FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 2 OF 5

LOS ANGELES COUNTY, CALIFORNIA

AND INCORPORATED AREAS

COMMUNITY NAME	NUMBER	COMMUNITY NAME	NUMBER
CITY OF AGOURA HILLS	065072	CITY OF COMMERCE	060110
CITY OF ALHAMBRA*	060095	CITY OF COMPTON	060111
CITY OF ARCADIA*	065014	CITY OF COVINA*	065024
CITY OF ARTESIA*	060097	CITY OF CUDAHY	060657
CITY OF AVALON	060098	CITY OF CULVER CITY	060114
CITY OF AZUSA	065015	CITY OF DIAMOND BAR	060741
CITY OF BALDWIN PARK*	060100	CITY OF DOWNEY	060645
CITY OF BELL*	060101	CITY OF DUARTE*	065026
CITY OF BELL GARDENS	060656	CITY OF EL MONTE*	060658
CITY OF BELLFLOWER	060102	CITY OF EL SEGUNDO	060118
CITY OF BEVERLY HILLS*	060655	CITY OF GARDENA	060119
CITY OF BRADBURY*	065017	CITY OF GLENDALE*	065030
CITY OF BURBANK	065018	CITY OF GLENDORA	065031
CITY OF CALABASAS	060749	CITY OF HAWAIIAN GARDENS*	065032
CITY OF CARSON	060107	CITY OF HAWTHORNE*	060123
CITY OF CERRITOS	060108	CITY OF HERMOSA BEACH	060124
CITY OF CLAREMONT*	060109	CITY OF HIDDEN HILLS	060125

*No Special Flood Hazard Areas Identified

REVISED: April 4, 2018

FLOOD INSURANCE STUDY NUMBER

06037CV002C

Version Number 2.3.3.2

COMMUNITY NAME	NUMBER	COMMUNITY NAME	NUMBER
CITY OF HUNTINGTON PARK*	060126	CITY OF POMONA*	060149
CITY OF INDUSTRY*	065035	CITY OF RACHO PALOS VERDES	060464
CITY OF INGLEWOOD*	065036	CITY OF REDONDO BEACH	060150
CITY OF IRWINDALE*	060129	CITY OF ROLLING HILLS*	060151
CITY OF LA CANADA FLINTRIDGE*	060669	CITY OF ROLLING HILLS ESTATES*	065054
CITY OF LA HABRA HEIGHTS*	060701	CITY OF ROSEMEAD*	060153
CITY OF LA MIRADA	060131	CITY OF SAN DIMAS	060154
CITY OF LA PUENTE*	065039	CITY OF SAN FERNANDO*	060628
CITY OF LA VERNE	060133	CITY OF SAN GABRIEL*	065055
CITY OF LAKEWOOD	060130	CITY OF SAN MARINO*	065057
CITY OF LANCASTER	060672	CITY OF SANTA CLARITA	060729
CITY OF LAWNDALE*	060134	CITY OF SANTA FE SPRINGS	060158
CITY OF LOMITA*	060135	CITY OF SANTA MONICA	060159
CITY OF LONG BEACH	060136	CITY OF SIERRA MADRE*	065059
CITY OF LOS ANGELES	060137	CITY OF SIGNAL HILL*	060161
CITY OF LYNWOOD	060635	CITY OF SOUTH EL MONTE*	060162
CITY OF MALIBU	060745	CITY OF SOUTH GATE	060163
CITY OF MANHATTAN BEACH	060138	CITY OF SOUTH PASADENA*	065061
CITY OF MAYWOOD*	060651	CITY OF TEMPLE CITY*	060653
CITY OF MONROVIA*	065046	CITY OF TORRANCE	060165
CITY OF MONTEBELLO	060141	CITY OF VERNON*	060166
CITY OF MONTEREY PARK*	065047	CITY OF WALNUT*	065069
CITY OF NORWALK	060652	CITY OF WEST COVINA	060666
CITY OF PALMDALE	060144	CITY OF WEST HOLLYWOOD	060720
CITY OF PALOS VERDES ESTATES	060145	CITY OF WESTLAKE VILLAGE	060744
CITY OF PARAMOUNT	065049	CITY OF WHITTIER	060169
CITY OF PASADENA*	065050	LOS ANGELES COUNTY UNINCORPORATED AREAS	065043
CITY OF PICO RIVERA	060148		

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FEMA

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SECTION 5.0 – ENGINEERING METHODS

For the flooding sources in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded at least once on the average during any 10-, 25-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 25-, 50-, 100-, and 500-year floods, have a 10-, 4-, 2-, 1-, and 0.2% annual chance, respectively, of being equaled or exceeded during any year.

Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedance) during the term of a 30-year mortgage is approximately 26 percent (about 3 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

The engineering analyses described here incorporate the results of previously issued Letters of Map Change (LOMCs) listed in Table 27, "Incorporated Letters of Map Change", which include Letters of Map Revision (LOMRs). For more information about LOMRs, refer to Section 6.5, "FIRM Revisions."

5.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied. Hydrologic analyses are typically performed at the watershed level. Depending on factors such as watershed size and shape, land use and urbanization, and natural or man-made storage, various models or methodologies may be applied. A summary of the hydrologic methods applied to develop the discharges used in the hydraulic analyses for each stream is provided in Table 13. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

A summary of the discharges is provided in Table 10. Frequency Discharge-Drainage Area Curves used to develop the hydrologic models may also be shown in Figure 7 for selected flooding sources. A summary of stillwater elevations developed for non-coastal flooding sources is provided in Table 11. (Coastal stillwater elevations are discussed in Section 5.3 and shown in Table 17.) Stream gage information is provided in Table 12.

Table 10: Summary of Discharges

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Amargosa Creek	East of Antelope Valley Freeway North of Avenue H	206	3,000	*	9,000	13,000	*	30,000
Amargosa Creek	West of Antelope Valley Freeway North of Avenue H	147	2,000	*	5,600	8,400	*	18,000
Amargosa Creek	Approximately Midway between 20th Street West and 10th Street West	32.7	1,800	*	3,300	5,000	*	10,100
Amargosa Creek	At 10th Street West	32.0	*	*	*	2,364	*	*
Amargosa Creek	At 25th Street West Bridge	30.0	*	*	*	2,341	*	*
Amargosa Creek	At Elizabeth Lake Ford Crossing	28.6	*	*	*	2,288	*	*
Amargosa Creek	At Vineyard Ranch	26.5	*	*	*	2,063	*	*
Amargosa Creek	At Outlet of Ritter Ranch Detention Pond	23.8	*	*	*	1,856	*	*
Amargosa Creek	At 90th Street West	6.9	580	*	2,000	3,100	*	4,500
Amargosa Creek Tributary	Intersection of Avenue I and Spearman Avenue	7.2	310	*	900	1,220	*	2,400

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Amargosa Creek Tributary	Intersection of Avenue L and 3rd Street East	2.4	150	*	420	560	*	1,000
Amargosa Creek Tributary	Avenue M and Valleyline Drive	1.8	120	*	340	460	*	850
Anaverde Creek	Acton Canyon Road, Escondido Canyon Road, and Crown Valley Road	20.3	*	*	*	3,421	*	6,052
Anaverde Creek	West of Sierra Highway at Avenue P-8	19.0	700	*	2,100	3,100	*	6,600
Anaverde Creek	At Antelope Freeway	16.4	*	*	*	3,730	*	*
Anaverde Creek	East of Antelope Valley Freeway	16.0	700	*	2,100	3,000	*	6,400
Anaverde Creek	1.85 Miles Downstream of California Aqueduct	15.7	*	*	*	3,630	*	*
Anaverde Creek	1.47 miles Downstream of California Aqueduct	12.8	*	*	*	3,200	*	*
Anaverde Creek	0.75 miles Downstream of California Aqueduct	11.8	*	*	*	3,050	*	*
Anaverde Creek	At California Aqueduct	8.3	*	*	*	2,440	*	*

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Anaverde Creek	3,000 feet East of 165th Street East and 4.000 feet South of Pearblossom Highway	7.3	500	*	1,700	2,300	*	4,700
Anaverde Creek	West of 136th Street East at Avenue W-8	2.4	440	*	1,500	1,900	*	3,900
Anaverde Creek	165th Street East Approximately 4,000 feet South of Pearblossom Highway	1.0	370	*	1,300	1,600	*	3,100
Anaverde Creek Tributary	Division Street between Avenue P and Avenue P-8	1.4	300	*	1,100	1,600	*	3,000
Avalon Canyon	At Cross Section A	3.7	859	*	1,895	2,419	*	3,785
Avalon Canyon	At Cross Section G	1.8	440	*	971	1,239	*	1,938
Ballona Creek	At intersection of Adams Boulevard and Genesee Avenue	16.7	2,100	*	4,700	6,000	*	9,400
Bel Air Estates Shallow Flooding	Beverly Glen Boulevard North of Sunset Boulevard	1.2	700	*	1,000	1,200	*	1,600
Bel Air Estates Shallow Flooding	Stone Canyon Road South of Bellagio Road	1.0	630	*	940	1,100	*	1,400

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Bel Air Estates Shallow Flooding	Stone Canyon Road South of Somma Way	0.7	480	*	710	800	*	1,100
Big Rock Wash	At mouth, Southwest	23.0	*	*	*	15,000	*	*
Big Tujunga Canyon	Upstream of Wheatland Avenue	43.3	9,300	*	26,800	38,900	*	66,000
Big Tujunga Canyon	Approximately 1,200 feet Upstream of Foothill Boulevard and Tujuna Valley Street	34.6	8,100	*	24,700	36,500	*	62,600
Bouquet Canyon	Approximately 2,600 feet upstream of Bouquet Canyon Road	32.1	*	*	*	11,117	*	22,707
Bouquet Canyon	Approximately 4,500 feet Upstream of Vasquez Canyon Road	38.6	*	*	*	11,303	*	23,161
Brentwood Shallow Flooding	North of San Vicente Boulevard, West of Westgate Avenue	0.2	60	*	140	180	*	280
Brentwood Shallow Flooding	Northeast of Sunset Boulevard and Barrington Avenue	0.2	230	*	340	390	*	520

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Castaic Canyon	Approximately 2,100 feet Upstream of Confluence with Charlie Canyon	16.8	*	*	*	11,805	*	22,326
Century City Shallow Flooding	Northwest of Santa Monica Boulevard and Avenue of the Stars	0.5	400	*	590	700	*	900
Chatsworth Shallow Flooding	Vicinity of Variel Avenue and Chatsworth Street	13.4	2,100	*	4,700	6,000	*	9,300
Chatsworth Shallow Flooding	Vicinity of Santa Susana Pass Road and Santa Susana Avenue	1.5	450	*	990	1,300	*	2,000
Chatsworth Shallow Flooding	Vicinity of Chatsworth Street and Corbin Avenue	0.9	220	*	480	610	*	960
Chatsworth Shallow Flooding	Vicinity of Canoga Avenue and Devonshire Street	0.8	230	*	510	650	*	1,000
Chatsworth Shallow Flooding	Vicinity of Valley Circle Boulevard and Lassen Street	0.8	220	*	480	600	*	950
Chatsworth Shallow Flooding	Vicinity of Farrolone Avenue and Lassen Street	0.4	100	*	220	280	*	440

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Chatsworth Shallow Flooding	Vicinity of Topanga Canyon Boulevard and Lassen Street	0.3	50	*	120	150	*	230
Chatsworth Shallow Flooding	Vicinity of Topanga Canyon Boulevard and Santa Susana Place	0.1	20	*	50	60	*	100
Cheseboro Creek	1,100 feet Upstream of Driver Avenue	7.6	2,169	*	4,779	6,088	*	9,551
Cold Creek	Cross Section A	8.1	2,280	*	5,019	6,406	*	10,023
Cold Creek	Cross Section C	7.8	2,280	*	5,041	6,432	*	10,066
Cold Creek	Cross Section G	5.7	1,734	*	3,826	4,881	*	7,640
Dark Canyon	Cross Section A	1.2	753	*	1,600	2,118	*	3,314
Dowd Canyon Creek	At Calle Corona Extended	3.9	*	*	*	2,982	*	5,963
Dry Canyon	Approximately 2,000 feet Upstream of San Francisquito Road	5.5	*	*	*	5,235	*	10,470
Dry Canyon	Cross Section C	1.1	527	*	1,104	1,484	*	2,323
Dry Canyon	Cross Section M	0.8	490	*	1,083	1,382	*	2,162
Dry Canyon	Cross Section T	0.4	242	*	534	681	*	1,065
Elizabeth Canyon Creek	Approximately 2,300 feet Downstream of Elizabeth Lake Pine Canyon Road	7.7	*	*	*	3,455	*	7,176

