FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 3

SAN LUIS OBISPO COUNTY, CALIFORNIA

AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
ARROYO GRANDE, CITY OF	060305
ATASCADERO, CITY OF	060700
EL PASO DE ROBLES, CITY OF	060308
GROVER BEACH, CITY OF	060306
MORRO BAY, CITY OF	060307
PISMO BEACH, CITY OF	060309
SAN LUIS OBISPO, CITY OF	060310
SAN LUIS OBISPO COUNTY UNINCORPORATED AREAS	060304

FEMA

PRELIMINARY
11/13/2015

REVISED:

FLOOD INSURANCE STUDY NUMBER
06079CV001C

Version Number 2.3.2.2

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Flood Profiles	Panel
Arroyo Grande Creek	01-06 P
Atascadero Creek	07-10 P

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Exhibits

Flood Profiles	Panel
Carpenter Canyon Creek	11 P
Cayucos Creek	12 P
Chorro Creek	13 P
Corbett Canyon Creek	14-15 P

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Exhibits

Flood Profiles	Panel
Deleissigues Creek	16-17 P
Graves Creek	18-23 P
Little Cayucos Creek	24 P
Little Morro Creek	25-26 P
Los Berros Creek	27-30 P
Meadow Creek	31-34 P
Morro Creek	35-37 P
Mountain Springs Creek	38-39 P
Nipomo Creek	40-43 P
Noname Creek	44-45 P
North Fork Los Berros Creek	46 P
North Fork Paloma Creek	47 P
Old Garden Creek	48-49 P
Paloma Creek	50-52 P
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Pismo Creek	54 P
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Prefumo Creek	56-57 P
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Santa Margarita Creek	74-77 P
Santa Rosa Creek	78-80 P
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See Canyon Creek	82 P
South Branch Toad Creek	83 P
South Branch Unnamed Creek No. 1	84 P
Stenner Creek	85-86 P
Tefft Road Tributary	87-89 P
Tefft Road Tributary East Fork	90 P
Toad Creek (Main and North Branch)	91-92 P
Toro Creek	93 P
Unnamed Creek No. 1	94-97 P
Unnamed Creek (Alva Paul Creek)	98-99 P
Willow Creek	100 P
Yerba Buena Creek	101 P

Published Separately

Flood Insurance Rate Map (FIRM)

FLOOD INSURANCE STUDY REPORT
SAN LUIS OBISPO COUNTY, CALIFORNIA

SECTION 1.0 – INTRODUCTION

1.1 The National Flood Insurance Program

The National Flood Insurance Program (NFIP) is a voluntary Federal program that enables property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

For decades, the national response to flood disasters was generally limited to constructing flood-control works such as dams, levees, sea-walls, and the like, and providing disaster relief to flood victims. This approach did not reduce losses nor did it discourage unwise development. In some instances, it may have actually encouraged additional development. To compound the problem, the public generally could not buy flood coverage from insurance companies, and building techniques to reduce flood damage were often overlooked.

In the face of mounting flood losses and escalating costs of disaster relief to the general taxpayers, the U.S. Congress created the NFIP. The intent was to reduce future flood damage through community floodplain management ordinances, and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for the protection.

The U.S. Congress established the NFIP on August 1, 1968, with the passage of the National Flood Insurance Act of 1968. The NFIP was broadened and modified with the passage of the Flood Disaster Protection Act of 1973 and other legislative measures. It was further modified by the National Flood Insurance Reform Act of 1994 and the Flood Insurance Reform Act of 2004. The NFIP is administered by the Federal Emergency Management Agency (FEMA), which is a component of the Department of Homeland Security (DHS).

Participation in the NFIP is based on an agreement between local communities and the Federal Government. If a community adopts and enforces floodplain management regulations to reduce future flood risks to new construction and substantially improved structures in Special Flood Hazard Areas (SFHAs), the Federal Government will make flood insurance available within the community as a financial protection against flood losses. The community's floodplain management regulations must meet or exceed criteria established in accordance with Title 44 Code of Federal Regulations (CFR) Part 60.3, *Criteria for land Management and Use*.

