

FLOOD INSURANCE STUDY



SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS VOLUME I OF 7

Community Name	Community Number
CARLSBAD, CITY OF	060285
CHULA VISTA, CITY OF	065021
CORONADO, CITY OF	060287
DEL MAR, CITY OF	060288
EL CAJON, CITY OF	060289
ENCINITAS, CITY OF	060726
ESCONDIDO, CITY OF	060290
IMPERIAL BEACH, CITY OF	060291
LA MESA, CITY OF	060292
LEMON GROVE, CITY OF	060723
NATIONAL CITY, CITY OF	060293
OCEANSIDE, CITY OF	060294
POWAY, CITY OF	060702
SAN DIEGO, CITY OF	060295
SAN DIEGO COUNTY UNINCORPORATED AREAS	060284
SAN MARCOS, CITY OF	060296
SANTEE, CITY OF	060703
SOLANA BEACH, CITY OF	060725
VISTA, CITY OF	060297



REVISED:
SEPTEMBER 29, 2006



Federal Emergency Management Agency
FLOOD INSURANCE STUDY NUMBER
06073CV001B

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

This Preliminary Flood Insurance Study report does not include unrevised Floodway Data Tables or unrevised Flood Profiles. These unrevised components will appear in the final Flood Insurance Study report.

This publication incorporates revisions to the original Flood Insurance Study. These revisions are presented in Section 10.0.

Due to the large file size only the information relevant to the City of Oceanside has been provided here. For complete copy of this document please contact the City of Oceanside Engineering Division or FEMA.

TABLE OF CONTENTS

Volume 1

	<u>Page</u>
1.0 <u>INTRODUCTION</u>	1
1.1 Purpose of Study.....	1
1.2 Authority and Acknowledgments.....	1
1.3 Coordination.....	7
2.0 <u>AREA STUDIED</u>	8
2.1 Scope of Study.....	8
2.2 Community Description.....	12
2.3 Principal Flood Problems.....	23
2.4 Flood Protection Measures.....	39
3.0 <u>ENGINEERING METHODS</u>	48
3.1 Hydrologic Analyses.....	49
3.2 Hydraulic Analyses.....	82
4.0 <u>FLOODPLAIN MANAGEMENT APPLICATIONS</u>	100
4.1 Floodplain Boundaries.....	100
4.2 Floodways.....	102
5.0 <u>INSURANCE APPLICATION</u>	105
6.0 <u>FLOOD INSURANCE RATE MAP</u>	106
7.0 <u>OTHER STUDIES</u>	107
8.0 <u>LOCATION OF DATA</u>	112
9.0 <u>BIBLIOGRAPHY AND REFERENCES</u>	112
10.0 <u>REVISION DESCRIPTIONS</u>	123
10.1 First Revision.....	123
10.2 Second Revision.....	125
10.3 Third Revision.....	126
10.4 Fourth Revision.....	139
10.5 Fifth Revision.....	140
10.6 Sixth Revision.....	141
10.7 Seventh Revision.....	144

TABLE OF CONTENTS (Cont'd)

Volume 1 (Cont'd)

Page

FIGURES

Figure 1 - Estimated Flood Elevations, Las Chollas Creek.....	37
Figure 2 - Estimated Flood Elevations, Las Chollas Creek.....	37
Figure 3 - Estimated Flood Elevations, Las Puleta Creek.....	38
Figure 4 - Estimated Flood Elevations, Las Puleta Creek.....	38
Figures 5-7 - Frequency-Discharge, Drainage Area Curves.....	78-80
Figure 8 - Floodway Schematic.....	105

TABLES

Table 1 - Community Coordination Officer Meetings.....	9
Table 2 - Streams Studied by Detailed Methods.....	10
Table 3 - Areas of Probable Damage to Structures in the City of Poway.....	34
Table 4 - Summary of Discharges.....	50
Table 5 - Summary of Elevations.....	68
Table 6 - Summary of Pacific Ocean Wave Elevations.....	70
Table 7 - Summary of Manning's "n" Values.....	87
Table 8 - Floodway Data.....	See Vol. 2
Table 9 - Community Map History.....	108