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Escondido Canyon	Cross Section B	3.2	958		2,116	2,700		4,226
Escondido Canyon	Cross Section F	1.7	986		2,176	2,778		4,346
Garapito Canyon	Cross Section A	2.9	996	*	2,171	2,807	*	4,392
Garapito Canyon	Cross Section E	2.0	675	*	1,470	1,910	*	2,974
Gorman Creek	Approximately 250 feet North of Interstate Highway 5 Overcrossing Gorman Road	3.8	*	*	*	1,713	*	3,221
Granada Hills Shallow Flooding	Superior Street, West of Paso Robles Avenue	0.5	90	*	200	260	*	400
Granada Hills Shallow Flooding	Vicinity of Balboa Boulevard and Citronia Street	0.5	90	*	200	260	*	400
Hacienda Creek	Cross Section A	1.5	626	*	1,381	1,762	*	2,758
Halsey Canyon	Approximately 1,150 feet Downstream of Halsey Canyon Road	7.3	*	*	*	5,544	*	10,163

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Halsey Canyon	Approximately 550 feet Downstream of Romero Canyon Road	5.9	*	*	*	4,523	*	8,292
Hancock Park Shallow Flooding	Vicinity of Highland Avenue and St. Elmo Drive	20.2	3,600	*	7,700	9,300	*	13,700
Hancock Park Shallow Flooding	Vicinity of San Vicente and Pico Boulevards	18.9	3,500	*	7,400	9,000	*	13,100
Hancock Park Shallow Flooding	Vicinity of West Boulevard and Dockweiler Street	18.8	3,600	*	7,600	9,300	*	13,600
Hancock Park Shallow Flooding	Vicinity of Bronson Avenue and Country Club Drive	18.1	3,700	*	7,900	9,600	*	14,000
Hancock Park Shallow Flooding	Sixth Street, Vicinity of Alexandria Avenue	8.1	2,100	*	4,600	5,900	*	9,200
Hancock Park Shallow Flooding	Chesapeake Avenue, Vicinity of Exposition Boulevard	8.0	1,100	*	2,400	3,000	*	3,700
Hancock Park Shallow Flooding	Vicinity of Western Avenue and 11th Street	3.5	670	*	1,300	1,600	*	2,500
Hancock Park Shallow Flooding	Victoria Avenue, Vicinity of Jefferson Boulervard	1.2	320	*	1,100	1,400	*	2,600

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Hancock Park Shallow Flooding	Arlington Avenue,Vicinity of 37th Place	0.8	440	*	990	1,400	*	2,500
Hancock Park Shallow Flooding	Olympic Boulevard at Hudson Avenue	0.6	130	*	290	370	*	570
Hancock Park Shallow Flooding	Harcourt Avenue, Vicinity of Westhaven Street	0.5	160	*	350	450	*	700
Hancock Park Shallow Flooding	Lucerne Boulevard at Francis Avenue	0.3	70	*	160	200	*	320
Harbor Area Shallow Flooding	North of Carson Street Between Vermont and Berendo Avenues	0.4	74	*	164	209	*	327
Harbor Lake	Southeast of Vermont Avenue and Pacific Coast Highway	19.0	3,200	*	7,000	8,900	*	14,000
Harbor District Shallow Flooding	Denker Avenue, Vicinity of 204th Street	0.3	60	*	130	170	*	260
Haskell Canyon	Approximately 1,300 feet Downstream of Headworks	6.7	*	*	*	5,363	*	10,516

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Haskell Canyon	Approximately 6,400 feet Upstream of Confluence with Bouquet Canyon	10.4	*	*	*	7,268	*	14,072
Hollywood Shallow Flooding	Third Street at Kenmore Avenue	3.4	800	*	1,800	2,300	*	3,500
Hollywood Shallow Flooding	South of Hollywood Freeway, Vicinity of Kenmore Avenue	3.2	830	*	1,800	2,300	*	3,700
Hollywood Shallow Flooding	Santa Monica Boulevard, Vicinity of Mariposa Avenue	2.8	940	*	2,100	2,700	*	4,200
Hollywood Shallow Flooding	Madison Avenue at Monroe Street	0.5	160	*	350	440	*	690
Hyde Park	South of Southwest Drive,Vicinity of Van Ness Avenue	4.2	730	*	1,600	2,100	*	3,200
Hyde Park	Wilton Place, Vicinity of Gage Avenue	3.3	770	*	1,600	1,900	*	3,000
Hyde Park	Halldale Avenue, Vicinity of 65th Street	1.2	300	*	660	850	*	1,300
Industry Area Shallow Flooding	Vicinity of Brea Canyon Road and Lycoming Street	3.9	952	*	2,102	2,682	*	4,197

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Iron Canyon	Approximately 2,000 feet Upstream of Sand Canyon Road	2.8	*	*	*	2,078	*	2,833
Kagel Canyon Area	Cross Section A	2.0	490	*	1,081	1,380	*	2,159
Kagel Canyon	Approximately 650 feet Upstream of Osborne Avenue	2.0	490	*	1,100	1,400	*	12,200
La Mirada Area Shallow Flooding	Mystic Street, Vicinity of Parkinson Avenue	0.3	81	*	179	228	*	357
La Mirada Creek	Approximately 1,100 feet Downstream of La Mirada Boulevard	5.0	610	*	1,350	1,720	*	2,690
La Mirada Creek	At Ocaso Avenue	4.6	610	*	1,340	1,700	*	2,670
Las Flores Canyon	Cross Section F	4.1	1,758	*	3,882	4,954	*	7,752
Las Virgenes Creek	Approximately 1,500 feet downstream of the confluence of Stokes Canyon	24.3	9,230	11,913	13,678	15,521	*	18,704
Las Virgenes Creek	Downstream of the confluence of Stokes Canyon	24.3	9,228	11,909	13,673	15,515	*	18,811

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Las Virgenes Creek	Upstream of the confluence of Stokes Canyon	19.7	9,193	12,066	13,766	15,646	*	19,340
Las Virgenes Creek	At Mulholland Highway	19.1	6,873	9,014	10,346	11,929	*	14,853
Las Virgenes Creek	Upstream of the confluence of Liberty Canyon	16.6	6,871	9,025	10,348	11,935	*	15,210
Las Virgenes Creek	Approximately 1,500 feet upstream of the confluence of Liberty Canyon	16.5	5,862	7,440	8,799	10,069	*	12,755
Las Virgenes Creek	Approximately 4,000 feet upstream of the confluence of Liberty Canyon	16.2	5,783	7,350	8,676	9,913	*	12,554
Las Virgenes Creek	Approximately 1,800 feet downstream of Lost Hills Road	15.0	5,414	6,923	8,112	9,246	*	11,714
Las Virgenes Creek	At Lost Hills Road	15.0	5,420	6,932	8,133	9,281	*	11,764
Las Virgenes Creek	At Meadow Creek Lane	14.9	5,414	6,923	8,124	9,269	*	11,751
Las Virgenes Creek	Approximately 1,600 feet upstream of Meadow Creek Lane	13.3	4,860	6,190	7,211	8,197	*	10,356

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Las Virgenes Creek	Just downstream of Agola Road	12.7	4,783	6,091	7,040	8,005	*	10,076
Las Virgenes Creek	Just downstream of US Highway 101	10.4	3,830	4,875	5,644	6,419	*	8,137
Las Virgenes Creek	Just downstream of Las Virgenes Road	10.2	3,787	4,818	5,577	6,340	*	8,044
Liberty Canyon	Cross Section E	1.4	938	*	2,072	2,645	*	4,140
Lindero Canyon	Cross Section N	3.1	1,258	*	2,776	3,542	*	5,545
Lindero Canyon	At Reyes Adobe Road (Cross Section M)	3.4	1,290	*	2,847	3,632	*	5,685
Lindero Canyon	Cross Section H	3.8	1,343	*	2,965	3,783	*	5,920
Lindero Canyon	Approsimately 700 feet Downstream of Thousand Oaks Boulevard	4.1	1,369	*	3,024	3,858	*	6,037
Lindero Canyon	Cross Section C	6.7	1,725	*	3,809	4,860	*	7,604
Little Rock Wash	At Little Rock Reservoir	48.0	*	*	*	20,000	*	*
Little Tujunga Wash	Approximately 1,600 feet Upstream of Foothill Boulevard	20.3	2,700	*	6,000	7,700	*	12,200
Little Tujunga Wash	Approximately 3,000 feet Upstream of the City of Los Angeles Corporate Limits	17.9	2,273	*	5,019	6,405	*	10,022

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Lobo Canyon	Cross Section B	3.8	1,572	*	3,473	4,429	*	6,932
Lobo Canyon	Cross Section C	2.5	1,625	*	3,588	4,579	*	7,166
Lockheed Drain Channel	Approximately 100 feet Downstream of Burbank Boulevard	3.7	*	*	*	2,910	*	*
Lockheed Drain Channel	Approximately 300 feet Downstream of Victory Place	2.5	*	*	*	2,410	*	*
Lockheed Drain Channel	Approximately 100 feet Downstream of Naomi Street	1.9	*	*	*	2,026	*	*
Lockheed Drain Channel	At Ontario Street	1.8	*	*	*	2,054	*	*
Lockheed Drain Channel	Approximately 300 feet Upstream of Lima Street	1.4	*	*	*	1,635	*	*
Lockheed Drain Channel	Approximately 150 feet Downstream of Hollywood Way	0.9	*	*	*	965	*	*
Lockheed Drain Channel	Approximately 450 feet Upstream of Clybourn Avenue	0.4	278	*	*	448	*	*
Lopez Canyon Channel	Cross Section A	1.8	682	*	1,506	1,922	*	3,007
Los Angeles River	At Compton Creek	808	92,900	*	133,000	142,000	*	143,000
Los Angeles River	At Imperial Highway	752	89,400	*	126,000	140,000	*	156,000

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Malibu Creek	Cross Section A	110	14,183	*	31,648	40,544	*	63,934
Malibu Lake	Malibu Lake	64.6	11,859	*	26,556	34,043	*	53,712
Medea Canyon	Cross Section B	24.6	5,794	*	12,788	16,319	*	25,537
Medea Canyon	Cross Section H	23.0	6,174	*	13,628	17,389	*	25,537
Medea Canyon	Cross Section K	22.2	6,363	*	14,074	17,925	*	28,049
Medea Canyon	Cross Section P	6.3	2,558	*	5,647	7,204	*	11,272
Medea Creek	Downstream of Venture Highway	6.3	2,560	*	2,645	7,200	*	11,270
Medea Creek	Approximately 950 feet Upstream of Canwood Street	[1]	*	*	*	6,720	*	*
Medea Creek	Approximately 1,100 feet Upstream of Kanan Road	[1]	*	*	*	5,960	*	*
Medea Creek	At Thousand Oaks Boulevard	[1]	*	*	*	5,946	*	*
Medea Creek	Approximately 1,700 feet Downstream of Laro Drive	4.1	*	*	*	5,320	*	*
Medea Creek	Approximately 575 feet Downstream of Fountainwood Street	3.9	*	*	*	5,240	*	*
Medea Creek	Just Upstream of Fountainwood Street	3.4	*	*	*	4,700	*	*

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Mill Creek	Cross Section B	14.8	2,274	*	5,019	6,405	*	10,024
Mint Canyon	Approximately 1,600 feet Downstream of Sierra Highway Crossing	29.3	*	*	*	8.300	*	14,581
Mint Canyon	Approximately 3,600 feet Downstream of Vasquez Canyon Road	26.8	*	*	*	7,896	*	14,179
Mint Canyon	Approximately 2,600 feet Downstream of Davenport Road	19.9	*	*	*	6,691	*	12,604
Newhall Creek	Approximately 650 feet Downstream of Railroad Canyon	7.3	*	*	*	3,892	*	6,228
Newhall Creek	Approximately 650 feet Upstream of Railroad Canyon	6.2	*	*	*	3,390	*	5,424
Newhall Creek	Approximately 800 feet Upstream of Railroad Canyon	5.2	*	*	*	3,224	*	4,396
Oak Springs Canyon	Approximately 100 feet Upstream of Union Pacific Railroad (former Southern Pacific Railroad)	5.7	*	*	*	2,703	*	4,054

