.86	1.15
2799.43	4.15	2835.33	5.15	2856.62	10.15	2901.3	12.15	2911.1	14.15
2950.5	15.15	2956.5	18.15	2979.06	18.15	3013.35	6.65	3114.64	6.4

3217.61	6.15	3261.71	5.9	3341.87	5.4	3386.06	4.15	3416.07	-1.85
3454.32	-1.85	3491.1	-.85	3522.46	2.15	3535.54	7.15	3537.58	9.15
3542.05	10.15	3557.3	10.15	3559.85	11.15	3567.6	11.15	3573.34	10.15
3642.5	10.15	3782.9	9.15	4150.47	8.15	4334.46	8.15	4352.2	9.15
4366.54	11.15	4463.3	11.15	4568.81	11.15				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	198.2	.035	4463.3	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
198.2	4463.3	321.4	224.95	198.11	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	2600.8	30.15	F
3781.1	4568.81	30.15	F

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 6437

INPUT
Description:
Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	187.11	12.37	189.89	12.15	216.55	10.15	238.46	9.15
270.9	8.15	315.41	7.15	539.57	7.15	587.06	6.15	700.85	5.15
764.94	4.15	796.11	3.15	852.9	2.15	1052.61	1.15	1267.8	1.15
1374.3	2.15	1452.16	3.15	1464.83	5.15	1502.5	6.15	1527.05	7.15
1534.75	8.15	1536.88	9.15	1549.3	9.15	1558.97	6.15	1563.23	5.15
1593.09	4.15	1622.57	3.15	1710.81	.15	1723.2	-1.85	1882.87	-2.85
2052.23	-3.85	2504.34	-3.85	2609.73	-2.85	2719.26	-1.85	2731.25	.15
2786.37	2.15	2868.96	5.15	2883.54	9.15	2905.7	13.15	2916.5	18.15
2938.43	18.15	2971.43	7.15	3066.53	6.4	3169.5	6.15	3213.73	5.9
3254.05	5.65	3293.22	5.4	3333.3	5.15	3337.5	4.15	3338.3	3.15
3341.82	2.15	3378.75	-1.85	3442.34	-.85	3495.5	2.15	3500.85	3.15
3502.14	4.15	3504.38	5.15	3506.07	6.15	3507.55	7.15	3511	8.15
3521.75	11.15	3539.68	12.15	3544.12	12.15	3556.04	11.15	3605.61	10.15
3671.64	9.15	3747.43	8.15	4032.7	8.15	4392.9	9.15	4405.25	10.15
4414.57	12.15	4415.52	12.18	4446.25	13.15	4479.88	13.15		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	187.11	.035	4415.52	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
187.11	4415.52	407.84	510.16	564.9	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	2279.4	30.15	F
3929.86	4479.88		F

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 5926

INPUT
Description:
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	149.15	12.23	149.9	12.15	166.22	11.15	230.5	7.15
807.3	7.15	836.52	3.15	853.84	2.15	890.9	1.15	1444.82	1.15
1519.4	2.15	1557.1	3.15	1569.84	5.15	1582.3	6.15	1588.77	7.15
1591.2	8.15	1649.7	9.15	1664.55	9.15	1791.1	8.15	1807.1	7.15
1821.5	6.15	1836.7	5.15	1933.9	2.15	1962.2	1.15	1989.6	.15
2002.2	-1.85	2354.9	-3.85	2493.3	-3.85	2598.6	-2.85	2701	-1.85
2713.5	.15	2852.92	5.15	2870	10.15	2896.14	13.15	2906.6	18.15
2928.7	18.15	2962.1	7.15	3129.9	6.4	3232.55	6.15	3277.77	5.9
3356.66	5.15	3401.44	4.15	3408.4	3.15	3441.6	.15	3522	.15
3560.44	3.15	3567.4	4.15	3571	7.15	3630.7	8.15	3642	14.15
3644.9	14.15	3653.65	12.15	4540.9	12.15	4680.26	12.15		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	149.15	.035	4540.9	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
149.15	4540.9	1306.04	593.43	542.48	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	1758.1	30.15	F
4392.9	4680.26	30.15	F

CROSS SECTION

RIVER: San Dieguito Riv
REACH: 1 RS: 5333

INPUT
Description:
Station Elevation Data num= 113

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	27.15	12.23	22.15	14.59	21.15	23.42	18.15	26.93	17.15
30.68	16.15	34.49	15.15	41.48	14.15	48.41	13.15	56.22	12.15
57.11	12.08	69.03	11.15	87.66	10.15	101.96	9.15	115.82	8.15
129.67	7.15	141.97	6.15	151.79	5.15	161.54	4.15	170.25	3.15
178.96	2.15	198.59	1.15	278.77	1.15	312.94	2.15	326.16	3.15
333.36	4.15	412.15	4.15	438.65	3.15	443.36	2.15	456.16	1.15
521.64	3.15	526.95	4.15	539.2	5.15	573.21	6.15	724.42	7.15
734.29	7.15	1059.37	7.15	1066	6.15	1068.73	5.15	1071.38	4.15
1076.82	3.15	1091.51	2.15	1132.22	2.15	1169	3.15	1182.6	4.15
1186.4	5.15	1214	5.15	1383.6	5.15	1408	4.15	1415.4	3.15
1430.8	2.15	1470.9	2.15	1485.5	5.15	1500.75	6.15	1702.7	7.15
1724	8.15	1729.26	9.15	1736.2	10.15	1745.14	10.15	1749.15	9.15
1752.7	8.15	1755.34	7.15	1765.93	5.15	1781.5	4.15	1799.94	3.15
1812.53	2.15	1833.88	.15	1850.12	.15	1858.45	-1.85	1997.5	-1.85
2012.7	-.85	2083.7	.15	2135.8	-1.85	2295.3	-1.85	2315.42	.15
2349.9	1.15	2397.2	2.15	2433.17	3.15	2466.5	4.15	2497.88	5.15
2513.2	9.15	2536.14	10.15	2553	18.15	2577	18.15	2611.6	7.15
2745	6.4	2888.3	6.15	3001.2	5.4	3029.3	5.15	3033.5	3.15
3039	2.15	3052.25	1.15	3070	.15	3088.8	-.85	3117.6	-1.85
3155.9	-1.85	3164.9	-.85	3173.7	.15	3183.5	1.15	3192.4	2.15
3194.4	3.15	3200.1	6.15	3286.9	7.15	3292	8.15	3297.1	9.15
3327.6	10.15	3369.3	10.15	3380.1	11.15	3385.8	13.15	3389.76	14.15
3418.9	12.15	3536.6	12.15	4401.26	12.15				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	57.11	.035	3536.6	.05

Bank Sta: Left Right Coeff Contr. Expan.