Volume 2

TABLES

Table 8 - Floodway Data

Volume 3

EXHIBITS

Exhibit 1 - Flood Profiles

Agua Hedionda Creek (At City of Vista)	Panels 01P-05P
Beaver Hollow Creek	Panels 06P-10P
Beeler Creek	Panels 11P-17P
Broadway Creek	Panels 18P-20P
Buena Creek	Panels 21P-29P
Buena Vista Creek	Panels 30P-49P
Buena Vista Creek Tributary 1	Panels 50P-51P
Carmel Valley Creek	Panels 52P-54P
Carroll Canyon Creek	Panels 55P-65P
Coleman Creek	Panels 66P-72P
County Ditch Creek	Panels 73P-74P
Deer Springs Creek	Panel 75P
Descanso Creek	Panels 76P-78P
Encanto Branch	Panels 79P-82P
Escondido Creek	Panels 83P-91P
Escondido Creek (Above Lake Wohlford)	Panel 92P
Escondido Creek (Left Reach)	Panel 93P
Eucalyptus Hills (East Branch)	Panel 94P
Eucalyptus Hills (West Branch)	Panels 95P-96P
Florida Drive Branch	Panel 97P

TABLE OF CONTENTS (Cont'd)

Volume 4

EXHIBITS (Cont'd)

Exhibit 1 - Flood Profiles (Cont'd)

Forester Creek	Panels 98P-118P
Forester Creek-Carlton Hills Boulevard Overflow	Panel 119P
Garrison Creek	Panels 120P-123P
Gopher Canyon Creek	Panels 124P-127P
Green Valley Creek	Panels 128P-131P
Green Valley Creek Tributary	Panel 132P
Harbison Canyon Creek	Panels 133P-139P
Hatfield Creek	Panels 140P-141P
Home Avenue Branch	Panels 142P-144P
Kit Carson Park Creek	Panels 145P-149P
Las Chollas Creek	Panels 150P-154P
Las Posas Creek (Upper)	Panel 155P
Las Puleta Creek	Panels 156P-157P
Lawson Valley Creek	Panels 158P-163P
Loma Alta Creek	Panels 164P-169P
Los Penasquitos Creek	Panels 170P-178P
Lusardi Creek	Panel 179P
Mexican Canyon Creek	Panels 180P-183P
Panel Not Printed	Panel 184P
Moosa Creek (North Branch)	Panels 185P-187P
Moosa Creek (South Branch)	Panel 188P
Murphy Canyon Creek	Panels 189P-191P
Murray Canyon Creek	Panels 192P-195P
Nestor Creek	Panels 196P-201P
North Branch Poway Creek	Panels 202P-203P
North Tributary to Santa Maria Creek	Panels 204P-205P

Volume 5

Olive Creek	Panels 206P-207P
Otay River	Panels 208P-231P
Pala Mesa Creek	Panels 232P-233P
Paradise Creek	Panels 234P-238P
Poggi Canyon Creek	Panels 239P-242P
Poway Creek	Panels 243P-250P
Rainbow Creek (Main Branch)	Panels 251P-252P
Rainbow Creek (West Branch)	Panel 253P
Rattlesnake Creek	Panels 254P-261P
Rattlesnake Creek Split Flow at Heritage Hills	Panels 262P-263P
Rattlesnake Creek Split Flow at Midland Road	Panel 264P
Reidy Creek	Panels 265P-269P
Rice Canyon Creek	Panels 270P-272P
Rose Canyon Creek	Panels 273P-279P
Samagutuma Creek	Panels 280P-282P
San Clemente Canyon Creek	Panels 283P-285P
San Diego River	Panels 286P-306P
San Dieguito River	Panels 307P-309P
San Elijo Creek	Panel 310P
Panels Not Printed	Panels 311P-351P

TABLE OF CONTENTS (Cont=d)

Volume 6

EXHIBITS (Cont'd)