SFHAs are delineated on the community's Flood Insurance Rate Maps (FIRMs). Under the NFIP, buildings that were built before the flood hazard was identified on the community's FIRMs are generally referred to as "Pre-FIRM" buildings. When the NFIP was created, the U.S. Congress recognized that insurance for Pre-FIRM buildings would be prohibitively expensive if the premiums were not subsidized by the Federal Government. Congress also recognized that most of these floodprone buildings were built by individuals who did not have sufficient knowledge of the flood hazard to make informed decisions. The NFIP requires that full actuarial rates reflecting the complete flood risk be charged on all buildings constructed or substantially improved on or after the effective date of the initial FIRM for the community or after December 31, 1974, whichever is

later. These buildings are generally referred to as “Post-FIRM” buildings.

1.2 Purpose of this Flood Insurance Study Report

This Flood Insurance Study (FIS) Report revises and updates information on the existence and severity of flood hazards for the study area. The studies described in this report developed flood hazard data that will be used to establish actuarial flood insurance rates and to assist communities in efforts to implement sound floodplain management.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive than the minimum Federal requirements. Contact your State NFIP Coordinator to ensure that any higher State standards are included in the community’s regulations.

1.3 Jurisdictions Included in the Flood Insurance Study Project

This FIS Report covers the entire geographic area of San Luis Obispo County, California.

The jurisdictions that are included in this project area, along with the Community Identification Number (CID) for each community and the 8-digit Hydrologic Unit Codes (HUC-8) sub-basins affecting each, are shown in Table 1. The Flood Insurance Rate Map (FIRM) panel numbers that affect each community are listed. If the flood hazard data for the community is not included in this FIS Report, the location of that data is identified.

Table 1: Listing of NFIP Jurisdictions

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Arroyo Grande, City of	060305	18060006	06079C1363H 06079C1364G 06079C1368G 06079C1601H 06079C1602G 06079C1606G	
Atascadero, City of	060700	18060005, 18060006	06079C0612G 06079C0613G 06079C0614G 06079C0618G 06079C0810F[1] 06079C0826G 06079C0827G 06079C0828F[1] 06079C0829G 06079C0831G 06079C0832G 06079C0833G	

Table 1: Listing of NFIP Jurisdictions, continued

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Atascadero, City of (continued)	060700	18060005, 18060006	06079C0834G 06079C0840F[1] 06079C0841F[1] 06079C0842G 06079C0853G	
El Paso De Robles, City of	060308	18060004, 18060005	06079C0389G 06079C0390G 06079C0391G 06079C0392G 06079C0393G 06079C0394G 06079C0400G 06079C0425G 06079C0602G 06079C0604G 06079C0606G 06079C0607G 06079C0609F[1]	
Grover Beach, City of	060306	18060006	06079C1344H 06079C1363H 06079C1582H 06079C1601H	
Morro Bay, City of	060307	18060006	06079C0811H 06079C0813H 06079C0814G 06079C1026H 06079C1027H 06079C1029H	
Pismo Beach, City of	060309	18060006	06079C1337H 06079C1341H 06079C1343H 06079C1344H 06079C1363H	
San Luis Obispo, City of	060310	18060006	06079C1064G 06079C1065G 06079C1066G 06079C1067G	

Table 1: Listing of NFIP Jurisdictions, continued

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
San Luis Obispo, City of (continued)	060310	18060006	06079C1068G 06079C1069G 06079C1100G 06079C1330H 06079C1331G 06079C1332G 06079C1355G	
San Luis Obispo County, Unincorporated Areas	060304	18030003, 18030012, 18060003, 18060004, 18060005, 18060006, 18060007, 18060008	06079C0011H 06079C0012H 06079C0014H 06079C0020H 06079C0050F[1] 06079C0075G 06079C0100G 06079C0125G 06079C0150G 06079C0175G 06079C0200F[1] 06079C0225G 06079C0250F[1] 06079C0252H 06079C0254H 06079C0258H 06079C0260H 06079C0266H 06079C0267H 06079C0269H 06079C0286H 06079C0287H 06079C0288H 06079C0289H 06079C0293H 06079C0295H[1] 06079C0300H 06079C0325G 06079C0350G 06079C0375F[1] 06079C0389G 06079C0390G	