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Old Topanga Canyon	Cross Section E	1.7	567	*	1,253	1,597	*	2,499
Old Topanga Canyon	Cross Section H	0.8	251	*	554	706	*	1,104
Overland Flow	Marquardt Avenue, 1400 feet North of Rosecrans Avenue	2.1	411	*	907	1,158	*	1,812
Overland Flow	North of Florence Avenue and East of Pioneer Boulevard	1.3	270	*	596	760	*	1,190
Overland Flow	North of Lakeland Road, 1000 feet East of Bloomfield Avenue	0.4	68	*	151	192	*	301
Palo Comando Creek	Cross Section E	4.1	1,159	*	2,562	3,268	*	5,113
Palo Comando Creek	At Fairview Place (Cross Section J)	3.5	1,074	*	2,374	3,028	*	4,738
Palo Comando Creek	Cross Section K	3.2	1,032	*	2,279	2,908	*	4,551
Park La Brea Shallow Flooding	Vicinity of Orange Drive and Pickford Street	24.7	4,400	*	9,500	11,800	*	17,700
Park La Brea Shallow Flooding	Venice Boulevard, Vicinity of Fairfax Avenue	18.4	3,400	*	7,500	9,500	*	14,900

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Park La Brea Shallow Flooding	Vicinity of Whitworth Drive and La Cienega Boulevard	17.1	3,400	*	7,600	9,700	*	15,200
Park La Brea Shallow Flooding	Fairfax Avenue, Vicinity of La Cienega Boulevard	16.7	2,100	*	4,700	6,000	*	9,600
Park La Brea Shallow Flooding	Houser Boulevard,Vicinity of La Cienega Boulevard	14.8	1,900	*	4,300	5,500	*	8,800
Park La Brea Shallow Flooding	Redondo Boulevard,Vicinity of Roseland Street	14.5	2,000	*	4,400	5,700	*	9,100
Park La Brea Shallow Flooding	Wilshire Boulevard, Vicinity of Crescent Heights Avenue	6.6	1,500	*	3,300	4,200	*	6,600
Park La Brea Shallow Flooding	Redondo Boulevard, Vicinity of Santa Monica Freeway	1.2	300	*	670	860	*	1,300
Pine Canyon	Approximately 1,200 feet Upstream of Lake Hughes Road	6.4	*	*	*	2,969	*	6,166
Placerita Creek	Approximately 575 feet Downstream of San Fernando Road	9.3	*	*	*	5,321	*	7,981

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Placerita Creek	Approximately 2,900 feet Upstream of San Fernando Road	8.6	*	*	*	4,988	*	7,482
Placerita Creek	Approximately 2,000 feet Upstream of Quigley Canyon Road	7.1	*	*	*	4,085	*	6,313
Placerita Creek	Approximately 850 feet Downstream of Antelope Valley Freeway	6.3	*	*	*	3,546	*	5,673
Plum Canyon	Approximately 2,350 feet Upstream of Bouquet Canyon Road	3.4	*	*	*	1,942	*	3,453
Ponding	At Intersection of Mines Avenue and Taylor Avenue	0.5	120	*	250	330	*	510
Portal Ridge Wash	Intersection of Avenue H and Antelope Valley Freeway	147	1,600	*	5,000	7,200	*	16,000
Porter Ranch Shallow Flooding	Mayerling Street, Northwest of Shoshone Avenue	0.2	40	*	100	120	*	190
Porter Ranch Shallow Flooding	Vicinity of Sesnon Boulevard	0.1	30	*	60	70	*	120

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Railroad Canyon	Approximately 350 feet Upstream of San Fernando Road	1.2	*	*	*	835	*	1,253
Ramirez Canyon	Cross Section B	3.3	1,066	*	2,352	3,000	*	4,696
Ramirez Canyon	Cross Section I	2.8	1,150	*	2,540	3,240	*	5,070
Rio Hondo	At Stewart and Gray Road	132	35,600	*	41,000	39,300	*	40,200
Rio Hondo	At Beverly Boulevard	113	33,800	*	37,50	38,000	*	38,400
Rio Hondo	At Outflow from Whittier Narrows Dam	110	33,500	*	36,500	36,500	*	36,500
Rustic Canyon	Approximately 1,030 feet Downstream (South) of Sunset Boulevard	5.7	700	*	1,500	2,000	*	3,100
San Fernando Pacoima Wash	Approximately 150 feet Downstream of Shablow Avenue	31.1	1,900	*	5,600	8,100	*	12,100
San Francisquito Canyon Creek	At Spunky Road	2.7	*	*	*	2,140	*	4,281
San Gabriel River	Whittier Narrows Flood Control Basin At Siphon Road	524	*	*	*	90,000	*	*

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
San Martinez-Chiquito Canyon	Approximately 250 feet Downstream of Verdale Street	1.1	*	*	*	1,205	*	2,208
San Martinez-Chiquito Canyon	Approximately 400 feet Upstream of Chiquito Canyon Road (Upper Crossing)	3.1	*	*	*	3,112	*	5,705
San Martinez-Chiquito Canyon	Approximately 1,000 feet Upstream of Chiquito Canyon Road (Lower Crossing)	4.7	*	*	*	4,659	*	8,607
Sand Canyon Creek	Approximately 800 feet Upstream of Placerita Canyon Road	6.4	*	*	*	4,371	*	5,961
Sand Canyon Creek	Approximately 2,900 feet Downstream of Placerita Canyon Road	7.3	*	*	*	4,908	*	6,693
Sand Canyon Creek	Approximately 250 feet Downstream of Iron Canyon Confluence	10.1	*	*	*	6,372	*	8,689
Santa Clara River	Approximately 2,600 feet Upstream of Los Angeles Aqueduct	235.4	*	*	*	15,182	*	26,369

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Santa Clara River	At Sand Canyon Road	179	3,840	*	12,810	19,500	*	30,490
Santa Clara River	Approximately 7,600 feet Upstream of Oak Springs Canyon	172.7	*	*	*	13,412	*	22,588
Santa Clara River	Approximately 3,500 feet Upstream of Confluence of Arraste Canyon Road	67.7	*	*	*	8,408	*	13,849
Santa Fe Springs Area Shallow Flooding	Vicinity of Rivera Road and Vicki Drive	0.4	80	*	176	225	*	352
Santa Maria Canyon	Cross Section C	3.1	1,070	*	2,333	3,016	*	4,719
Savage Creek	At Intersection of York Avenue and Mar Vista Street	0.9	260	*	570	730	*	1,150
Sepulveda	Haskell Avenue North of Union Pacific Railroad (former Southern Pacific Railroad)	1.0	230	*	500	640	*	1,000
Sepulveda	Roscoe Boulevard at Haskell Avenue	0.8	160	*	360	460	*	720

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Shallow Flooding	At intersection of Ripley Avenue and Rindge Lane	[1]	61	*	135	172	*	270
Shallow Flooding	At Gould Avenue between Ford and Goodman Avenues	0.0	66	*	146	186	*	291
Shallow Flooding	At intersection of Sixth Street and Quincy Avenue	1.0	271	*	598	763	*	1,194
Shallow Flooding	At intersection of Vincent Street and South Irena Avenue	[1]	68	*	149	190	*	298
Shallow Flooding	At intersection of Camino Real and South Juanita Avenue	10.0	50	*	111	141	*	221
Shallow Flooding	At intersection of Avenue H and Massena Avenue	5[2]	154	*	340	434	*	679
Sherman Oaks Shallow Flooding	Magnolia Boulevard at Haskell Avenue	1.2	360	*	800	1,000	*	1,600
Silver Lake Shallow Flooding	Myra Avenue, Vicinity of Del Mar Avenue	1.8	490	*	1,110	1,400	*	2,200
Silver Lake Shallow Flooding	Silver Lake Boulevard East of Virgil Avenue	1.3	420	*	900	1,100	*	1,800

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Silver Lake Shallow Flooding	Between Hyperion Avenue and Griffith Park Boulevard, North of Fountain Avenue	0.9	290	*	650	830	*	1,300
Silver Lake Shallow Flooding	Griffith Park Boulevard at Tracy Street	0.6	220	*	490	620	*	970
South Fork Santa Clara River	Approximately 500 feet Downstream of Wiley Canyon Road	12.9	*	*	*	8,483	*	13,704
South Fork Santa Clara River	Approximately 600 feet Downstream of Golden State Freeway	12.8	*	*	*	8,417	*	13,596
Spade Springs Canyon	At confluence with Mint Canyon	4.5	471	*	1,099	1,364	*	1,839
Spade Springs Canyon	At boundary of Angeles National Forest	3.4	428	*	911	1,118	*	1,491
Stokes Canyon	Cross Section C	2.9	1,089	*	2,403	3,067	*	4,799
Stokes Canyon	Cross Section B	2.4	934	*	2,062	2,631	*	4,117
Surface Runoff	At Intersection of Garfield Avenue and Beverly Boulevard	2.9	820	*	1,810	2,310	*	3,610

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Surface Runoff	Laurel Canyon Boulevard at Hollywood Boulevard	1.9	600	*	800	1,160	*	2,100
Surface Runoff	Happy Lane	1.7	640	*	1,400	1,800	*	2,800
Surface Runoff	Vicinity of Rosewood Avenue and Huntley Drive West Los Angeles and Central Districts	1.1	670	*	1,479	1,888	*	3,329
Sylmar Area Shallow Flooding	East Side of Golden State Freeway South of Sierra Highway	0.2	50	*	120	150	*	240
Topanga Canyon	Cross Section H	19.6	4,095	*	9,040	11,537	*	18,054
Topanga Canyon	Cross Section M	15.0	5,404	*	11,930	15,223	*	23,882
Topanga Canyon	Cross Section Q	14.5	5,208	*	11,499	14,672	*	22,960
Topanga Canyon	Cross Section T	7.3	2,560	*	5,656	7,215	*	11,289
Topanga Canyon	Cross Section V	7.0	2,364	*	5,222	6,601	*	10,422
Topanga Canyon	Cross Section X	5.5	1,862	*	4,113	5,247	*	8,210
Topanga Canyon	Cross Section AG	0.3	259	*	572	729	*	1,141

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Trancas Creek	Upstream of Pacific Coast Highway (Cross Section A)	8.6	2,499	*	5,518	7,040	*	11,106
Triunfo Creek	Approximately 1,200 feet upstream of Crags Drive	39.22	10,167	14,221	17,118	20,021	*	26,901
Triunfo Creek	Approximately 320 feet downstream of Kanan Road	38.1	9,942	13,861	16,647	19,443	*	26,105
Triunfo Creek	Approximately 1,340 feet upstream of Kanan Road	36.8	9,675	13,464	16,163	18,870	*	25,364
Triunfo Creek	Approximately 4,940 feet upstream of Kanan Road	36.5	9,608	13,366	16,041	18,725	*	25,168
Triunfo Creek	Approximately 7,520 feet upstream of Kanan Road	30.1	8,135	11,278	13,520	15,781	*	21,252
Triunfo Creek	Approximately 11,000 feet upstream of Kanan Road	29.5	7,995	11,074	13,267	15,480	*	20,846
Triunfo Creek	Approximately 2,300 feet downstream of Westlake Dam	29.0	7,874	10,900	13,052	15,226	*	20,505
Triunfo Creek	At Westlake Lake Dam	28.5	7,766	10,748	12,872	15,011	*	20,227

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Turnbull Canyon Ponding	At intersection of Painter Avenue and Camilla Street	1.0	250	*	540	690	*	1,080
Turnbull Canyon Shallow Flooding	Vicinity of Broadway and Alta Drive	1.0	250	*	540	690	*	1,080
Unnamed Canyon (Serra Retreat Area)	Serra Retreat Area (Cross Section C)	0.4	281	*	619	791	*	1,237
Unnamed Stream Main Reach	At Pacific Ocean	1.2	353	*	724	917	*	1,400
Unnamed Stream Main Reach	Downstream of Confluence with Tributary 2	1.1	338	*	692	876	*	1,282
Unnamed Stream Main Reach	Upstream of Confluence with Tributary 2	0.7	229	*	462	580	*	865
Unnamed Stream Main Reach	Upstream of Confluence with Tributary 1	0.4	146	*	290	361	*	523
Unnamed Stream Tributary 1	At Confluence with Main Reach	0.2	97	*	191	236	*	381
Unnamed Stream Tributary 2	At Confluence with Main Reach	0.4	164	*	331	413	*	600