57.11 3536.6 .1 .3

SUMMARY OF MANNING'S N VALUES

River:San Dieguito Riv

Reach	River Sta.	n1	n2	n3
1	13555	.035	.05	.035
1	11854	.05	.035	.05
1	10577	.05	.035	.05
1	9777	.05	.035	.05
1	9274	.05	.035	.05
1	8043	.05	.035	.05
1	7554	.05	.035	.05
1	7286	.05	.035	.05
1	7000	Bridge		
1	6809	.05	.035	.05
1	6661	.05	.035	.05
1	6437	.05	.035	.05
1	5926	.05	.035	.05
1	5333	.05	.035	.05

SUMMARY OF REACH LENGTHS

River: San Dieguito Riv

Reach	River Sta.	Left	Channel	Right
1	13555	1909.77	1701.26	1796
1	11854	743.4	1277.32	1429.64
1	10577	809.4	800.27	1102.6
1	9777	275.06	502.66	1232.3
1	9274	1312.7	1232.14	731.7
1	8043	2307.4	488.53	209.2
1	7554	1488	268.5	1186.87
1	7286	640.24	476.55	543.46
1	7000	Bridge		
1	6809	1290.06	147.74	464.74
1	6661	321.4	224.95	198.11
1	6437	407.84	510.16	564.9
1	5926	1306.04	593.43	542.48
1	5333			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: San Dieguito Riv

Reach	River Sta.	Contr.	Expan.
1	13555	.1	.3
1	11854	.1	.3
1	10577	.1	.3
1	9777	.1	.3
1	9274	.1	.3

1	8043		.1	.3
1	7554		.1	.3
1	7286		.1	.3
1	7000	Bridge		
1	6809		.1	.3
1	6661		.1	.3
1	6437		.1	.3
1	5926		.1	.3
1	5333		.1	.3

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : SD_Widening

River: San Dieguito Riv Reach: 1 RS: 13555 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: San Dieguito Riv Reach: 1 RS: 11854 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: San Dieguito Riv Reach: 1 RS: 10577 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: San Dieguito Riv Reach: 1 RS: 8043 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: San Dieguito Riv Reach: 1 RS: 7554 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: San Dieguito Riv Reach: 1 RS: 7286 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: San Dieguito Riv Reach: 1 RS: 7000 Profile: PF 1 Upstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: San Dieguito Riv Reach: 1 RS: 7000 Profile: PF 1 Downstream
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: San Dieguito Riv Reach: 1 RS: 6809 Profile: PF 1
Warning:The cross-section end points had to be extended vertically for the

computed water surface.

Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: San Dieguito Riv Reach: 1 RS: 6661 Profile: PF 1

Warning:The cross-section end points had to be extended vertically for the computed water surface.

Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.

River: San Dieguito Riv Reach: 1 RS: 6437 Profile: PF 1

Warning:The cross-section end points had to be extended vertically for the computed water surface.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.

River: San Dieguito Riv Reach: 1 RS: 5926 Profile: PF 1

Warning:The cross-section end points had to be extended vertically for the computed water surface.

Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.

APPENDIX 'C'

Location Hydraulic Study Form

Floodplain Encroachment Form

As-builts

Backup Data

LOCATION HYDRAULIC STUDY FORM

Dist. 11 Co. SD Rte. 5 K.P. R54.9/R75.7
EA 235800 Bridge No.57-0488
Floodplain Description:
Meandering fresh water River with areas of shallow water, salt marshes, large ponds, and small islands. Location of interest: I-5/San Dieguito River.

1. Description of Proposal (include any physical barriers i.e. concrete barriers, soundwalls, etc. and design elements to minimize floodplain impacts)

This project includes widening of the I-5 Bridge over the Sna Dieguito River with 10 + 4 + buffer alternative. The proposed alternative would not have significant impacts to the existing floodplain.

2. ADT: Current 272,000 Projected 364,000 (year 2030)

3. Hydraulic Data: Base Flood Q_{100}= 42,800 CFS
WSE_{100}= 20.95 ft at xsection 7286 The flood of record, if greater than Q_{100}: N/A
Q= N/A CFS WSE= N/A
Overtopping flood Q=_____CFS WSE= 0.02 ft increase maximum from existing condition

Are NFIP maps and studies available? YES X NO_____

4. Is the highway location alternative within a regulatory floodway ?
YES_____ NO X

5. Attach map with flood limits outlined showing all buildings or other improvements within the base floodplain. (See Appendix A)

Potential Q_{100} backwater damages:

A.	Residences?	NO X	YES_____
B.	Other Bldgs?	NO X	YES_____
C.	Crops?	NO X	YES_____
D.	Natural and beneficial Floodplain values?	NO X	YES_____

6. Type of Traffic:

A. Emergency supply or evacuation route?	NO_____	YES X
B. Emergency vehicle access?	NO_____	YES X
C. Practicable detour available?	NO_____	YES X
D. School bus or mail route?	NO_____	YES X

7. Estimated duration of traffic interruption for 100-year event hours: No traffic interruption.

8. Estimated value of Q_{100} flood damages (if any) – moderate risk level.

A.	Roadway	$ 0
B	Property	$ 0
	Total	$ 0

9. Assessment of Level of Risk Low X
Moderate ____
High ____

For High Risk projects, during design phase, additional Design Study Risk Analysis May be necessary to determine design alternative.

Signature – Dist. Hydraulic Engineer Tri Brown Date 2/18/09
(Item numbers 3,4,5,7,9)

Is there any longitudinal encroachment, significant encroachment, or any support of incompatible
Floodplain development? NO X YES ____

If yes, provide evaluation and discussion of practicability of alternatives in accordance with 23 CFR 650.113

Information developed to comply with the Federal requirement for the Location Hydraulic Study shall be retained in the project files.

Signature – Dist. Project Engineer ____ Date ____
(Item numbers 1,2,6,8)

SUMMARY FLOODPLAIN ENCROACHMENT REPORT

Dist. 11 Co. SD Rte. 5 K.P. R54.9/R75.7
Project No.: 235800 Bridge No. 57-0488
Limits: _____

Floodplain Description:
Meandering fresh water River with areas of shallow water, salt marshes, large ponds, and small islands. Location of interest: I-5/San Dieguito River.

		No	Yes
1.	Is the proposed action a longitudinal encroachment of the base floodplain?	X	
2.	Are the risks associated with the implementation of the proposed action significant?	X	
3.	Will the proposed action support probable incompatible floodplain development?	X	
4.	Are there any significant impacts on natural and beneficial floodplain values?	X	
5.	Routine construction procedures are required to minimize impacts on the floodplain. Are there any special mitigation measures necessary to minimize impacts or restore and preserve natural and beneficial floodplain values? If yes, explain.	X	
6.	Does the proposed action constitute a significant floodplain encroachment as defined in 23 CFR, Section 650.105(q).	X	
7.	Are Location Hydraulic Studies that document the above answers on file? If not explain.		X

PREPARED BY:

Signature - Dist. Hydraulic Engineer — Date: 2/18/09

Signature - Dist. Environmental Branch Chief — Date

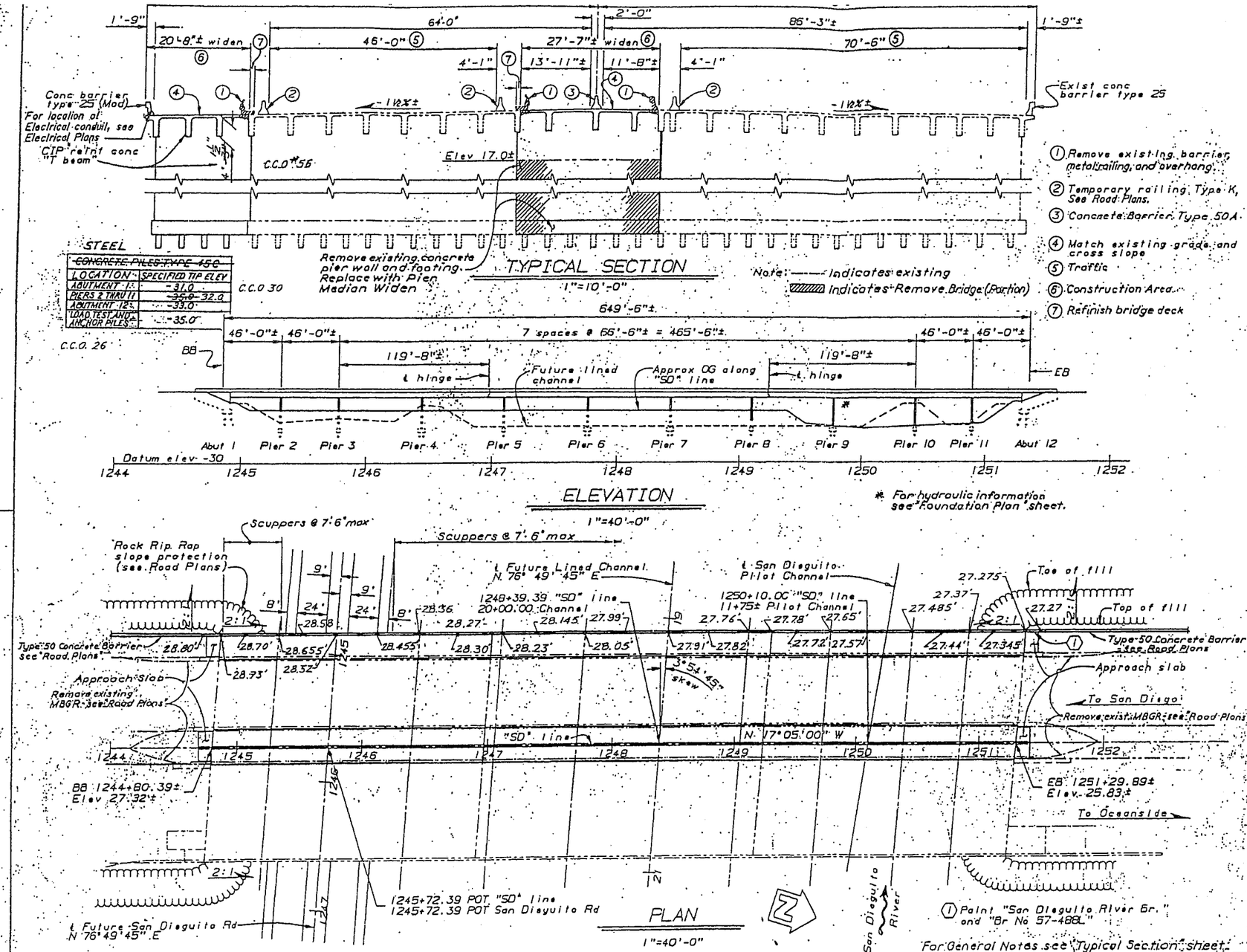
Signature - Dist. Project Engineer — Date

11	SD	5	R33.6/R36.2	186	209

Alex Stekoenis
REGISTERED ENGINEER - CIVIL

REGISTERED PROFESSIONAL ENGINEER — Alex Stekoenis, No. 12220, Exp. 3-31-93, CIVIL, STATE OF CALIFORNIA

10-13-92
PLANS APPROVAL DATE



STEEL

~~CONCRETE PILES TYPE 45C~~	
LOCATION	SPECIFIED TIP ELEV
ABUTMENT 1	-31.0
PIERS 2 THRU 11	~~-35.0~~ -32.0
ABUTMENT 12	-33.0
LOAD TEST AND ANCHOR PILES	-35.0

1. Remove existing barrier, metal railing, and overhang.
2. Temporary railing, Type K, See Road Plans.
3. Concrete Barrier Type 50A.
4. Match existing grade and cross slope
5. Traffic
6. Construction Area.
7. Refinish bridge deck

APPROXIMATE QUANTITIES

BRIDGE REMOVAL (PORTION), LOCATION A	LUMP SUM	
FURNISH PILING (CLASS 45C)	9,156	LF
DRIVE PILE (CLASS 45C)	293	EA
DRILL AND BOND DOWEL	700	LF
REFINISH BRIDGE DECK	1,067	SQFT
WATERSTOP	93	LF
12" NEOPRENE STRIP	76	LF
JOINT SEAL (MR 1/2")	76	LF
JOINT SEAL (TYPE B-MR 1 1/2")	94	LF

FINAL PAY QUANTITIES

STRUCTURE EXCAVATION (BRIDGE)	130	CY
STRUCTURE EXCAVATION (TYPE D)	2,660	CY
STRUCTURE BACKFILL (BRIDGE)	48	CY
STRUCTURAL CONCRETE, BRIDGE FOOTING	702	CY
STRUCTURAL CONCRETE, BRIDGE	2,654	CY
STRUCTURAL CONCRETE, APPROACH SLAB (TYPE ED)	32	CY
BAR REINFORCING STEEL (BRIDGE)	860,620	LB
MISCELLANEOUS METAL		
LOOSTRAINER - CABLE TYPE)	1,615	LB
MISCELLANEOUS METAL (BRIDGE)	700	LB
CONCRETE BARRIER (TYPE 25)	600	LF
CONCRETE BARRIER (TYPE 50A)	630	LF

AS BUILT A.A.L.

CORRECTIONS BY R.A. Bizzegotta

CONTRACT NO. 11-189154

DATE 12-6-94

Standard Plan Sheet No.
Detail No.

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

INDEX TO PLANS

SHEET NO.	TITLE
1	GENERAL PLAN
2	FOUNDATION PLAN
3	ABUTMENT DETAILS NO. 1
4	ABUTMENT DETAILS NO. 2
5	PIERS
6	TYPICAL SECTION
7	GIRDER LAYOUT - LEFT WIDEN
8	GIRDER LAYOUT - MEDIAN WIDEN
9	REINFORCEMENT - LEFT WIDEN
10	REINFORCEMENT - MEDIAN WIDEN
11	T-BEAM HINGE DETAIL - ELASTOMERIC
12	EARTHQUAKE RESTRAINERS
13	LOAD TEST PILES (1)
14	LOAD TEST PILES (2)
15	STRUCTURE APPROACH TYPE ED (10)
16	CONCRETE BARRIER TYPE 25 (MOD)
17	LOG OF TEST BORINGS 1 OF 3
18	LOG OF TEST BORINGS 2 OF 3
19	LOG OF TEST BORINGS 3 OF 3

STANDARD PLANS DATED JANUARY 1988

A62-C	EXCAVATION AND BACKFILL BRIDGE - LIMITS OF PAYMENT
A75-A	CONCRETE BARRIER TYPE 50
B0-1	BRIDGE DETAILS
B0-3	BRIDGE DETAILS
B0-5	BRIDGE DETAILS
B0-13	BRIDGE DETAILS
B2-8	PILE DETAILS - CLASS 45C AND 70C
B2-9	LOAD TEST ANCHOR PILE DETAIL
B6-1	T-BEAM DETAILS
B6-21	JOINT SEAL DETAILS
B11-30	TEMPORARY RAILING

DESIGN	BY A. Schumann	CHECKED	LOAD FACTOR DESIGN	LIVE LOADING: HS20-44 AND ALTERNATIVE AND PERMIT DESIGN LOAD	
DETAILS	BY Andy Onodera 6-91	CHECKED	LAYOUT	BY A. Schumann	CHECKED
QUANTITIES	BY	CHECKED	SPECIFICATIONS	BY D. Blackerby 5/92	PLANS AND WEB COMPARED DB 5/92

DESIGN ENGINEER

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
STRUCTURE DESIGN 10

CU 11
EA 189151

BRIDGE NO. 57-488R/L
POST MILE 35.66

DISREGARD PRINTS BEARING EARLIER REVISION DATES

SAN DIEGUITO RIVER BRIDGE (WIDEN)

GENERAL PLAN

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 1 OF 19

DS DSC 2138 (CADD 1/99)