Exhibit 1 - Flood Profiles (Cont'd)

Panels Not Printed	Panels	352P-365P
San Luis Rey River (At Oceanside)	Panels	366P-374P
San Marcos Creek	Panels	375P-378P
San Marcos Creek Highway 78 Split Flow	Panel	379P
San Vicente Creek	Panels	380P-382P
Santa Maria Creek (San Pasqual Valley Area)	Panels	383P-386P
Santa Maria Creek (Santa Maria Valley Area)	Panels	387P-406P
Santa Ysabel Creek	Panels	407P-418P
Slaughterhouse Creek	Panels	419P-420P
Soledad Canyon	Panels	421P-425P
South Branch Poway Creek	Panels	426P-427P
South Fork Moosa Canyon Creek	Panels	428P-432P
South Las Chollas Creek	Panels	433P-436P
South Tributary to Santa Maria Creek	Panels	437P-438P
Spring Valley Creek	Panel	439P
Steele Canyon Creek	Panels	440P-448P
Stevenson Creek	Panel	449P
Sunrise Overflow	Panel	450P

Volume 7

Sweetwater River (Above Reservoir)	Panels	451P-473P
Sweetwater River (At National City)	Panels	474P-479P
Sweetwater River (Descanso Area)	Panels	480P-483P
Switzer Creek	Panel	484P
Tecolote Creek	Panels	485P-494P
Telegraph Canyon Creek	Panels	495P-501P
Panels Not Printed	Panels	502P-503P
Tijuana River	Panels	504P-508P
Tributary of South Tributary to Santa Maria Creek	Panel	509P
Tributary to Sweetwater River	Panels	510P-511P
Twin Oaks Valley Creek	Panels	512P-516P
Wabash Branch	Panel	517P
Witch Creek	Panels	518P-520P
Tributary to Forester Creek	Panels	521P-522P
Tributary to Forester Creek (South Branch)	Panel	523P
Agua Hedionda Creek (At City of Carlsbad)	Panels	524P-525P
Calavera Creek	Panel	526P
Calavera Creek Split Flow	Panel	527P
Pilgrim Creek	Panels	528P-530P
Pomerado Creek	Panels	531P-534P
Johnson Canyon Creek	Panels	535P-540P
Telegraph Canyon Creek	Panels	541P-552P
Alvarado Creek	Panels	553P-561P

Exhibit 2 - Flood Insurance Rate Map Index
Flood Insurance Rate Map

**FLOOD INSURANCE STUDY
SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS**

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study revises and updates information on the existence and severity of flood hazards in the geographic area of San Diego County, California, including the Cities of Carlsbad, Chula Vista, Coronado, Del Mar, El Cajon, Encinitas, Escondido, Imperial Beach, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos, Santee, Solana Beach and Vista, and the unincorporated areas of San Diego County (referred to collectively herein as San Diego County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

San Diego County also includes the City of La Mesa, which does not contain any identified Special Flood Hazard Areas.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