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Unnamed Stream Tributary 2	At Via Zurita	0.4	144	*	290	361	*	525
Van Nuys	Victory Boulevard, Vicinity of Hayvenhurst Avenue	0.7	90	*	200	250	*	390
Vasquez Canyon	Approximately 1,373 feet Upstream of Vasquez Canyon Road	4.2	*	*	*	2,851	*	5,009
Violin Canyon	Approximately 2,000 feet Downstream of Interstate Highway 5	10.5	*	*	*	9,421	*	17,818
Weldon Canyon	Approximately 1,570 feet Downstream of Sierra Highway and San Fernando Road	1.5	410	*	900	1,150	*	1,800
West Hollywood Shallow Flooding	Third Street, Vicinity of Fairfax Avenue	6.1	1,500	*	3,200	4,100	*	6,800
West Hollywood Shallow Flooding	Fifth Street, Vicinity of Orlando Avenue	5.7	1,600	*	3,600	4,500	*	7,100

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
West Hollywood Shallow Flooding	Third Street, Vicinity of La Cienga Boulevard	5.1	1,600	*	3,500	4,500	*	7,200
West Hollywood Shallow Flooding	Beverly Boulevard, Vicinity of Spaulding Avenue	4.0	730	*	1,600	2,100	*	2,900
West Hollywood Shallow Flooding	Genesse Avenue North of Hollywood Boulevard	1.0	370	*	820	1,000	*	1,600
West Hollywood Shallow Flooding	Vicinity of Pan Pacific Auditorium	4.0	730	*	1,600	3,600	*	4,500
West Hollywood Shallow Flooding	Vicinity of Rosemead Avenue and Huntley Drive	1.1	670	*	1,479	1,888	*	3,329
West Los Angeles Shallow Flooding	Between Westwood Boulevard and Overland Avenue, Vicinity of Exposition Boulevard	4.0	190	*	1,200	1,500	*	2,700
West Los Angeles Shallow Flooding	Manning Avenue, Vicinity of Tennessee Avenue	3.4	530	*	1,300	1,700	*	2,600

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
West Los Angeles Shallow Flooding	Balsam Avenue, Vicinity of Olympic Boulevard	1.2	290	*	550	660	*	940
West Los Angeles Shallow Flooding	Roundtree Road, Vicinity of Manning Avenue	0.7	500	*	740	840	*	1,100
Westchester Shallow Flooding	Arizona Avenue North of Arizona Circle	1.7	340	*	740	950	*	1,500
Westchester Shallow Flooding	Sepulveda Boulevard South of San Diego Freeway	1.4	310	*	690	880	*	1,400
Westlake Shallow Flooding	Vicinity of Wilshire Boulevard West of Hoover Street	1.4	360	*	790	1,000	*	1,600
Whittier Area Shallow Flooding	Vicinity of Turnbull Canyon Road	1.0	246	*	543	692	*	1,084
Whittier Narrows Flood Control Basin	Whittier Narrows Flood Control Basin	524	*	*	*	90,000	*	*
Wildwood Canyon	Approximately 600 feet Upstream of Intersection of Valley Street and Maple Street	0.2	*	*	*	172	*	279

Table 10: Summary of Discharges, Continued

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance Existing	1% Annual Chance Future	0.2% Annual Chance
Woodland Hills Shallow Flooding	Vicinity of Mulholland Drive and Ventura Freeway	2.3	490	*	1,100	1,400	*	2,200
Woodland Hills Shallow Flooding	Vicinity of Saltillo Street and Canoga Avenue	0.3	100	*	250	300	*	500
Zuma Canyon	Cross Section A	8.9	2,024	*	4,469	5,705	*	8,925
Zuma Canyon	Cross Section W	8.4	2,079	*	4,590	5,858	*	9,167

[1] Data not available

[2] Pump capacity

* Not calculated for this Flood Risk Project

Figure 7: Frequency Discharge-Drainage Area Curves

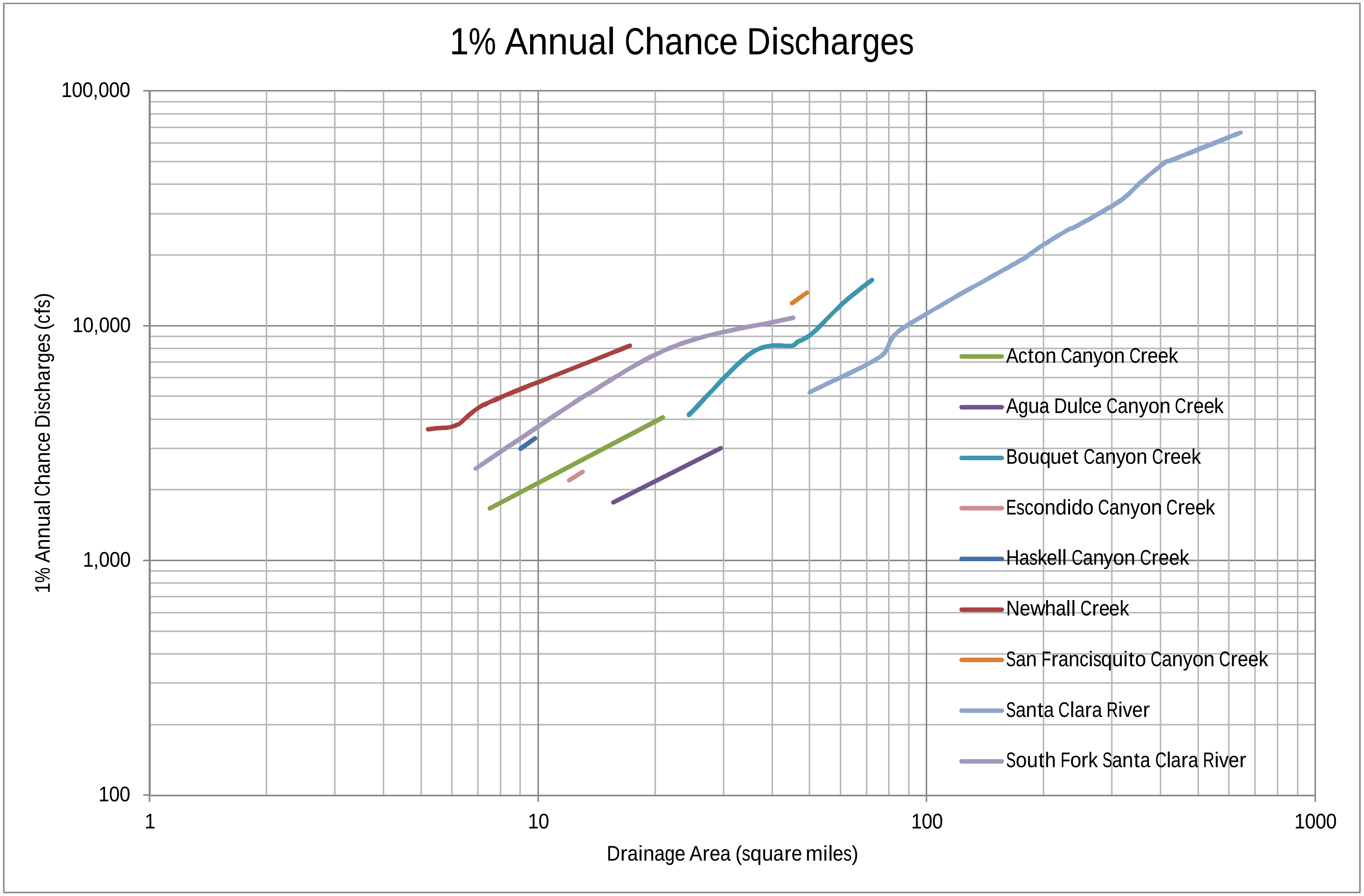

Table 11: Summary of Non-Coastal Stillwater Elevations

Flooding Source	Location	Elevations (feet NAVD88)				
		10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
La Canada Verde Creek	At Marquardt Avenue 1,400 feet North of Rosecrans Avenue	83.8	*	85.8	86.8	88.8
Malibu Lake	At confluence of Triunfo Creek and Medea Creek.	*	*	*	737.0	*
Ponding	600 feet East of Bloomfield Avenue North of Lakeland Road	139.8	*	142.8	143.8	143.8
Ponding	1,000 feet East of Bloomfield Avenue North of Lakeland Road	116.8	*	148.3	148.8	149.8
Rio Hondo Channel	Intersection of Mines Avenue and Taylor Avenue	186.7	*	188.8	188.8	188.8
San Gabriel River	At Whittier Narrows Flood Control Basin	213.8	*	222.8	222.8	231.8
Savage Creek	Intersection of York Avenue and Mar Vista Street	382.8	*	382.8	382.8	382.8
Shallow Flooding	Intersection of Ripley Avenue and Rindge Lane	*	*	62.9	64.9	68.9

Table 11: Summary of Non-Coastal Stillwater Elevations (continued)

Flooding Source	Location	Elevations (feet NAVD88)				
		10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Shallow Flooding	At Gould Avenue between Ford and Goodman Avenues	83.4	*	91.4	95.9	105.9
Shallow Flooding	Intersection of Vincent Street and South Irena Avenue	81.9	*	82.9	83.6	84.9
Shallow Flooding	Intersection of Camino Real and South Juanita Avenue	120.5	*	121.9	122.9	124.3
Shallow Flooding	Intersection of Avenue H and Massena Avenue	61.4	*	64.4	65.4	67.4
Surface Runoff – Deep Ponding Area	Southwest of the Intersection of Carson Street and Madrona Avenue	60.1	*	66.1	68.8	74.8
Surface Runoff – Deep Ponding Area	Intersection of Doris Way and Reese Road	61.6	*	64.8	65.8	67.7
Surface Runoff – Ponding Area	Intersection of Anza Avenue and Spencer Street	82.6	*	83.4	83.8	84.9
Surface Runoff – Ponding Area	Northeast of Sepulveda Boulevard and Madrona Avenue	77.3	*	78.4	78.8	79.5
Surface Runoff – Ponding Area	Intersection of California Street and Alaska Avenue	78.7	*	80.1	80.8	81.6

Table 11: Summary of Non-Coastal Stillwater Elevations (continued)

Flooding Source	Location	Elevations (feet NAVD88) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Turnbull Canyon	Intersection of Painter Avenue and Camilla Street	411.8	*	419.8	420.8	421.8
Westlake Lake	City of Westlake Village	875.5	976.2	876.6	877.1	878.1

* Not calculated for this Flood Risk Project

Table 12: Stream Gage Information used to Determine Discharges

Flooding Source	Gage Identifier	Agency that Maintains Gage	Site Name	Drainage Area (Square Miles)	Period of Record	
					From	To
Aliso Creek	F152B-R	Los Angeles County Flood Control District (LACFCD)	At Nordhoff Street	189	*	*
Ballona Creek	F38C-R	LACFCD	Ballona Creek above Sawtelle Boulevard	88.6	02/27/1928	09/18/2014
Big Rock Creek	10263500	USGS	Big Rock Creek near Valyermo, CA	22.9	02/01/1923	09/18/2014
Big Tujunga Creek	11095500	USGS	Big Tujunga Creek near Sunland, CA	106	11/01/1916	09/30/1977
Burbank Western Flood Control Channel	*	LACFCD	At Tujunga Avenue	401	01/01/1950	*
Compton Creek	F37B-R	LACFCD	Compton Creek near Greenleaf Boulevard	22.6	01/22/1928	09/18/2014
Coyote Creek	3208	LACFCD	Centralia Street	110	34 years	—
Dominguez Channel	*	*	*	33	*	*
Little Rock Creek	L1-R	LACFCD	Little Rock Creek above Little Rock Dam	49.2	10/01/1930	09/18/2014
Los Angeles River	F300-R	LACFCD	At Tujunga Avenue	401	05/08/1950	09/18/2014
Los Angeles River	F57-R	LACFCD	Los Angeles River above Arroyo Seco	511	12/05/1929	09/18/2014

Table 12: Stream Gage Information used to Determine Discharges, Continued

Flooding Source	Gage Identifier	Agency that Maintains Gage	Site Name	Drainage Area (Square Miles)	Period of Record	
					From	To
Los Angeles River Flood Control Channel	*	LACFCD	*	*	*	*
Malibu Creek	F130-R	LACFCD	Malibu Creek below Cold Creek	105	01/17/1931	09/18/2014
San Gabriel River	F262-R	LACFCD	San Gabriel River above Florence Avenue	215.8	08/06/1968	09/18/2014
Sawtelle-Westwood Storm Drain Channel	F301-R	LACFCD	At Culver Boulevard	23	01/01/1951	*
Topanga Creek	F548-R	LACFCD	*	*	*	*
Zuma Creek	F53-R	LACFCD	*	*	*	*

* Data not available

5.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Base flood elevations on the FIRM represent the elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations. These whole-foot elevations may not exactly reflect the elevations derived from the hydraulic analyses. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM. The hydraulic analyses for this FIS were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

For streams for which hydraulic analyses were based on cross sections, locations of selected cross sections are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 6.3), selected cross sections are also listed on Table 24, “Floodway Data.”