ClibPDF - www.fastio.com

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5	R33.6/R36.2	187	209

REGISTERED ENGINEER-CIVIL

REGISTERED PROFESSIONAL ENGINEER — Alex Stamenis — No. 12228 — Exp. 3-31-93 — CIVIL — STATE OF CALIFORNIA

10-13-92
PLANS APPROVAL DATE

HYDROLOGIC SUMMARY

DRAINAGE AREA : 347 square miles

	DESIGN FLOOD	BASE FLOOD
FREQUENCY (Years)	100	100
DISCHARGE (Cubic feet per second)	80,000	41,000
WATER SURFACE (Elevation ~~at bridge~~)	17.5'*	15.0'*

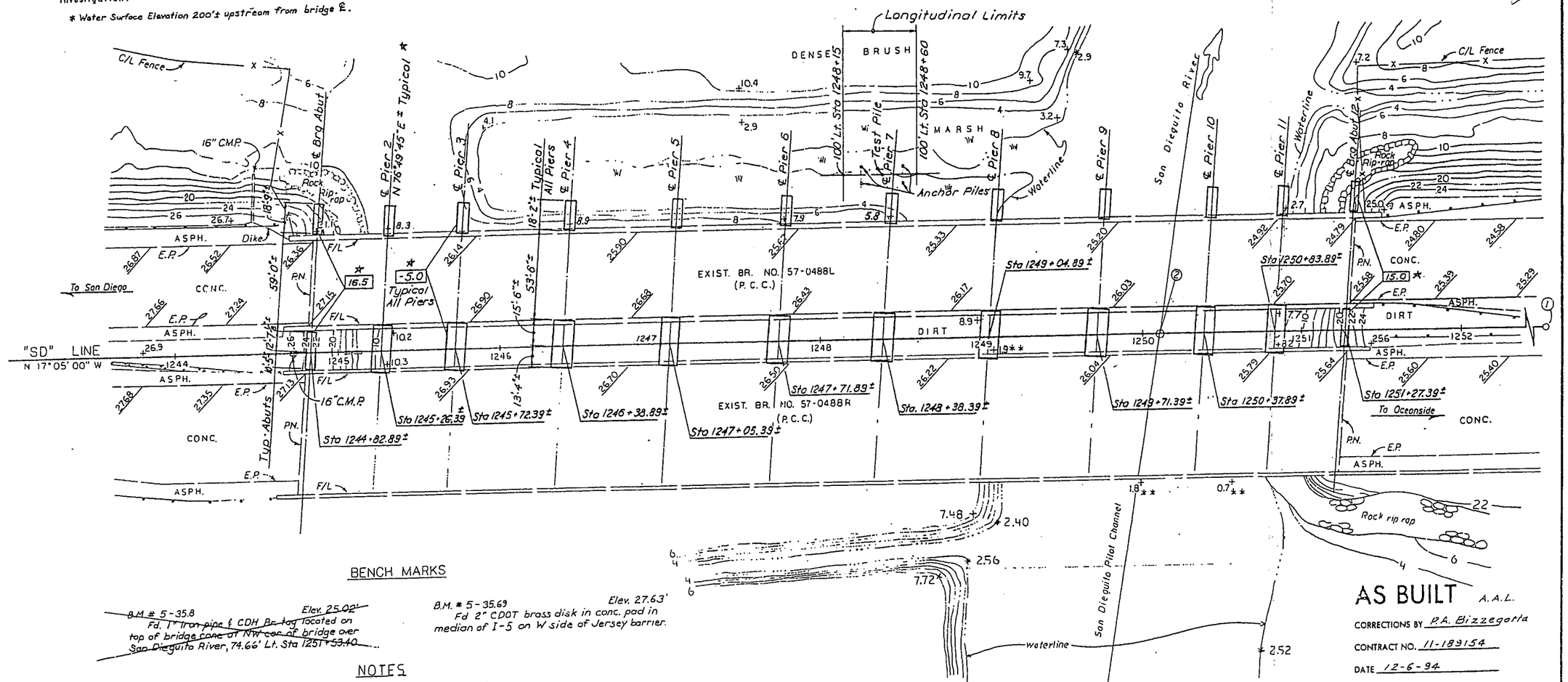
Flood plain data are based upon information available when the plans were prepared and are shown to meet Federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.

* Water Surface Elevation 200'± upstream from bridge ℄.

① 1285 +37.79 P.O.T. "SD" Line | 298138.204 | 1692409.154

② 1250 +10.00 P.O.T. "SD" Line
11 +75± ℄ San Dieguito Pilot Channel

NOTE:
Piles for Pile Load Test shall be located within the Longitudinal Limits Shown. See "Load Test Pile Details" for additional details.



BENCH MARKS

~~B.M. # 5-35.8 Elev. 25.02'~~
~~Fd. 1" iron pipe & CDH Brass tag located on top of bridge cone at NW cor. of bridge over San Dieguito River, 74.66' Lt. Sta 1251+53.40~~

B.M. # 5-35.69 Elev. 27.63'
Fd 2" CDOT brass disk in conc. pad in median of I-5 on W side of Jersey barrier.

NOTES

Underground Utilities as shown are approx.
+ Denotes spot elevation
* Denotes bottom of structure elevation
# Denotes water line elev. @ 1600 hrs. on 5-14-91
☆ Match existing
Indicates bottom of footing elev.

AS BUILT A.A.L.
CORRECTIONS BY P.A. Bizzegotta
CONTRACT NO. 11-189154
DATE 12-6-94

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

PRELIMINARY INVESTIGATION SECTION					
SCALE 1" = 30'	DATUM USGS 1929 (ADJ 1959 SURVEY)	PHOTOGRAMMETRY AS OF:	DRAWN	BY M. HENNING 6-25-91	
ALIGNMENT TIES		SURVEYED BY	TRACED BY		
		FIELD CHECKED BY U. Joe 5-14-91	CHECKED BY H. Joe 7-19-91		

DESIGN	BY A. Stamenis	CHECKED
DETAILS	BY Frank Segura 3/92	CHECKED
QUANTITIES	BY	CHECKED

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURE DESIGN 10

CU 11
EA 189151

BRIDGE NO. 57-488R/L
POST MILE 35.66

SAN DIEGUITO RIVER BRIDGE (WIDEN)