Table 1: Listing of NFIP Jurisdictions, continued

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
San Luis Obispo County, Unincorporated Areas	060304	18030003, 18030012, 18060003, 18060004, 18060005, 18060006, 18060007, 18060008	06079C0391G 06079C0392G 06079C0393G 06079C0394G 06079C0400G 06079C0425G 06079C0450G 06079C0475G 06079C0500F[1] 06079C0506H 06079C0507H 06079C0509H 06079C0528H 06079C0529G 06079C0530H 06079C0531F[1] 06079C0532F[1] 06079C0533G 06079C0534F[1] 06079C0536H 06079C0537H 06079C0539H 06079C0541G 06079C0543H 06079C0545H 06079C0575G 06079C0600G 06079C0602G 06079C0604G 06079C0605G 06079C0606G 06079C0607G 06079C0608G 06079C0609F[1] 06079C0611G 06079C0612G 06079C0613G 06079C0614G 06079C0616F[1] 06079C0617F[1]	

Table 1: Listing of NFIP Jurisdictions, continued

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
San Luis Obispo County, Unincorporated Areas (continued)	060304	18030003, 18030012, 18060003, 18060004, 18060005, 18060006, 18060007, 18060008	06079C0618G 06079C0619G 06079C0650G 06079C0675G 06079C0700G 06079C0725G 06079C0750F[1] 06079C0756H 06079C0757H 06079C0759H 06079C0776H 06079C0777H[1] 06079C0778H 06079C0779H 06079C0783H 06079C0784H 06079C0785G 06079C0792H 06079C0805G 06079C0810F[1] 06079C0811H 06079C0812G 06079C0813H 06079C0814G 06079C0816G 06079C0817G 06079C0818G 06079C0819F[1] 06079C0826G 06079C0828F[1] 06079C0829G 06079C0831G 06079C0832G 06079C0833G 06079C0834G 06079C0840F[1] 06079C0841F[1] 06079C0842G 06079C0843F[1] 06079C0844G	

Table 1: Listing of NFIP Jurisdictions, continued

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
San Luis Obispo County, Unincorporated Areas (continued)	060304	18030003, 18030012, 18060003, 18060004, 18060005, 18060006, 18060007, 18060008	06079C0851F[1] 06079C0852F[1] 06079C0853G 06079C0854G 06079C0860G 06079C0861G 06079C0862G 06079C0863G 06079C0864G 06079C0870G 06079C0900G 06079C0925G 06079C0950G 06079C0975G 06079C1000F[1] 06079C1017H 06079C1019H 06079C1026H 06079C1027H 06079C1028H 06079C1029H 06079C1031G 06079C1032G 06079C1033G 06079C1034G 06079C1036H 06079C1040H 06079C1045G 06079C1055F[1] 06079C1060G 06079C1064G 06079C1065G 06079C1066G 06079C1067G 06079C1068G 06079C1069G 06079C1100G 06079C1125G 06079C1150G 06079C1175G	

Table 1: Listing of NFIP Jurisdictions, continued

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
San Luis Obispo County, Unincorporated Areas (continued)	060304	18030003, 18030012, 18060003, 18060004, 18060005, 18060006, 18060007, 18060008	06079C1200G 06079C1225G 06079C1250G 06079C1275F[1] 06079C1282H 06079C1301H 06079C1302H[1] 06079C1303H 06079C1304H 06079C1308H 06079C1310H 06079C1316H 06079C1317H 06079C1319H 06079C1328H 06079C1329H 06079C1330H 06079C1331G 06079C1332G 06079C1333F[1] 06079C1334F[1] 06079C1336H 06079C1337H 06079C1338H[1] 06079C1341H 06079C1342G 06079C1343H 06079C1344H 06079C1355G 06079C1360G 06079C1361G 06079C1362G 06079C1363H 06079C1364G 06079C1368G 06079C1370G 06079C1400G 06079C1425G 06079C1450F[1] 06079C1475G	