A summary of the methods used in hydraulic analyses performed for this project is provided in Table 13. Roughness coefficients are provided in Table 14. Roughness coefficients are values representing the frictional resistance water experiences when passing overland or through a channel. They are used in the calculations to determine water surface elevations. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

Table 13: Summary of Hydrologic and Hydraulic Analyses

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Acton Canyon	—	—	Regional Regression Equations	HEC-2	—	A	
Acton Canyon Creek Tributary 1	—	—	Regional Regression Equations	HEC-2	—	A	
Acton Canyon Creek Tributary 1-A	—	—	Regional Regression Equations	HEC-2	—	A	
Acton Canyon Creek Tributary 2	—	—	Regional Regression Equations	HEC-2	—	A	
Agua Amarge Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Agua Dulce Canyon Creek	Confluence with Santa Clara River	0.8 miles upstream of State Highway 14	Regional Regression Equations	HEC-2	—	A, AO	
Agua Dulce Canyon Creek	Approximately 900 feet upstream of Sierra Highway	0.6 miles upstream of Hierba Road	Regional Regression Equations	HEC-2	—	A	
Agua Dulce Canyon Creek Lateral	Confluence with Agua Dulce Canyon Creek	0.2 miles upstream of confluence with Agua Dulce Canyon Creek	HEC-1	HEC-RAS 3.1.3	08/01/2008	AE w/ Floodway	
Alamitos Bay	—	—	Regional Regression Equations	HEC-2	—	A	
Aliso Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Aliso Creek Creek	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	—	A	
Amargosa Creek	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	11/01/1985	A, AH, AO	
Amargosa Creek	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	11/01/1985	AE	
Amargosa Creek	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	11/01/1985	A, AO	
Amargosa Creek Tributary	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	—	A	
Anaverde Creek	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	11/01/1985	AE w/ Floodway	
Anaverde Creek	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	11/01/1985	A	
Arrastre Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Arroyo Calabasas	—	—	Regional Regression Equations	HEC-2	—	AE	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Arroyo San Miguel	—	—	Regional Regression Equations	HEC-2	08/01/1978	A	
Arroyo Sequit	—	—	Regional Regression Equations	HEC-2	—	A	
Avalon Bay	—	—	Regional Regression Equations	HEC-2	—	AE	
Avalon Canyon Creek	At confluence with Pacific Ocean	0.9 miles upstream of confluence with Pacific Ocean	Regional Regression Equations	HEC-2	—	AE	
Back Channel	—	—	Regional Regression Equations	HEC-2	—	AE	
Ballona Creek	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	—	AE	
Ballona Creek	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	—	A, AO	
Ballona Creek Watershed	—	—	XPSWMM 15.0	XPSWMM 15.0	07/01/2015	AE, X	
Bar Creek	—	—	Regional Regression Equations	HEC-2	—	A, AO	
Bee Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Bee Canyon Creek (2)	—	—	Regional Regression Equations	HEC-2	—	A	
Bee Canyon Creek (3)	—	—	Regional Regression Equations	HEC-2	—	A	
Big Rock Creek	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	—	A	
Big Rock Creek South Fork	—	—	Regional Regression Equations	HEC-2	—	A	
Big Rock Wash	—	—	Regional Regression Equations	HEC-2	—	A	
Big Rock Wash (Profile Base Line)	City of Palmdale Corporate Limits	City of Palmdale Corporate Limits	Regional Regression Equations	HEC-2	11/01/1985	AE	
Big Rock Wash	—	—	Regional Regression Equations	HEC-2	—	A	
Big Tujunga Wash	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	—	A, AO	
Boulder Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Bouquet Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Bouquet Reservoir	—	—	Regional Regression Equations	HEC-2	—	A	
Broad Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Browns Creek	—	—	Regional Regression Equations	HEC-2	—	AO	
California Aqueduct	—	—	Regional Regression Equations	HEC-2	—	A	
Canada De Los Alamos Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Carlos Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Carr Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Castaic Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Castaic Lagoon	—	—	Regional Regression Equations	HEC-2	—	A	
Castaic Lake	—	—	Regional Regression Equations	HEC-2	—	A	
Channel No. 2	—	—	Regional Regression Equations	HEC-2	—	AE	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Channel No. 3	—	—	Regional Regression Equations	HEC-2	—	AE	
Charlie Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Chatsworth Reservoir	—	—	Regional Regression Equations	HEC-2	—	A	
Cherry Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Cheseboro Creek	—	—	Regional Regression Equations	HEC-2	—	AE	
Cold Creek	—	—	Regional Regression Equations	HEC-2	—	AE	
Cold Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Colorado Lagoon	—	—	Regional Regression Equations	HEC-2	—	AE	
Consolidated Channel	—	—	Regional Regression Equations	HEC-2	—	AE	
Coyote Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A, AO	
Coyote Creek	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Cruthers Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Dark Canyon	—	—	Regional Regression Equations	HEC-2	—	AE	
Dark Canyon West Branch	—	—	Regional Regression Equations	HEC-2	—	A	
Dewitt Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Dominguez Channel	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	—	AE	
Dorr Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Dowd Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A, AO	
Dry Canyon	—	—	Regional Regression Equations	HEC-2	—	A, AO	
Dry Canyon	—	—	Regional Regression Equations	HEC-2	—	AE	
East Basin	—	—	Regional Regression Equations	HEC-2	—	AE	
Elizabeth Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A, AO	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Elizabeth Lake	—	—	Regional Regression Equations	HEC-2	—	A	
Elizabeth Lake Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Eller Slough	—	—	Regional Regression Equations	HEC-2	—	A	
Elsmere Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Encino Reservoir	—	—	Regional Regression Equations	HEC-2	—	A	
Entrance Channel (Marina Del Ray)	—	—	Regional Regression Equations	HEC-2	—	AE	
Escondido Canyon	—	—	Regional Regression Equations	HEC-2	—	A	
Escondido Canyon (2)	—	—	Regional Regression Equations	HEC-2	—	AE	
Fenner Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Fish Harbor	—	—	Regional Regression Equations	HEC-2	—	AE	
Flood Control Channel to Aliso Creek	—	—	Regional Regression Equations	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Flowline No. 1	—	—	Regional Regression Equations	HEC-2	10/01/1978	AE	
Garapito Creek	—	—	Regional Regression Equations	HEC-2	—	AE	
Gavin Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Gorman Creek	—	—	Regional Regression Equations	HEC-2	—	A, AH, AO	
Gorman Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A, AO	
Graham Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Grandview Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Grandview Canyon Creek (2)	—	—	Regional Regression Equations	HEC-2	—	A	
Harbor Lake	—	—	Regional Regression Equations	HEC-2	—	AE	
Haskell Canyon	—	—	Regional Regression Equations	HEC-2	—	AO	
Hasley Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Holcomb Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Holmes Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Hughes Lake	—	—	Regional Regression Equations	HEC-2	—	A	
Iron Canyon	Confluence with Sand Canyon Creek	0.5 miles upstream of North Iron Canyon Road	HEC-1	HEC-RAS 4.1	02/01/2010	AE, AO w/ Floodway	
Jesus Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Kagel Canyon	—	—	Regional Regression Equations	HEC-2	—	AE w/ Floodway	
Kagel Canyon	—	—	Regional Regression Equations	HEC-2	—	AE	
Kentucky Springs Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
La Mirada Creek	—	—	Regional Regression Equations	HEC-2	—	AE	
Lake Lindero	—	—	Regional Regression Equations	HEC-2	—	A	
Lake Palmdale	—	—	Regional Regression Equations	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Lake Street Overflow	—	—	Regional Regression Equations	HEC-2	—	AE	
Las Flores Canyon	—	—	Regional Regression Equations	HEC-2	—	AE	
Las Flores Canyon	—	—	Regional Regression Equations	HEC-2	—	A	
Las Virgenes Creek	At confluence with Malibu Creek	Immediately downstream of Las Virgenes Road	HEC-HMS 3.5	HEC-RAS 4.1	08/01/2010	AE	
Leaming Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Lemontaine Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Liberty Canyon	—	—	Regional Regression Equations	HEC-2	—	AE	
Limekiln Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Lindero Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	AE	
Little Rock Creek	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	—	A	
Little Rock Reservoir	—	—	Regional Regression Equations	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Little Rock Wash	—	—	Regional Regression Equations	HEC-2	—	A	
Little Rock Wash - Profile A	City of Palmdale Corporate Limits	City of Palmdale Corporate Limits	Regional Regression Equations	HEC-2	11/01/1985	A, AE	
Little Rock Wash - Profile B	City of Palmdale Corporate Limits	City of Palmdale Corporate Limits	Regional Regression Equations	HEC-2	11/01/1985	AE	
Little Rock Wash - Profile C	—	—	Regional Regression Equations	HEC-2	11/01/1985	AE	
Little Tujunga Wash	—	—	Regional Regression Equations	HEC-2	—	A, AO	
Lobo Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	AE	
Lockheed Drain Channel	—	—	Regional Regression Equations	HEC-2	—	AE, AO	
Lockheed Storm Drain	—	—	Regional Regression Equations	HEC-2	—	AE	
Lopez Canyon Channel	—	—	Regional Regression Equations	HEC-2	—	A	
Lopez Canyon Channel	—	—	Regional Regression Equations	HEC-2	—	AE	
Los Angeles County Flood Control Channel	—	—	Regional Regression Equations	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Los Angeles County Flood Control Channel to Aliso Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Los Angeles County Storm Drain	—	—	Regional Regression Equations	HEC-2	—	A	
Los Angeles County Storm Drain (2)	—	—	Regional Regression Equations	HEC-2	—	A	
Los Angeles Harbor	—	—	Regional Regression Equations	HEC-2	—	AE	
Los Angeles Reservoir	—	—	Regional Regression Equations	HEC-2	—	A	
Los Angeles River	—	—	Regional Regression Equations	HEC-2	05/01/1991	A	
Los Angeles River Flood Control Channel	—	—	Regional Regression Equations	HEC-2	—	A	
Los Angeles River Flood Control Channel	—	—	Regional Regression Equations	HEC-2	—	A	
Los Cerritos Channel (1)	—	—	Regional Regression Equations	HEC-2	—	AE	
Los Cerritos Channel (2)	—	—	Regional Regression Equations	HEC-2	—	AE	
Lyon Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Main Channel	—	—	Regional Regression Equations	HEC-2	—	AE	
Malaga Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Malibu Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Malibu Creek	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	—	AE	
Malibu Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Malibu Lake	—	—	Regional Regression Equations	HEC-2	—	A	
Marina Del Ray	—	—	Regional Regression Equations	HEC-2	—	AE	
Marine Stadium	—	—	Regional Regression Equations	HEC-2	—	AE	
Medea Creek	—	—	Regional Regression Equations	HEC-2	—	AE	
Medea Creek	—	—	Regional Regression Equations	HEC-2	—	AE	
Middle Harbor	—	—	Regional Regression Equations	HEC-2	—	AE	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Mill Creek	—	—	Regional Regression Equations	HEC-2	—	AE	
Milton B. Arthur Lakes	—	—	Regional Regression Equations	HEC-2	—	A	
Mint Canyon Creek	Confluence with Santa Clara River	Immediately downstream of Adon Avenue	HEC-1	HEC-RAS 4.1	02/01/2010	AE	
Mint Canyon Creek	Immediately downstream of Adon Avenue	0.9 miles upstream of Rocking Horse Road	HEC-1	HEC-RAS 4.1	02/01/2010	AE w/ Floodway	
Mint Canyon Creek Overflow	Confluence with Santa Clara River	Immediately downstream of Adon Avenue	Regional Regression Equations	HEC-2	—	AE, AO	
Mint Canyon Spring	—	—	Regional Regression Equations	HEC-2	—	A	
Montebello Municipal Golf Course Pond	—	—	Regional Regression Equations	HEC-2	—	A	
Muscal Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Myrick Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Oak Springs Canyon	—	—	Regional Regression Equations	HEC-2	—	A	
Oakgrove Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Old Topanga Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A, AE	
Oro Fino Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Oso Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Pacific Terrace Harbor	—	—	Regional Regression Equations	HEC-2	—	AE	
Pacoima Channel	—	—	Regional Regression Equations	HEC-2	—	A	
Pacoima Wash	—	—	Regional Regression Equations	HEC-2	—	A, AO	
Pallett Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Palmdale Ditch	—	—	Regional Regression Equations	HEC-2	—	A	
Palo Comando Creek	—	—	Regional Regression Equations	HEC-2	—	AE	
Palomas Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Pico Canyon	—	—	Regional Regression Equations	HEC-2	1984	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Pine Canyon Creek (3)	—	—	Regional Regression Equations	HEC-2	11/01/1985	A	
Piru Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Placerita Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Plum Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Portal Ridge Wash	—	—	Regional Regression Equations	HEC-2	—	AH	
Potrero Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Potrero Valley Creek (Westlake Lake)	—	—	Regional Regression Equations	HEC-2	—	A	
Puzzle Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Pyramid Lake	—	—	Regional Regression Equations	HEC-2	—	A	
Quail Lake	—	—	Regional Regression Equations	HEC-2	—	A	
Quigley Canyon Creek	—	—	Regional Regression Equations	HEC-2	1984	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Railroad Canyon	—	—	Regional Regression Equations	HEC-2	1984	A, AO	
Ramirez Canyon	—	—	Regional Regression Equations	HEC-2	—	AE	
Reservoir near UCLA	—	—	Regional Regression Equations	HEC-2	—	A	
Rice Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Rio Hondo River	—	—	Regional Regression Equations	HEC-2	05/01/1991	A	
Rio Hondo River Tributary	—	—	Regional Regression Equations	HEC-2	05/01/1991	AE	
Roberts Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Rock Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Romero Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Rustic Canyon	—	—	Regional Regression Equations	HEC-2	—	AE w/ Floodway	
Rustic Canyon	—	—	Regional Regression Equations	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Salt Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