FOUNDATION PLAN

DISREGARD PRINTS BEARING EARLIER REVISION DATES → 4/5/94 4-13-92

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 2 OF 19

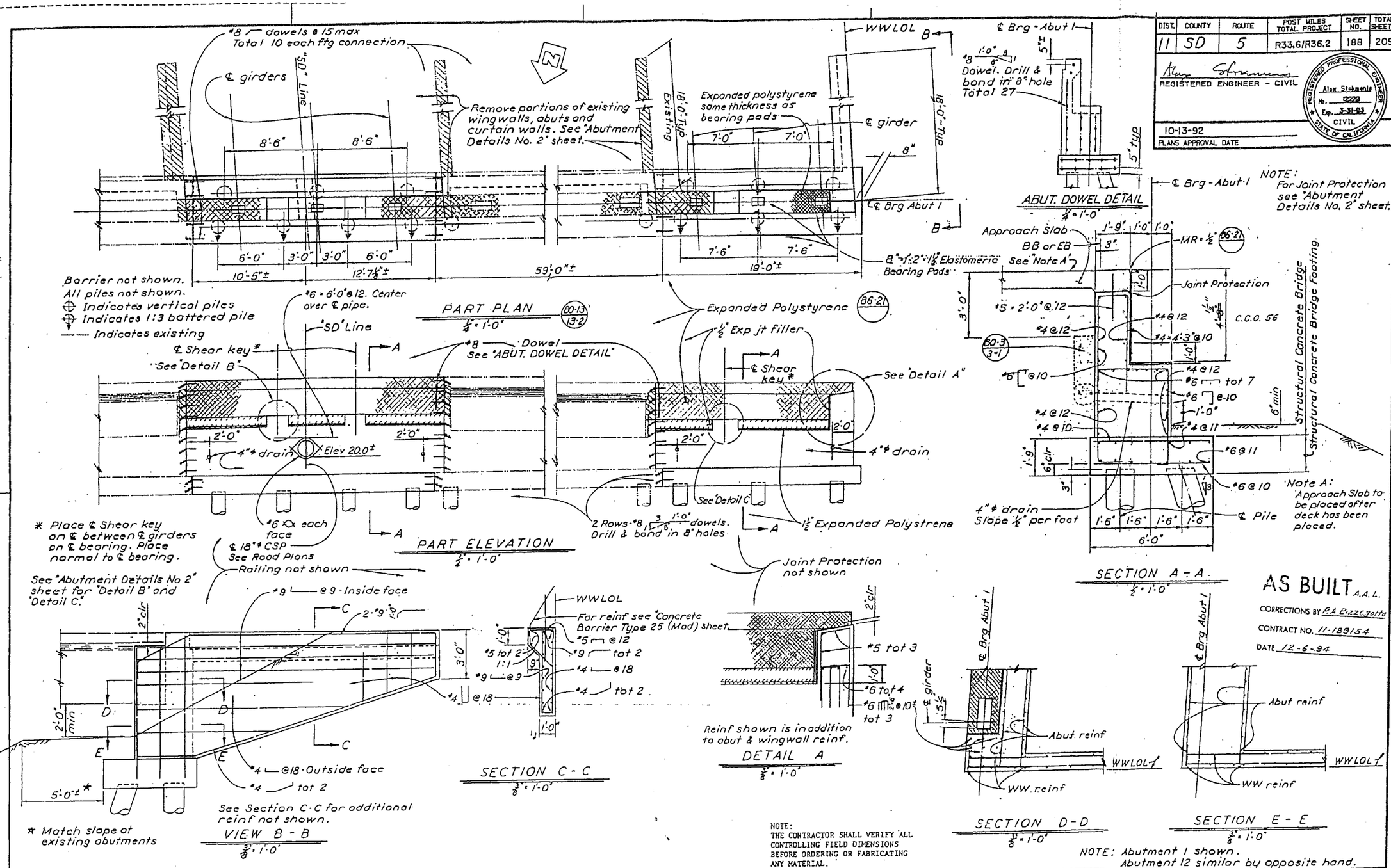
DS OSD 2145 (4/89)

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5	R33.6/R36.2	188	209

REGISTERED ENGINEER - CIVIL

REGISTERED PROFESSIONAL ENGINEER — Alex Sirkhanents No. 12229 Exp. 3-31-93 CIVIL — STATE OF CALIFORNIA

10-13-92
PLANS APPROVAL DATE



AS BUILT A.A.L.
CORRECTIONS BY R.A. Bizzegotto
CONTRACT NO. 11-189154
DATE 12-6-94

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

DESIGN	BY A. Sirkhanents	CHECKED B.A. Kelly
DETAILS	BY Frank Segura 3/92	CHECKED A. Sirkhanents
QUANTITIES	BY Alex Sirkhanents	CHECKED B.A. Kelly

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
STRUCTURE DESIGN 10

CU 11
EA 189151

BRIDGE NO. 57-488 R/L
POST MILE 35.66

SAN DIEGUITO RIVER BRIDGE (WIDEN)

ABUTMENT DETAILS NO. 1

DISREGARD PRINTS BEARING EARLIER REVISION DATES 4-13-92 5-13-92

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 3 OF 19

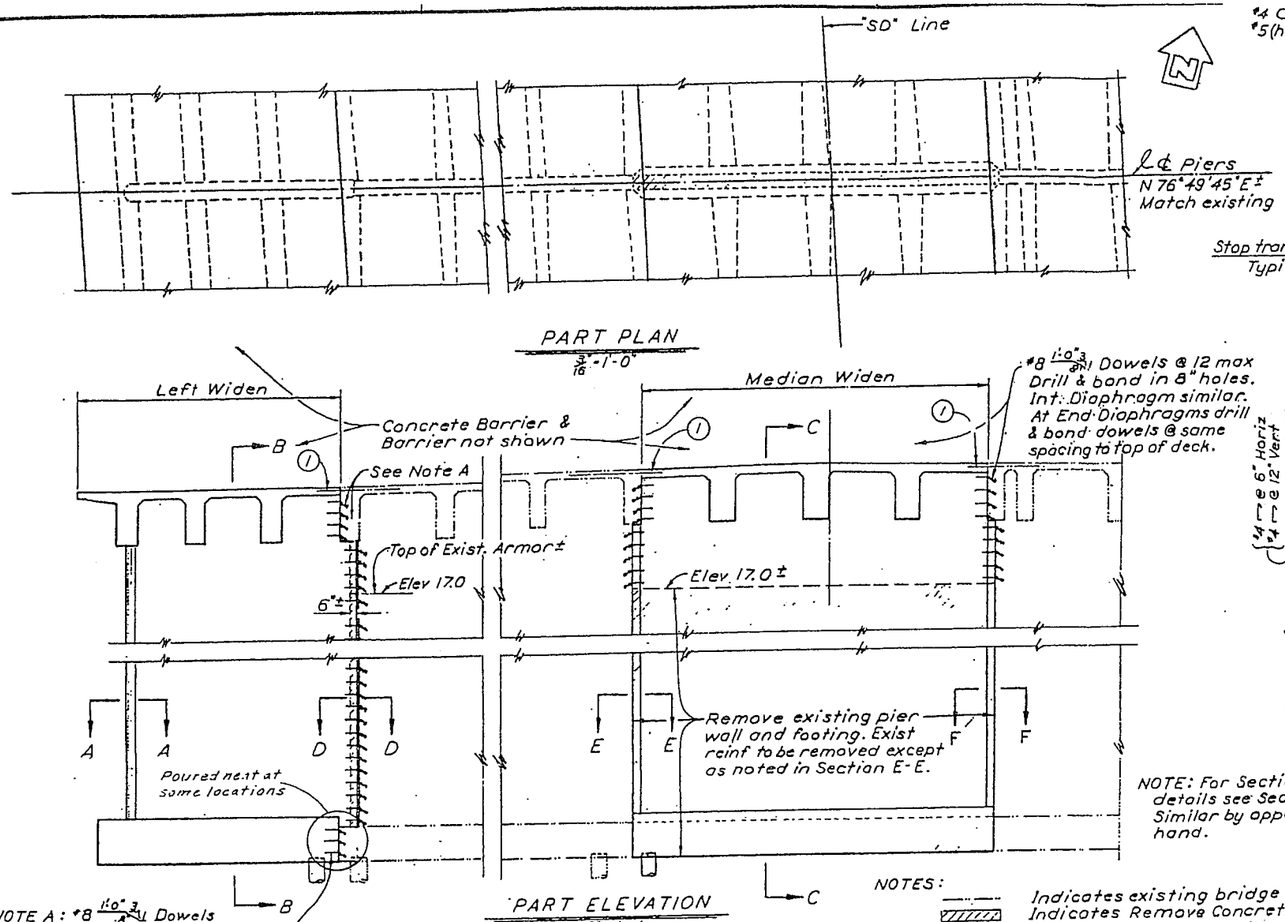
OS OSD 2138 (CADD 4/90)

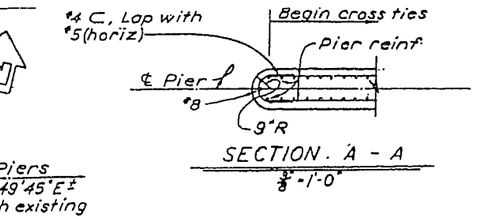
DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	NO.	SHEETS
11	SD	5	R33.6/R36.2	190	209