Table 4. Summary of Discharges

<u>Flooding Source and Location</u>	<u>Drainage Area (Square Miles)</u>	<u>Peak Discharges (cfs)</u>			
		<u>10-Year</u>	<u>50-Year</u>	<u>100-Year</u>	<u>500-Year</u>
Agua Hedionda Creek					
At Confluence with Buena Creek	6.3	1,600	4,800	7,000	15,500
2,200 Feet Upstream of Rancho Carlsbad Drive	16.5	-- ¹	-- ¹	7,810	-- ¹
Upstream of Calavera Creek	17.3	-- ¹	-- ¹	8,080	-- ¹
At El Camino Real	23.8	-- ¹	-- ¹	9,850	-- ¹
Beaver Hollow Creek					
Approximately 1,200 Feet Downstream of Beaver Hollow Road	5.0	-- ¹	-- ¹	4,000	-- ¹
Beeler Creek					
At U.S. Geological Survey (USGS) Gage on Downstream Side of Pomerado Road	5.5	700	2,400	3,600	9,200
Borrego Palm Canyon					
At Apex of Alluvial Fan	23.3	3,100	7,700	10,650	14,800
Box Canyon					
At Apex of Alluvial Fan	5.9	850	2,600	3,850	4,950
Broadway Creek					
At Mouth	3.8	500	1,200	1,600	4,200
Buena Creek					
At Mouth	6.3	1,880	3,520	4,100	5,420
At Buena Creek Road	1.5	-- ¹	-- ¹	1,980	-- ¹
Buena Vista Creek					
Upstream of Interstate Highway 5	20.8	2,000	5,600	8,500	19,000
At Sunset Drive	15.9	1,700	5,100	8,000	18,000
At Hacienda Drive	9.8	1,500	4,900	7,300	16,000
At Confluence with Tributary 1	7.7	1,490	3,390	4,290	5,680
At Confluence with Tributary 2	5.1	1,030	2,280	2,840	3,730
At Confluence with Tributary 4	4.0	860	1,850	2,300	2,910
At Intersection of Vista Way and Arcadia Avenue	0.2	40	100	130	170

¹Data Not Available

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
Buena Vista Creek Tributary 1					
At Confluence with Buena Vista Creek	2.6	460	1,180	1,510	2,020
At Intersection of Monte Vista Drive and Santa Fe Avenue	1.7	320	800	1,010	1,350
At Intersection of Monte Vista and Valley Drives	1.0	210	510	630	840
Buena Vista Creek Tributary 2					
At Confluence with Buena Vista Creek	0.8	110	410	530	700
At Intersection of Eucalyptus Avenue and Tiger Tail Road	0.5	110	280	360	480
Buena Vista Creek Tributary 3					
At Confluence with Buena Vista Creek	1.5	350	760	950	1,240
Approximately 1,000 feet Upstream of North Santa Fe Avenue	0.5	130	280	350	460
Buena Vista Creek Tributary 4					
At Confluence with Buena Vista Creek	2.5	570	1,210	1,450	1,860
Calavera Creek					
Upstream of Rancho Carlsbad Mobile Home Park	4.5	-- ¹	-- ¹	1,350	-- ¹
Confluence with Agua Hedionda Creek	5.9	-- ¹	-- ¹	1,740	-- ¹
Carmel Valley Creek					
Above Confluence with Soledad Canyon	15.7	2,100	6,500	9,800	21,300
Below Confluence with Shaw Valley Creek	11.0	1,400	4,200	6,300	13,700
Carroll Canyon Creek					
At Atchison, Topeka & Santa Fe Railway	17.8	1,500	4,500	6,700	18,700
At Interstate Highway 805	15.0	1,300	3,800	5,600	15,700
At Carroll Canyon Road	12.0	1,000	3,000	4,500	12,500
Coleman Creek					
Approximately 1,800 Feet Downstream of Highway 78	8.1	-- ¹	-- ¹	8,750	-- ¹

¹Data Not Available

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
Las Puleta Creek					
At San Diego and Arizona Eastern Railroad	2.8	550	1,200	1,400	2,500
Downstream of Confluence with Logan					
Avenue Branch	1.5	300	730	870	1,690
At 47th Street	0.8	160	390	470	910
0.6 Mile Upstream of Cervantes Avenue	0.1	20	50	60	120
Lawson Valley Creek					
Approximately 7,200 Feet Upstream of Mouth	10.2	--1	--1	9,000	--1
Loma Alta Creek					
At Mouth	9.1	800	2,500	3,800	8,200
Downstream of El Camino Real	4.7	450	1,500	2,200	4,800
Upstream of El Camino Real	2.9	350	1,100	1,700	3,700
Los Penasquitos Creek					
Above Confluence with Soledad Canyon	58.3	3,700	11,300	16,800	37,600
At U.S. Highway 395	42.7	3,100	10,000	15,400	35,800
Upstream of Confluence with Chicarita Creek	33.6	2,500	8,700	14,000	34,000
Lusardi Creek					
At Mouth	8.6	--1	--1	5,680	--1
Mexican Canyon Creek					
At Confluence with Sweetwater River	4.7	360	1,480	2,250	3,300
At U.S. Highway 94, 9,600 Feet Upstream of Confluence	2.0	160	700	1,060	1,470