San Dimas Wash	—	—	Regional Regression Equations	HEC-2	—	AE	
San Francisquito Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A, AO	
San Gabriel River	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	—	A	
San Martinez Chiquito Canyon	—	—	Regional Regression Equations	HEC-2	—	A, AO	
San Martinez Grande Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
San Pedro Bay	—	—	Regional Regression Equations	HEC-2	—	AE	
Sand Canyon Creek	Confluence with Santa Clara River	0.4 miles upstream of Coyote Canyon Creek	HEC-1	HEC-RAS 4.1	02/01/2010	AE, AO w/ Floodway	
Sand Canyon Creek (2)	—	—	Regional Regression Equations	HEC-2	1984	A, AO	
Sand Canyon Creek Tributary 1	—	—	Regional Regression Equations	HEC-2	1984	A, AO	
Sand Canyon Creek Tributary 2	—	—	Regional Regression Equations	HEC-2	1984	A, AO	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Santa Clara River	Approximately 1,200 feet downstream of Southern Pacific Railroad at Capra Road Tunnel	1.0 miles downstream of Arrastre Canyon Road	Regional Regression Equations	HEC-2	—	A	
Santa Clara River	Confluence of Aliso Canyon Creek	1.3 miles upstream of confluence of Soledid Canyon Creek	Regional Regression Equations	HEC-2	—	A	
Santa Maria Canyon	—	—	Regional Regression Equations	HEC-2	—	AE	
Santa Maria Canyon	—	—	Regional Regression Equations	HEC-2	—	A	
Santa Susana Pass Wash	—	—	Regional Regression Equations	HEC-2	—	A	
Santa Ynez Canyon Reservoir	—	—	Regional Regression Equations	HEC-2	—	A	
Savage Creek	—	—	Regional Regression Equations	HEC-2	08/01/1978	AE	
Sierra Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Sloan Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Soledad Canyon	—	—	Regional Regression Equations	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
South Portal Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Spade Spring Canyon Creek	Confluence with Mint Canyon Creek	2.8 miles upstream of confluence with Mint Canyon Creek	HEC-1	HEC-RAS 4.1	02/01/2010	AE w/ Floodway	
Stokes Canyon	—	—	Regional Regression Equations	HEC-2	—	A	
Stokes Canyon	—	—	Regional Regression Equations	HEC-2	—	AE	
Sullivan Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Sunshine Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Tacobi Creek	—	—	Regional Regression Equations	HEC-2	08/01/1978	A	
Tapia Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Texas Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A, AO	
Tonner Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Topanga Canyon	—	—	Log-Pearson Type III Frequency Analysis	HEC-2	—	AE	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Topanga Canyon	—	—	Regional Regression Equations	HEC-2	—	A	
Towsley Canyon Creek	—	—	Regional Regression Equations	HEC-2	1984	A, AO	
Trancas Creek	—	—	Regional Regression Equations	HEC-2	—	AE	
Triunfo Creek	Approximately 200 feet downstream of Crags Drive	At Westlake Lake Dam	HEC-HMS 4.0	HEC-RAS 4.0	09/25/2015	AE	
Turnbull Canyon Creek	—	—	Regional Regression Equations	HEC-2	08/01/1978	AE, AO	
Unnamed Canyon Creek (Serra Retreat Area)	—	—	Regional Regression Equations	HEC-2	—	AE	
Unnamed Stream Main Reach	—	—	1993 Regional Regression Equations	HEC-RAS 3.1.3	02/01/2010	AE w/ Floodway	
Unnamed Stream Tributary 1	—	—	1993 Regional Regression Equations	HEC-RAS 3.1.3	02/01/2010	AE w/ Floodway	
Unnamed Stream Tributary 2	—	—	1993 Regional Regression Equations	HEC-RAS 3.1.3	02/01/2010	AE w/ Floodway	
Upper Los Angeles River Left Overbank	—	—	Regional Regression Equations	HEC-2	—	AE	
Vasquez Canyon	—	—	Regional Regression Equations	HEC-2	—	A, AO	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Villa Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Vine Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Violin Canyon Creek	Confluence with Castaic Creek	At I-5 (Golden State Freeway)	Regional Regression Equations	HEC-2	—	AE, AO	
Violin Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Wayside Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Weldon Canyon	—	—	Regional Regression Equations	HEC-2	—	AE w/ Floodway	
West Basin	—	—	Regional Regression Equations	HEC-2	—	AE	
West Channel	—	—	Regional Regression Equations	HEC-2	—	AE	
Westlake Lake	At the Westlake Lake Dam	At the County Boundary	HEC-HMS 4.0	—	2015	AE	
Whitney Canyon Creek	—	—	Regional Regression Equations	HEC-2	1984	A	
Wildwood Canyon Creek	—	—	Regional Regression Equations	HEC-2	1984	A, AO	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Wiley Canyon Creek	—	—	Regional Regression Equations	HEC-2	1984	A	
Willow Springs Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Young Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
Zuma Canyon	—	—	Regional Regression Equations	HEC-2	—	A	
Zuma Canyon	—	—	Log-Pearson Type III Frequency Analysis	HEC-2		AE	
UNKNOWN 1 near W. 3rd Street	—	—	Regional Regression Equations	HEC-2	12/01/1980, 11/01/1985	AO	
UNKNOWN 2 near W. 3rd Street	—	—	Regional Regression Equations	HEC-2	12/01/1980, 11/01/1985	A	
UNKNOWN 3 near W. 3rd Street	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near 4th Street	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Aberdeen Avenue	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Alameda Street	—	—	Regional Regression Equations	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
UNKNOWN 2 near Alameda Street	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Alaska Avenue	—	—	Regional Regression Equations	HEC-2	08/01/1978	AH	
UNKNOWN 1 near Amsler Street	—	—	Regional Regression Equations	HEC-2	08/01/1978	AH	
UNKNOWN 1 to Anaverde Creek	—	—	Regional Regression Equations	HEC-2	11/01/1985	A	
UNKNOWN 1 near Anza Avenue	—	—	Regional Regression Equations	HEC-2	08/01/1978	AH	
UNKNOWN 1 to Arroyo Calabasas	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 2 to Arroyo Calabasas	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Baile Avenue	—	—	Regional Regression Equations	HEC-2	—	AE	
UNKNOWN 2 near Baile Avenue	—	—	Regional Regression Equations	HEC-2	—	AE	
UNKNOWN 1 near S. Beverley Glen Boulevard	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 1 to Big Rock Wash	—	—	Regional Regression Equations	HEC-2	—	A, AO	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
UNKNOWN 1-A to Big Rock Wash	—	—	Regional Regression Equations	HEC-2	—	A, AO	
UNKNOWN 2 to Big Rock Wash	—	—	Regional Regression Equations	HEC-2	—	A, AO	
UNKNOWN 1 near Blinn Avenue	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 to Broad Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 2 to Broad Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 3 to Broad Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 to California Aqueduct	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 2 to California Aqueduct	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 3 to California Aqueduct	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 4 to California Aqueduct	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 5 to California Aqueduct	—	—	Regional Regression Equations	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
UNKNOWN 1 near Camino Real Calle	—	—	Regional Regression Equations	HEC-2	06/01/1981	AE	
UNKNOWN 1 near Chaparal Street	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 1 near Childs Court	—	—	Regional Regression Equations	HEC-2	—	AO	
UNKNOWN 1 near Club View Drive	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 1 near Denker Avenue	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 1 near Edwards AF Base	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 2 near Edwards AF Base	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 2-A near Edwards AF Base	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Eubank Avenue	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Glade Avenue	—	—	Regional Regression Equations	HEC-2	—	AE	
UNKNOWN 2 near Glade Avenue	—	—	Regional Regression Equations	HEC-2	—	AH	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
UNKNOWN 1 to Glenoaks Boulevard	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 2 to Glenoaks Boulevard	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 3 to Glenoaks Boulevard	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Gould Avenue	—	—	Regional Regression Equations	HEC-2	06/01/1981	AE	
UNKNOWN 1 near Grenola Street	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near N. Hoover Street	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 1 near S. La Cienega Boulevard	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Lake Palmdale	—	—	Regional Regression Equations	HEC-2	11/01/1985	A	
UNKNOWN 1 near Laurel Canyon Boulevard	—	—	Regional Regression Equations	HEC-2	—	AO	
UNKNOWN 1 to Little Rock Wash	—	—	Regional Regression Equations	HEC-2	—	A, AO	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
UNKNOWN 2 to Little Rock Wash	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 3 to Little Rock Wash	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Long Beach Freeway	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 1 near Louise Avenue	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 1 near Lucerne Boulevard	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 1 near S. Main Street	—	—	Regional Regression Equations	HEC-2	—	AO	
UNKNOWN 1 near Magnolia Avenue	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 1 to Malaga Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 2 to Malaga Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 2-A to Malaga Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Marathon Street	—	—	Regional Regression Equations	HEC-2	—	AH	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
UNKNOWN 1 near Melrose Avenue	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Mines Avenue	—	—	Regional Regression Equations	HEC-2	—	AE	
UNKNOWN 1 to Myrick Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Overland Avenue	—	—	Regional Regression Equations	HEC-2	—	AO	
UNKNOWN 2 near Overland Avenue	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 1 near W. Olympic Boulevard	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 1 to Pallett Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1-A to Pallett Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1-A-1 to Pallett Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1-A-2 to Pallett Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1-B to Pallett Creek	—	—	Regional Regression Equations	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
UNKNOWN 1-B-1 to Pallett Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1-C to Pallett Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 to Paso Robles Avenue	—	—	Regional Regression Equations	HEC-2	—	AE	
UNKNOWN 1 near Pershing Drive	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 to Portal Ridge Wash	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1-A to Portal Ridge Wash	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1-B to Portal Ridge Wash	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1-C to Portal Ridge Wash	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Rexbon Road	—	—	Regional Regression Equations	HEC-2	—	AE	
UNKNOWN 1 near Ripley Avenue	—	—	Regional Regression Equations	HEC-2	06/01/1981	AE	
UNKNOWN 1 near Roscoe Boulevard	—	—	Regional Regression Equations	HEC-2	—	AH	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
UNKNOWN 1 near San Diego Freeway	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 1 to San Fernando Road	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 2 to San Fernando Road	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 to San Gabriel River	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 to Santa Susana Creek	—	—	Regional Regression Equations	HEC-2	—	A, AO	
UNKNOWN 1-A to Santa Susana Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 2 to Santa Susana Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Sesnon Boulevard	—	—	Regional Regression Equations	HEC-2	—	AE	
UNKNOWN 1 near Sheldon Street	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near W. Slausson Avenue	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 2 near W. Slausson Avenue	—	—	Regional Regression Equations	HEC-2	—	AH	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
UNKNOWN 1 near State Highway 110	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near W. Sunset Boulevard	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Sunset Canyon Drive	—	—	Regional Regression Equations	HEC-2	—	AO	
UNKNOWN 1 near Susanna Place	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 1 near W. Temple Street	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 1 near Toledo Street	—	—	Regional Regression Equations	HEC-2	08/01/1978	AE	
UNKNOWN 2 near Toledo Street	—	—	Regional Regression Equations	HEC-2	08/01/1978	AH	
UNKNOWN 1 near UCLA	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 1 near Vail Avenue	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near S. Van Ness Avenue	—	—	Regional Regression Equations	HEC-2	—	A, AH, AO	
UNKNOWN 1 near Via Valmonte	—	—	Regional Regression Equations	HEC-2	08/01/1978	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
UNKNOWN 1 near Victory Boulevard	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 1 near Vincent Street	—	—	Regional Regression Equations	HEC-2	06/01/1981	AE	
UNKNOWN 2 near Vincent Street	—	—	Regional Regression Equations	HEC-2	06/01/1981	AE	
UNKNOWN 1 to Vine Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 2 to Vine Creek	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Walker Avenue	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 to Weldon Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	AE	
UNKNOWN 1-A to Weldon Canyon Creek	—	—	Regional Regression Equations	HEC-2	—	AE	
UNKNOWN WEST of Edwards AF Base	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN WEST of Edwards AF Base	—	—	Regional Regression Equations	HEC-2	—	A	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
UNKNOWN WEST of Edwards AF Base	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 to UNKNOWN WEST	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1-A to UNKNOWN WEST	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 2 to UNKNOWN WEST	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 2-A to UNKNOWN WEST	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 3 to UNKNOWN WEST	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 3-A to UNKNOWN WEST	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 4 to UNKNOWN WEST	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 5 to UNKNOWN WEST	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 6 to UNKNOWN WEST	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Wilshire Boulevard	—	—	Regional Regression Equations	HEC-2	—	AH, AO	