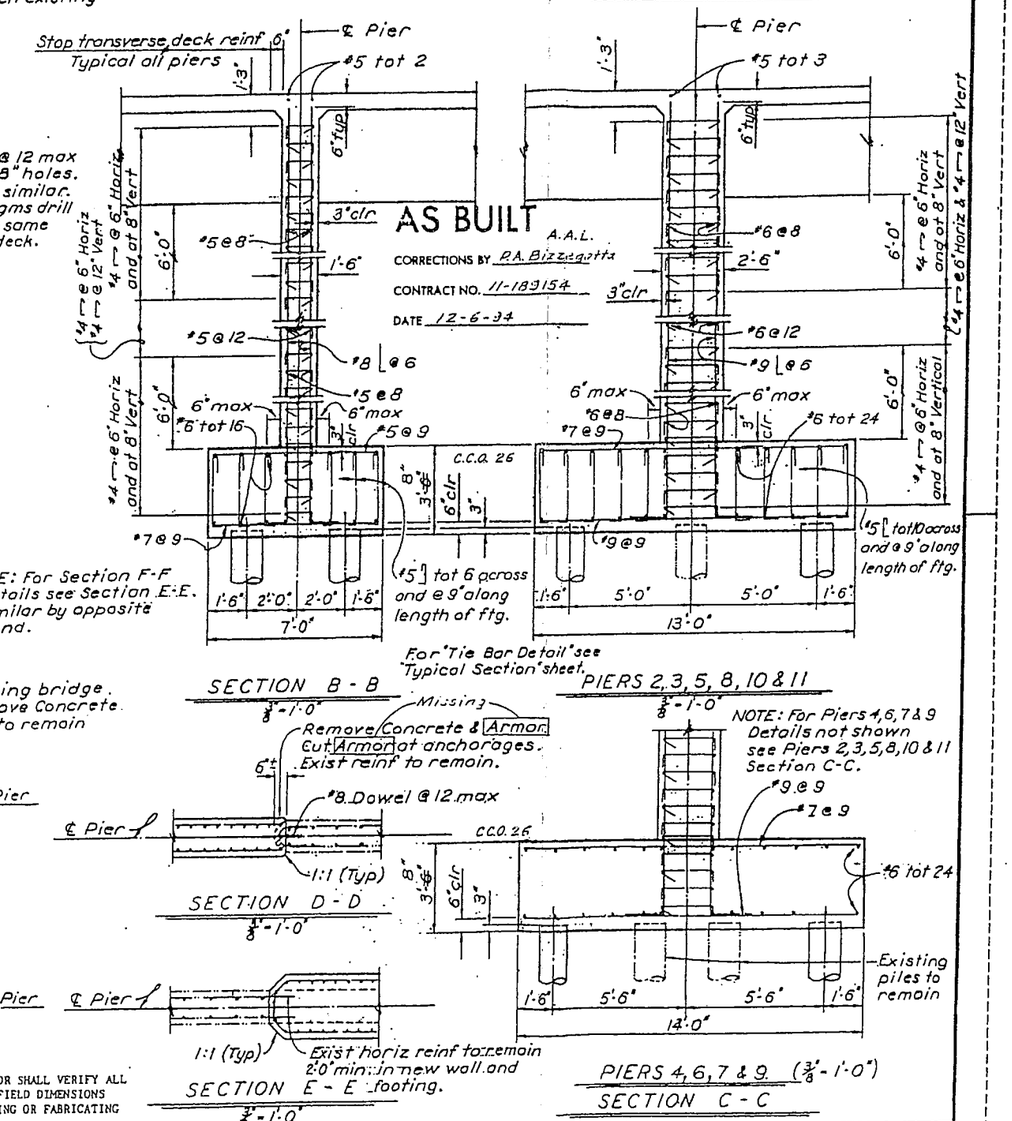
REGISTERED ENGINEER - CIVIL

Alex Stakosnik No. 12228 Exp. 3-31-93 CIVIL STATE OF CALIFORNIA REGISTERED PROFESSIONAL ENGINEER

10-13-92
PLANS APPROVAL DATE

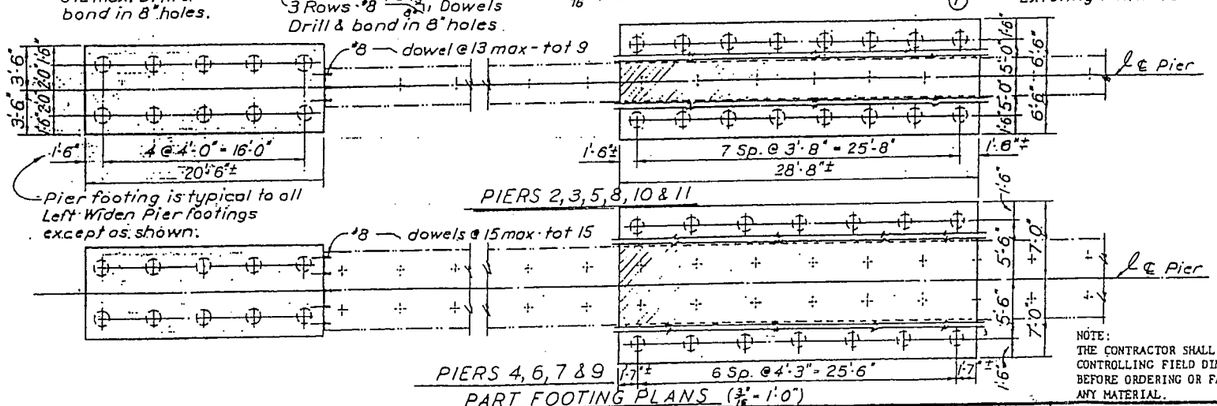






NOTES:

Indicates existing bridge.
Indicates Remove Concrete.
Existing reinf to remain



NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

DESIGN	BY A. Stakosnik	CHECKED R.A. Bizzegatta
DETAILS	BY Frank Segura 2/93	CHECKED R.A. Bizzegatta
QUANTITIES	BY	CHECKED R.A. Bizzegatta

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
STRUCTURE DESIGN 10

CU 11
EA 189151

BRIDGE NO. 57-488R/L
POST MILE 35.66

SAN DIEGUITO RIVER BRIDGE (WIDEN)

PIERS

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY) 7-13-92 7-28-92 5-13-93

SHEET 5 OF 19

DS OSD 2130 (CADD 4/88)