¹Data Not Available

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
Eucalyptus Hills West Branch At Riverside Drive	1.9	-- ¹	-- ¹	970	-- ¹
Fire Canyon At Apex of Alluvial Fan	0.8	200	550	900	1,500
Florida Drive Branch Above Confluence with Switzer Creek	2.5	490	1,120	1,350	2,340
Forester Creek At Terra Lane	3.1	-- ¹	-- ¹	1,420	-- ¹
Forester Creek - Carlton Hills Boulevard At Mission Gorge Road	-- ¹	-- ¹	2,400	3,900	10,000
Garrison Creek At Confluence with Loma Alta Creek	2.24	230	780	1,130	1,940
6,500 Feet Upstream of El Camino Real	0.97	110	340	570	970
Gopher Canyon Creek At Mouth	11.0	-- ¹	-- ¹	7,690	-- ¹
Green Valley Creek At Corporate Limits with City of San Diego	3.2	950	2,050	2,700	4,700
At Orchard Bend Road	1.5	450	925	1,200	2,000
Green Valley Creek Tributary At Confluence with Green Valley Creek	0.3	80	200	300	600
Harbison Canyon Creek At Noakes Street Crossing	-- ¹	500	-- ¹	2,100	-- ¹
At Warfield Way Crossing	-- ¹	750	-- ¹	3,000	-- ¹
At Collier Way Crossing	-- ¹	775	-- ¹	3,200	-- ¹
At Dehesa Road Crossing	-- ¹	1,050	-- ¹	4,700	-- ¹

¹Data Not Available

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
Nestor Creek					
At Palm Avenue	2.75	-- ¹	-- ¹	1,093	-- ¹
At 19th Street	-- ¹	-- ¹	-- ¹	864 ²	-- ¹
At Elm Avenue	2.45	-- ¹	-- ¹	796 ²	-- ¹
At Coronado Avenue	2.33	-- ¹	-- ¹	698 ²	-- ¹
At Hollister Street	1.99	-- ¹	-- ¹	496 ²	-- ¹
At 25th Street/Interstate 5	1.71	-- ¹	-- ¹	456 ²	-- ¹
At San Diego and Arizona Eastern Railroad	1.40	515	800	945	2,155
North Branch Poway Creek					
At Sycamore Canyon Road	4.5	650	2,000	3,000	7,200
North Tributary to Santa Maria Creek					
At Mouth	1.6	100	600	1,100	2,900
Olive Creek					
At Mouth	1.0	-- ¹	-- ¹	1,370	-- ¹
Otay River					
At Otay Valley Road	122.7	1,200	12,000	22,000	50,000
Pala Mesa Creek					
Approximately 265 Feet Upstream of Interstate Highway 15	2.1	-- ¹	-- ¹	1,700	-- ¹
Pauma Creek					
At Apex of Alluvial Fan	14.7	1,550	6,270	10,480	30,460
Pilgrim Creek					
Upstream End of Oceanside Golf Course	14.0	-- ¹	-- ¹	5,775	-- ¹
Downstream End of Oceanside Golf Course	14.0	-- ¹	-- ¹	1,440	
Just Upstream of the Confluence with Windmill Creek	15.8	-- ¹	-- ¹	2,020	-- ¹
At Mouth	19.0	-- ¹	-- ¹	2,810	-- ¹
Poggi Canyon Creek					
At City of Chula Vista Corporate Limit	3.74	180	830	1,280	2,470
At Confluence with Otay River	4.63	220	930	1,400	2,630

¹Data Not Available

²Decrease Due to Construction of "Lot 6 Detention Basin" Upstream of Railroad

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

¹Data Not Available²Discharge Decreases With Increasing Area Due to Breakouts From the Low Flow Channel