Table 13: Summary of Hydrologic and Hydraulic Analyses, Continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
UNKNOWN 2 near Wilshire Boulevard	—	—	Regional Regression Equations	HEC-2	—	AH	
UNKNOWN 3 near Wilshire Boulevard	—	—	Regional Regression Equations	HEC-2	—	A	
UNKNOWN 1 near Woodman Place	—	—	Regional Regression Equations	HEC-2	—	A	

Table 14: Roughness Coefficients

Flooding Source	Channel "n"	Overbank "n"
Acton Canyon	0.030-0.039	0.032-0.075
Agua Dulce Canyon	0.042-0.045	0.045-0.100
Amargosa Creek	0.040	0.040
Anaverde Creek	0.040	0.040
Avalon Canyon	0.030-0.050	0.030-0.050
Ballona Creek	NA[1]	0.012-0.110
Big Rock Wash	0.050	0.050
Bouquet Canyon	0.020-0.048	0.045-0.080
Cheseboro Creek	0.030	0.050
Cold Creek	0.030	0.050
Dark Canyon	0.030	0.050
Dry Canyon	0.030	0.050-0.060
Escondido Canyon	0.039	0.040-0.100
Flow along Empire Avenue	0.014-0.050	0.014-0.050
Flowline No. 1	0.030	0.030
Garapito Creek	0.030	0.050
Hacienda Creek	0.030	0.060
Haskell Canyon	0.020-0.042	0.031-0.050
Iron Canyon	0.040	0.050-0.130
Kegal Canyon	0.035-0.065	0.035-0.065
La Mirada Creek	0.025-0.030	0.025-0.030
Lake Street Overflow	0.014-0.050	0.014-0.050
Las Flores Canyon	0.030	0.050
Las Virgenes Creek	0.012-0.040	0.050-0.130
Liberty Canyon	0.030	0.050
Lindero Canyon above Confluence with Medea Creek	0.030	0.050
Lindero Canyon above Spillway above Lake Lindero	0.030	0.050

[1] This stream was studied using detailed 2-dimensional methods. Channel "n" values are not applicable in this case.

Table 14: Roughness Coefficients, Continued

Flooding Source	Channel “n”	Overbank “n”
Little Rock Wash-Profile A	0.030	0.050
Little Rock Wash-Profile B	0.030	0.050
Little Rock Wash-Profile C	0.030	0.050
Lobo Canyon	0.030	0.050
Lockheed Drain Channel	0.014-0.050	0.014-0.050
Lopez Canyon Channel	0.030	0.060
Los Angeles River Left Overbank Path 2	0.016	0.050-0.150
Los Angeles River Right Overbank Path 1	0.016	0.050-0.150
Los Angeles River Right Overbank Path 2	0.016	0.050-0.150
Malibu Creek	0.030	0.050
Medea Creek	0.030	0.050
Medea Creek (above Ventura Freeway)	0.030	0.050
Mill Creek	0.030	0.060
Mint Canyon	0.015-0.050	0.050-0.130
Mint Canyon Overflow	0.015-0.100	0.080-0.100
Newhall Creek	0.015-0.052	0.045-0.100
Newhall Creek Left Overbank 2	0.032-0.040	0.100-0.120
Newhall Creek Left Overbank 3	0.032	0.100
Newhall Creek Right Overbank 1	0.032	0.100-0.120
North Overflow	0.014-0.050	0.014-0.050
Old Topanga Canyon	0.030	0.050
Overflow Area of Lockheed Drain Channel	0.030-0.040	0.030-0.040
Overflow Area of Lockheed Storm Drain	0.014-0.050	0.014-0.050
Palo Comando Creek	0.030	0.050
Railroad Canyon	0.035-0.045	0.100
Railroad Canyon Left Overbank	0.028-0.032	0.100
Ramirez Canyon	0.030	0.050

Table 14: Roughness Coefficients, Continued

Flooding Source	Channel “n”	Overbank “n”
Rio Honda Left Overbank Path 3	0.050-0.150	0.050-0.150
Rio Honda Left Overbank Path 5	0.050-0.150	0.050-0.150
Rio Honda Left Overbank Path 6	0.050-0.150	0.050-0.150
Rustic Canyon	0.035-0.065	0.030-0.065
San Francisquito Canyon	0.038	0.042
Sand Canyon	0.020-0.130	0.050-0.130
Santa Clara River	0.032-0.040	0.010-0.100
Santa Clara River Overflow	0.032	0.036
Santa Maria Canyon	0.030	0.050
South Fork Santa Clara River	0.020-0.050	0.05-0.100
South Fork Santa Clara River Tributary	0.020-0.050	0.05-0.100
Spade Spring Canyon	0.070	0.075
Stokes Canyon	0.030	0.050
Topanga Canyon	0.030	0.050
Trancas Creek	0.030	0.050
Triunfo Creek	0.012-0.045	0.012-0.06
Unnamed Canyon (Serra Retreat Area)	0.030	0.050
Unnamed Stream Main Reach	0.015-0.040	0.015-0.120
Unnamed Stream Tributary 1	0.015-0.045	0.015-0.110
Unnamed Stream Tributary 2	0.015-0.045	0.015-0.110
Upper Los Angeles River Left Overbank	0.050-0.150	0.050-0.150
Weldon Canyon	0.035-0.065	0.035-0.065
Zuma Canyon	0.030	0.050

5.3 Coastal Analyses

For the areas of Los Angeles County that are impacted by coastal flooding processes, coastal flood hazard analyses were performed to provide estimates of coastal BFEs. Coastal BFEs reflect the increase in water levels during a flood event due to extreme tides and storm surge as well as overland wave effects.

The following subsections provide summaries of how each coastal process was considered for this FIS Report. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation. Table 15 summarizes the methods and/or models used for the coastal analyses and is followed by more detailed narratives describing the coastal analyses. Refer to Section 2.5 for descriptions of the terms used in this section.

Table 15: Summary of Coastal Analyses

Flooding Source	Study Limits From	Study Limits To	Hazard Evaluated	Model or Method Used	Date Analysis was Completed
Alamitos Bay, San Pedro Bay	Shoreline within Long Beach, City of	Shoreline within Long Beach, City of	Astronomical tide, Wave Runup, Tsunami	Various	June 1981 (FEMA, 1983)
Pacific Ocean	Shoreline within Avalon, City of	Shoreline within Avalon, City of	Wave Runup, Wave Setup	*	June 1981 (Tetra Tech, 1979/1982)
Pacific Ocean	Shoreline within Los Angeles, City of, and Los Angeles County Unincorporated Areas	Shoreline within Los Angeles, City of, and Los Angeles County Unincorporated Areas	Wave Runup, Wave Setup	Regression Relations	1984 (FEMA, 1984)
Pacific Ocean	Shoreline within Redondo Beach, City of	Shoreline within Redondo Beach, City of	Astronomical tide, Wave Runup, Tsunami	Various	(Tetra Tech, 1979/1982)
Pacific Ocean	Shoreline within Torrance, City of	Shoreline within Torrance, City of	Storm Surge, Wave Runup	Approximate analysis based on tidal data	* (FIA, 1979)

5.3.1 Total Stillwater Elevations

Stillwater elevations for the 1% annual chance flood were determined for specific coastal locations. The stillwater elevations used for these locations is shown below.

Stillwater Elevations, Pacific Ocean

Location	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
San Pedro Bay	7.4	7.9	10.0	15.7
San Pedro Bay	7.0	7.6	8.8	12.3
San Pedro Bay	8.9	*	8.9	*
Alamitos Bay	7.0	7.6	8.8	12.3
Swimming Lagoon	7.4	7.9	10.0	15.7
At King Harbor	6.9	6.9	6.9	8.3
At Pleasure Pier	8.9	*	8.9	*
At Pleasure Pier	10.3	11.2	11.6	12.3

*Data Not Available

Figure 8: 1% Annual Chance Total Stillwater Elevations for Coastal Areas

[Not Applicable to this Flood Risk Project]

An approximate coastal high-hazard analysis was conducted in the City of Torrance. Flooding due to storm surge and wave runup was approximated by adding 3 feet to the highest tide observed in the Los Angeles area. The highest tide observed was taken from observations at Los Angeles Harbor by the U.S. Coast and Geodetic Survey, during the period from 1941 through 1959. The highest tide observed during that period was 4.9 feet. The city's coastline has been designated as beach land by the County of Los Angeles, which will preclude any substantial development of the beach below an elevation of 7.9 feet. Because there are no existing structures and no likelihood of structures being built in the future below an elevation of 7.9 feet along the Torrance coastline, only an approximate coastal high-hazard area has been shown.

Table 16: Tide Gage Analysis Specifics

[Not applicable to this Flood Risk Project]]

Note: Please see the discussion of coastal analyses in Sections 5.3.1 and 5.3.2 for details on astronomical tide used in the coastal analyses.

5.3.2 Waves

Coastal elevations were modeled using the methods and models listed in Table 15. Table 26 provides the wave runup and wave setup elevations for each location evaluated for coastal wave hazards.

The following areas of Los Angeles County are impacted by coastal flooding processes, and were analyzed following the same methodology applied in the original study of the City of Long Beach: the Cities of Hermosa Beach, Long Beach, Los Angeles, Malibu, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Santa Monica, and the Unincorporated Areas of Los Angeles County. The principal coastal flood source for these communities is the Pacific Ocean, including areas with landward intrusions of stillwater elevation into San Pedro Bay, Alamitos Bay, and Marina Del Rey. Coastal flooding is attributed to the following mechanisms:

- Swell runup from intense offshore winter storms in the Pacific
- Tsunamis from the Aleutian-Alaskan and Peru-Chile Trenches
- Runup from wind waves generated by landfalling storms
- Swell runup from waves generated off Baja California by tropical cyclones
- Effects of landfalling tropical cyclones

The influence of the astronomical tides on coastal flooding is also incorporated in each of the previously mentioned mechanisms. A flood producing event from any of these mechanisms is considered to occur with a random phase of the astronomical tide. Each of these mechanisms is considered to act alone, so that the joint occurrence of any combination of the above mechanisms in a flooding event is considered to be irrelevant to the determination of flood elevations with return periods of less than 0.2-percent annual chance.