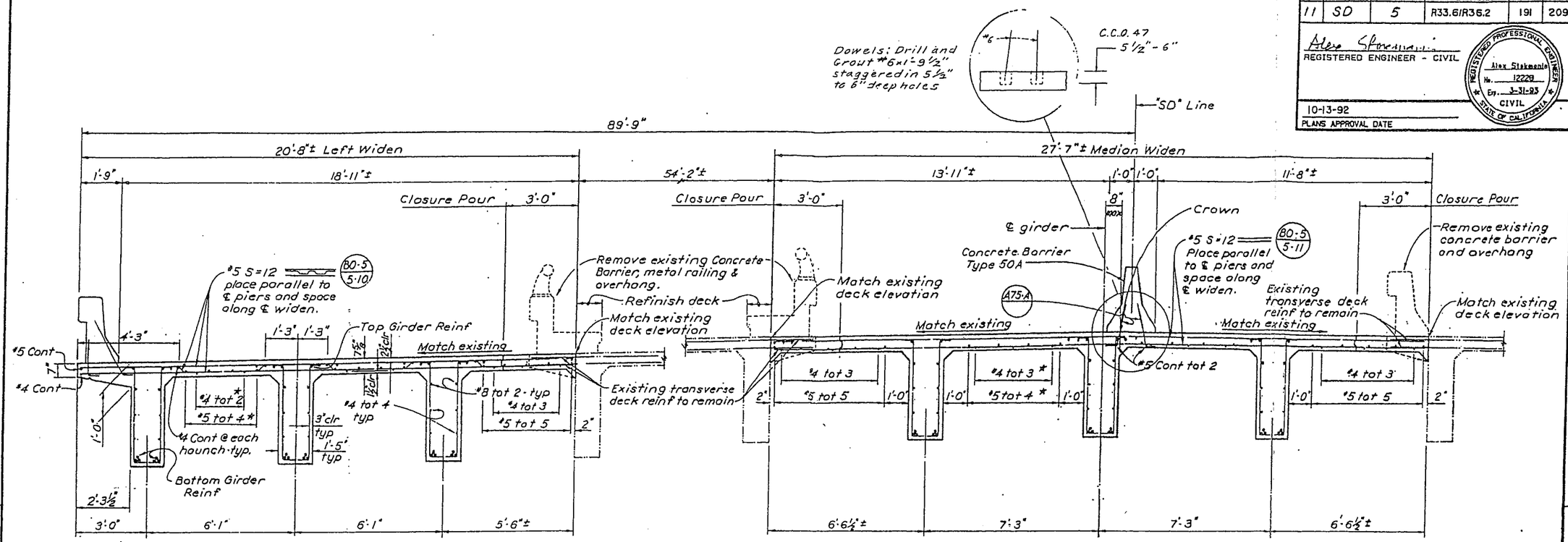
ClibPDF - www.fastio.com

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5	R33.6/R36.2	191	209

Alex Stakemann
REGISTERED ENGINEER - CIVIL

REGISTERED PROFESSIONAL ENGINEER Alex Stakemann No. 12229 Exp. 3-31-93 CIVIL STATE OF CALIFORNIA

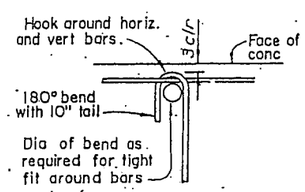
10-13-92
PLANS APPROVAL DATE



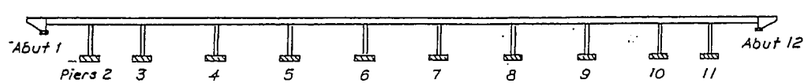
TYPICAL SECTION
1/2" = 1'-0"
80-5 86-1

NOTE: For Median Widen details not shown see Left Widen.
★ Typical per bay except as noted.
—— Indicates existing

AS BUILT A.A.L.
CORRECTIONS BY P.A. Bizzigotti
CONTRACT NO. 11-12315-1
DATE 12-5-94

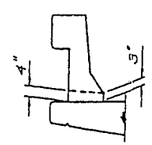


TIE BAR DETAIL
Scale: None

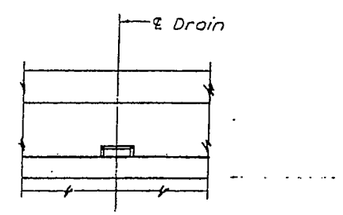


CONCRETE STRENGTH AND TYPE LIMITS
No Scale

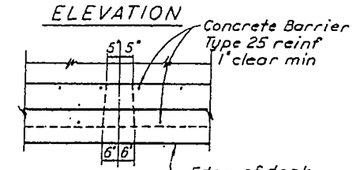
Structural Concrete, Bridge
Structural Concrete, Bridge Footing



SECTION



ELEVATION



PLAN

SCUPPER DRAIN DETAIL 1/2" = 1'-0"

GENERAL NOTES
LOAD FACTOR DESIGN

DESIGN: BRIDGE DESIGN SPECIFICATIONS (1983 AASHTO with Interims and Revisions by CAL TRANS)

DEAD LOAD: Includes 35 psf for future wearing surface.

LIVE LOADING: HS20-44 and alternative and permit design load.

SEISMIC LOADING: Peak Rock Acceleration = 0.5 g
Depth of Alluvium = > 150 ft.

REINFORCED CONCRETE: f_y = 60,000 psi
f'_c = 3,250 psi
n = 9

Transverse Deck Slabs (Working Stress Design)
f_s = 20,000 psi
f_c = 1,200 psi
n = 10

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

DESIGN	BY A. Stakemann	CHECKED
DETAILS	BY Frank Segura 2/92	CHECKED
QUANTITIES	BY Kelly Wu	CHECKED

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
STRUCTURE DESIGN 10

BRIDGE NO. 57-488R/L
POST MILE 35.66

SAN DIEGUITO RIVER BRIDGE (WIDEN)
TYPICAL SECTION

DS OSD 2138 (CADD 4/90)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 11
EA 189151

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 6 OF 19

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I-5 North Coast Widening Floodplain Studies
Caltrans
DE Project 1683

RECORD OF CONVERSATION

DATE: 09/21/07 **TIME:** 8:30 AM **DE FILE No.** 1683-300

RECORDED BY: Glen Parker

SPOKE WITH: Ray Martinez

TELEPHONE No. 703-317-6251

NATURE OF CALL: ☐ Incoming ☒ Outgoing ☐ Meeting

DISTRIBUTION: Ray Martinez (Michael Baker), Glen Parker (Dokken Engineering), Tim Brownson (Caltrans), Wen Cheng (Michael Baker), Mike Skowronek (Michael Baker)

SUBJECT OF CONVERSATION: Acceptable FEMA floodplain modeling procedures

ITEMS DISCUSSED:

Available Backup Data to generate previously approved floodplain models: Glen explained that a formal request has been submitted for backup floodplain information for lagoons and creeks along I-5 with Zone AE floodplains between San Diego and Oceanside. In some cases the HEC-2 data provided by Michael Baker Corporation was limited and did not have enough information to recreate previously generated floodplain models with reasonable accuracy. Glen said in these cases, Dokken Engineering would prefer to create HEC-RAS models which tie in with FEMA cross sections to use as a basis for existing conditions. Ray said Dokken Engineering must use their expertise to decide whether the existing FEMA data can be reused and to document efforts in a Technical Studies Data Notebook (TSDN). There have been past situations which required an existing model to be recreated and it is acceptable to FEMA as long as the appropriate documentation supports the procedure. Glen agreed to document the scenarios where existing models could not be used with accuracy.

Coordination with FEMA and Caltrans: Glen said that Caltrans is in the planning phase for the I-5 North Coast Widening, which will widen I-5 from San Diego to Oceanside. At this point in time, a preferred alternative has not been identified and therefore no coordination has occurred between Caltrans and FEMA to begin processing LOMRs. Glen said the final design of this project would likely occur in different phases several years in the future. It would be beneficial to coordinate with FEMA when needed during the process. Glen asked who the appropriate FEMA contacts may be to continue coordination when needed throughout the process. Ray said to coordinate with Wen Chen and Michael Skowronek, who work at the RMC for FEMA Region IX and can act as Outreach Coordinators on behalf of FEMA, when appropriate depending on the development of the project.