For each mechanism, the frequency of occurrence of causative events, as well as the probability distribution of flood elevations at a given location due to the ensemble of events, were determined using methods discussed in "Methodology for Coastal Flooding in Southern California." A brief outline follows.

Winter Swell

The statistics of flooding due to winter swell runup were determined using input data provided by the Navy Fleet Numerical Weather Center (FNWC). These input data consist of daily values of swell heights, periods, and directions at three deep water locations beyond the continental shelf bordering the study area. The data are inclusive from 1951 to 1974, and were computed by FNWC using input from ship observations, meteorological stations, and synoptic surface meteorological charts of the Pacific Ocean. For the original study, the incoming swells provided by FNWC were classified into 12 direction sectors of 10 degrees band width each. (Exposure of the study area to winter swells was confined to a 120 degree band, from directions 220° to 340°T). Within each sector, 10 days of swell height and period values were selected from the 24 years of FNWC data to represent extreme flood producing days. The selection criteria were guided by Hunts formula for runup. The 120 days at each of the three deepwater stations were merged to obtain a master list of 161 extreme runup producing days. For each of 161 days, the input swell provided by FNWC was refracted across the continental shelf and converted to runup at selected locations in the study area. Of the 161 days, a number of groups of consecutive days could be identified.

Each such group of days is considered to represent one event only; the largest runup from each group of days was selected as the maximum runup for that event. As a result of refraction and island sheltering effects, a number of the input swells produced no significant runup at certain locations. Therefore, the number of extreme runup events is less than 161. The average number of events in the study area is approximately 40. For each location in the study area, the runup for the extreme events were fitted to a Weibull distribution to obtain a probability distribution of runup from winter swell. The Weibull distribution was found to be best suited for representing runup statistics. Because extreme winter swell runup lasts for at least one day, the maximum runup must be considered to coexist with the maximum high tide.

Regarding the extreme runup values as a statistical sample only, the influence of the astronomical tides was included by convolving the probability distribution of runup with the probability distribution of daily high tides. The latter was obtained from standard tide prediction procedures using the harmonic constants at the nearest available tide gage for which such data exists as supplied by the Tidal Prediction Branch of the National Oceanic and Atmospheric Administration. At each location, the frequency of occurrence of extreme events is determined by the number of runup values used in the Weibull curve fit. The number of years over which these occur is 24. The product of the frequency occurrence with the complement of cumulative probability distribution of the runup-plus-tide (convolved) distribution gives the exceedence frequency curve for flood elevations due to winter swell runup.

Tsunamis

Elevation-frequency curves for tsunami flooding were obtained from information supplied by the USACE's Waterways Experiment Station (WES). The use of the results of the WES study were directed by FEMA.

In the WES study, the statistics of tsunami elevations along the coastline were derived by synthesizing data on tsunami source intensities, source dimensions, and frequencies of occurrence along the Aleutian- Alaskan and Peru-Chile Trenches. As a result, 75 different tsunamis, each with a known frequency of occurrence, were generated and propagated across the Pacific Ocean using a numerical hydrodynamic model of tsunamis. At a number of locations in the study area, these 75 tsunami time signatures were each added to the tidal time signature at the nearest tide gage location for which harmonic constants for tide computations are available. One year of tidal signature was generated from the harmonic constants. A given tsunami signature was then combined with the tide signature and the maximum of tsunami plus tide for the combination recorded. To simulate the occurrence of the tsunami at random phases of the tide, the tsunami signature was repeatedly combined to the tide signature starting at random phases over the entire year of the tide signature. Each combination produces a maximum tsunami-plus tide elevation with a frequency of occurrence equal to the frequency of occurrence of the particular tsunami signature used, divided by the total number of such combinations for that particular tsunami. The process was repeated for all 75 tsunamis and the elevation frequency curve for tsunami flooding was thus established.

Wind Waves From Landfalling Storms

The source of data for wind waves is the same as that for winter swell, the FNWC (1951 through 1974) data. The stations for which daily height, period, and direction data are available are also the same as for winter swells. The FNWC wind-wave data are directly correlated to local wind speeds. For obtaining runup statistics, the FNWC daily wave data were converted to daily runup data using the method outlined in this section. The daily runup data were then fitted to a Weibull distribution and convolved with the tide in the same manner as for winter swells.

Tropical Cyclone Swell

Runup from swell generated by tropical cyclones off Baja California was computed using the techniques discussed in this section. To establish the statistics of hurricane swell runup, the following procedure was used. Data concerning tropical cyclone tracks were obtained from the National Climatic Center (NCC). The data comprise 12-hourly positions of eastern North Pacific tropical cyclones from 1949 to 1974. This was supplemented by data on tropical cyclone tracks from the period 1975 to 1978, as reported in the Monthly Weather Review.

Besides position data, storm intensities at each 12-hourly position are also given. The intensity classifications are based on estimated maximum wind speeds. The intensity categories are tropical depression (less than 35 knot winds), tropical storm (less than 65 knot winds), and hurricane (at least 65 knot winds). Storms with tropical depression status were considered to generate negligible swell and omitted from this study. Data on actual maximum wind speeds were available from the NCC only from 1973 to 1977. These were used as the basis for obtaining values to represent maximum wind speeds from each of the two intensity classifications associated with the track data. Data on storm radii were derived from North American Surface Weather Charts by analysis of pressure fields of tropical cyclones off Baja California. These were used to define typical radius of maximum winds for each of two relevant intensity classes. For each tropical cyclone between 1949 and 1918, the hurricane wind waves were computed using the mean radius and maximum wind speeds established for each intensity class along with the track data. The swell and resultant runup were computed using the techniques described at the end of this section. For each tropical cyclone and each location of interest in the study area, a time history of swell runup was determined. These were added to time histories of the local astronomical tide in a procedure analogous to that used in determining tsunami plus tide effects. The exceedence frequencies of tropical cyclone swell runup were computed in a manner similar to that used for tsunamis.

Landfalling Tropical Cyclones

The frequency of landfalling tropical cyclones in southern California is extremely low. During those years covered by the NCC tape of eastern North Pacific tropical cyclones (1949 to 1974), no tropical cyclone hit southern California. A longer period of record was used to estimate the frequency of an event such as the Long Beach 1939 storm. A study by Pyke was used to compile a list of landfalling tropical cyclones along the coast of southern California. The study was a result of extensive investigation of historical records such as precipitation and other weather and meteorological data. The study spanned the period from 1889 to 1977 and showed only 5 or 6 identifiable landfalling tropical cyclones, of which the 1939 Long Beach event was the strongest, and only one in the tropical storm category. The others were all weak tropical depressions (with maximum winds of less than 35 knots). The low frequency event, once in 105 y ears over approximately 360 miles of coastline, coupled with an impact diameter of approximately 60 miles, implies that for any given location, the return period of a landfalling tropical cyclone is about 600 years. Therefore, landfalling tropical cyclones were not considered in the original study.

At each location within the study area, the exceedence frequencies at a given elevation due to the various flood producing mechanisms were summed to give the total exceedence frequency at the flood elevation.

For the incorporated coastal communities and the unincorporated coastal areas of Los Angeles County, coastal flood hazard areas subject to inundation by the Pacific Ocean were determined on the basis of water-surface elevations established from regression relations defined by Thomas (FEMA, 1984). These regression relations were defined as a practical method for establishing inundation elevations at any site along the southern California mainland coast. They were defined through analysis of water-surface elevations established for 125 locations in a complex and comprehensive model study by Tetra Tech, Inc. The regression relations establish wave run-up and wave set-up elevations having 10-, 1-, and 0.2-percent chances of occurring in any year and are sometimes referred to as the 10-, 100-, and 500- year flood events, respectively.

Wave runup elevations were used to determine flood hazard areas for sites along the open coast that are subject to direct assault by deep-water waves. Runup elevations range with location and local beach slope. Areas with ground elevations 3.0 feet or more below the 1-perecent annual chance wave runup elevation are subject to velocity hazard.

Wave setup elevations, determined on the basis of location along the coast, were used to identify flood hazard areas along bays, coves, and areas sheltered from direct action of deep-water waves.

For the City of Avalon, coastal flood hazards were analyzed using a complex hydrodynamic model which considered the effects of storm generated waves/swells and their transformation due to shoaling, refraction and frictional dissipation. Limited fetch distances preclude the City of Avalon from being directly exposed to severe storm-induced surge flooding. Locally generated storm waves combined with astronomical tide is the major cause of flooding along coastal areas in the vicinity of Avalon. Analysis of wave effects included a statistical analysis of historical local wind data to obtain the 10-, 2-, 1-, and 0.2- percent annual chance floods maximum wind magnitudes. Wave characteristics were then computed for the various wind recurrence intervals. Using the methodology cited in Table 15, wave runup and setup elevations were calculated based on the wave characteristics. The wave runup and setup elevations were then statistically combined with the astronomical tide to yield the final coastal flooding conditions.

Wave runup elevations were used to determine flood hazard areas for sites along the open coast that are subject to direct assault by deep-water waves. Runup elevations range with location and local beach slope and were computed at 0.5- mile intervals, or more frequently in areas where the beach profile changes significantly over short distances. Areas with ground elevations 3.0 feet or more below the 1- percent annual chance wave run-up elevation are subject to velocity hazard.

Wave setup elevations determined from the regression equations on the basis of location along the coast were used to identify flood hazard areas along bays, coves, and areas sheltered from direct action of deep-water waves. For the City of Avalon, no wave setup elevations are shown.

5.3.3 Coastal Erosion

This section is not applicable to this Flood Risk Project.

5.3.4 Wave Hazard Analyses

Refraction

Refraction computations were conducted to trace the evolution of winter swell and tropical cyclone swell from their source to the 60-foot depth contour. A large grid (200 by 250 miles) covering the coastal water of southern California with 1,000 by 1,000-foot grid spacing was used for the refraction calculations. Standard raytracing procedures were used to trace rays inward from the deep ocean grid boundaries. Ray spacing was chosen at 1,000 feet to provide adequate density of ray coverage. Wave heights at the 60-foot contour were computed using the principle of wave energy flux conservation between neighboring rays. One set of refraction computations was performed for each selected event from the list of extreme winter swells and the list of tropical cyclones off Baja California. The winter swell input values were obtained for the FNWC tape for the selected days of extreme events. The values at the three FNWC stations were the basis for linear interpolation to obtain input values in between them. For swell generated by tropical cyclones, the tropical cyclone swell procedure was used to provide input to the refraction program.

Wave Runup

Shoreward of the 60-foot contour, wave runup was determined for each beach profile of interest by adapting to composite beaches the standard empirical runup formulas valid for uniformly sloping beaches. The results of the refraction calculations were used as input. The beach profiles selected were assumed to be locally one-dimensional in order to apply the empirical runup formulas. However, the influence of incident wave directions, refraction, and shoaling effects were also taken into consideration.

Wave heights within the surf zone were also computed using empirical formulas to establish the zone where waves exceed 3 feet.

Computed elevations for wave runup and wave setup are shown in Table 26.

Tsunamis

Tsunamis were computed using numerical models of the long wave equations describing tsunami behavior. The results were taken from the USACE Study which details the method used to compute tsunami behavior.

Tropical Cyclone Swells

Waves generated by a tropical cyclone were determined using the JONSWAP spectrum with empirically derived shape and intensity parameters, which were correlated to radial position and wind speed. A cosine function centered about the local wind direction was used for the directional distribution function of the spectrum. The size of the tropical cyclone was defined by the radius at which the wind speed drops below 35 knots. Details of the node are discussed in "Methodology for Coastal Flooding in Southern California".

Table 17: Coastal Transect Parameters

[Not applicable to this Flood Risk Project]]

Figure 9: Transect Location Map

[Not Applicable to this Flood Risk Project]

5.4 Alluvial Fan Analyses

This section is not applicable to this Flood Risk Project.

Table 18: Summary of Alluvial Fan Analyses

[Not Applicable to this Flood Risk Project]

Table 19: Results of Alluvial Fan Analyses

[Not Applicable to this Flood Risk Project]