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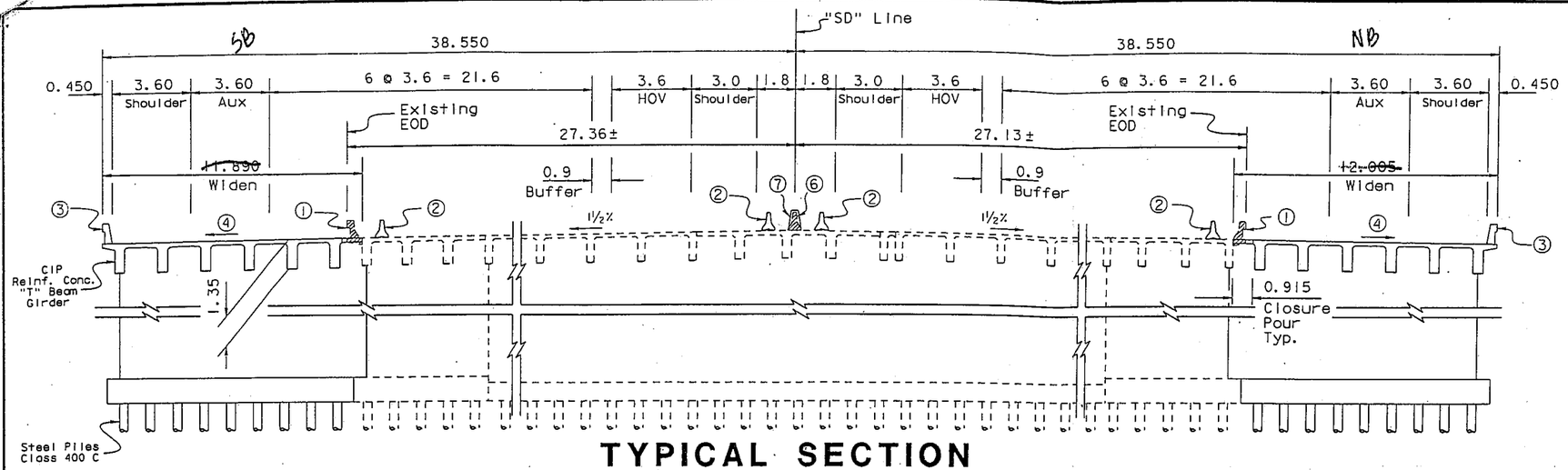
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

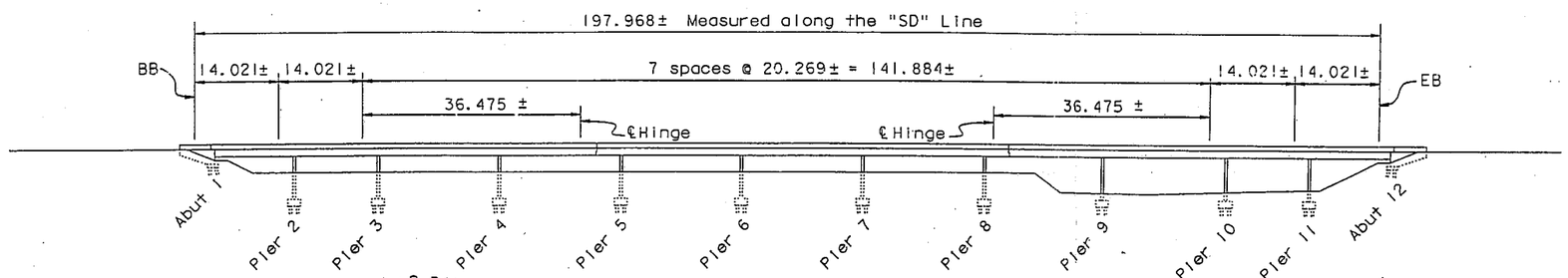
Caltrans Metric

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
11	SD	05	KP54.9/75.7



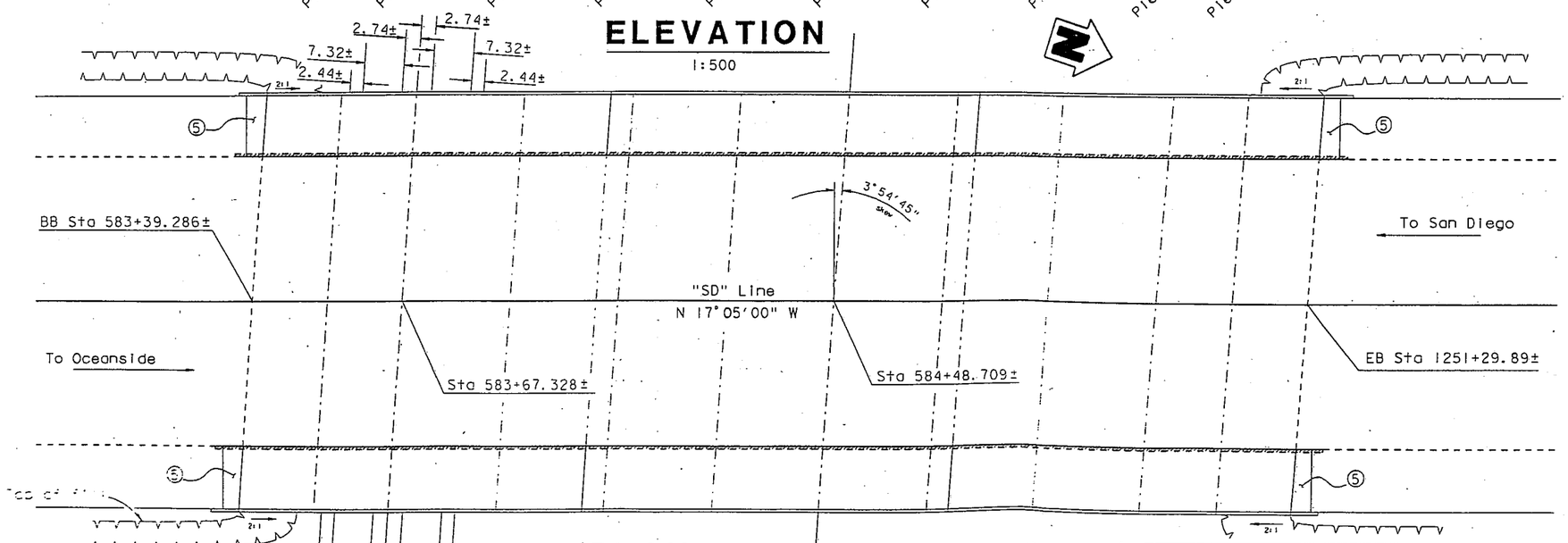
TYPICAL SECTION

1:125



ELEVATION

1:500



PLAN

1:500

LEGEND

1. Remove existing overhang and concrete barrier
2. Temporary Railing Type K – see road plans
3. Concrete Barrier Type 736
4. Match existing slope
5. Structure Approach Type EQ(3)
6. Remove existing concrete barrier Type 50A
7. Concrete Barrier Type 60 (Modified)

---- Existing Structure

—— Proposed Structure

Concrete Removal

NOTES & ASSUMPTIONS

- Lane restriping required
- Pile Footings (Steel piles class 400 C) at abutments and piers

DATE OF ESTIMATE	=	8-14-03 PLA
BRIDGE REMOVAL	=	—
STRUCTURE DEPTH	=	1.350 m
LENGTH	=	197.968 m
WIDTH		22.87 ~~11.890~~ Lt/12.005 Rt
AREA	=	4369 ~~4730~~ 44 m^2
COST/ $\square^M$ INCLUDING 10% MOBILIZATION & 25% CONTINGENCY	=	$ 1415
TOTAL COST	=	$6,184,000

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY	L. NEGRETE	DATE	7-7-03
DRAWN BY	L. NEGRETE	DATE	7-7-03
CHECKED BY		DATE	
APPROVED		DATE	

STRUCTURE DESIGN SECTION 18

PLANNING STUDY

SAN DIEGUITO RIVER BRIDGE (WIDEN)

BRIDGE NO. 57-0488 | CU

FILENAME => jnegrete DATE PLOTTED => 15-JUL-2003 TIME PLOTTED => 09:09