Table 1: Listing of NFIP Jurisdictions, continued

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
San Luis Obispo County, Unincorporated Areas (continued)	060304	18030003, 18030012, 18060003, 18060004, 18060005, 18060006, 18060007, 18060008	06079C1500G 06079C1525G 06079C1550G 06079C1575G 06079C1582H 06079C1584H 06079C1592H 06079C1594H 06079C1601H 06079C1602G 06079C1603H 06079C1604G 06079C1606G 06079C1608G 06079C1610G 06079C1611H 06079C1613H 06079C1615H 06079C1616F[1] 06079C1617G 06079C1618G 06079C1619F 06079C1630G 06079C1635G 06079C1636G 06079C1637G 06079C1638F 06079C1639F 06079C1641G[1] 06079C1642F[1] 06079C1643G 06079C1644F[1] 06079C1675G 06079C1700G 06079C1725G 06079C1750G 06079C1775G 06079C1800G 06079C1825G 06079C1850G	

Table 1: Listing of NFIP Jurisdictions, continued

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
San Luis Obispo County, Unincorporated Areas (continued)	060304	18030003, 18030012, 18060003, 18060004, 18060005, 18060006, 18060007, 18060008	06079C1857H 06079C1859H 06079C1880F 06079C1885F 06079C1902F 06079C1905F 06079C1906F 06079C1910F 06079C1950F 06079C1975G 06079C2000G 06079C2025G 06079C2050F[1]	

[1] Panel Not Printed

1.4 Considerations for using this Flood Insurance Study Report

The NFIP encourages State and local governments to implement sound floodplain management programs. To assist in this endeavor, each FIS Report provides floodplain data, which may include a combination of the following: 10-, 4-, 2-, 1-, and 0.2-percent annual chance flood elevations (the 1% annual chance flood elevation is also referred to as the Base Flood Elevation (BFE)); delineations of the 1% annual chance and 0.2% annual chance floodplains; and 1% annual chance floodway. This information is presented on the FIRM and/or in many components of the FIS Report, including Flood Profiles, Floodway Data tables, Summary of Non-Coastal Stillwater Elevations tables, and Coastal Transect Parameters tables (not all components may be provided for a specific FIS).

This section presents important considerations for using the information contained in this FIS Report and the FIRM, including changes in format and content. Figures 1, 2, and 3 present information that applies to using the FIRM with the FIS Report.

- Part or all of this FIS Report may be revised and republished at any time. In addition, part of this FIS Report may be revised by a Letter of Map Revision (LOMR), which does not involve republication or redistribution of the FIS Report. Refer to Section 6.5 of this FIS Report for information about the process to revise the FIS Report and/or FIRM.

  It is, therefore, the responsibility of the user to consult with community officials by contacting the community repository to obtain the most current FIS Report components. Communities participating in the NFIP have established repositories of flood hazard data for floodplain management and flood insurance purposes. Community map repository addresses are provided in Table 31, “Map Repositories,” within this FIS Report.

- New FIS Reports are frequently developed for multiple communities, such as entire

counties. A countywide FIS Report incorporates previous FIS Reports for individual communities and the unincorporated area of the county (if not jurisdictional) into a single document and supersedes those documents for the purposes of the NFIP.

The initial Countywide FIS Report for San Luis Obispo County became effective on August 28, 2008. Refer to Table 28 for information about subsequent revisions to the FIRMs.

- FEMA does not impose floodplain management requirements or special insurance ratings based on Limit of Moderate Wave Action (LiMWA) delineations at this time. The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. If the LiMWA is shown on the FIRM, it is being provided by FEMA as information only. For communities that do adopt Zone VE building standards in the area defined by the LiMWA, additional Community Rating System (CRS) credits are available. Refer to Section 2.5.4 for additional information about the LiMWA.

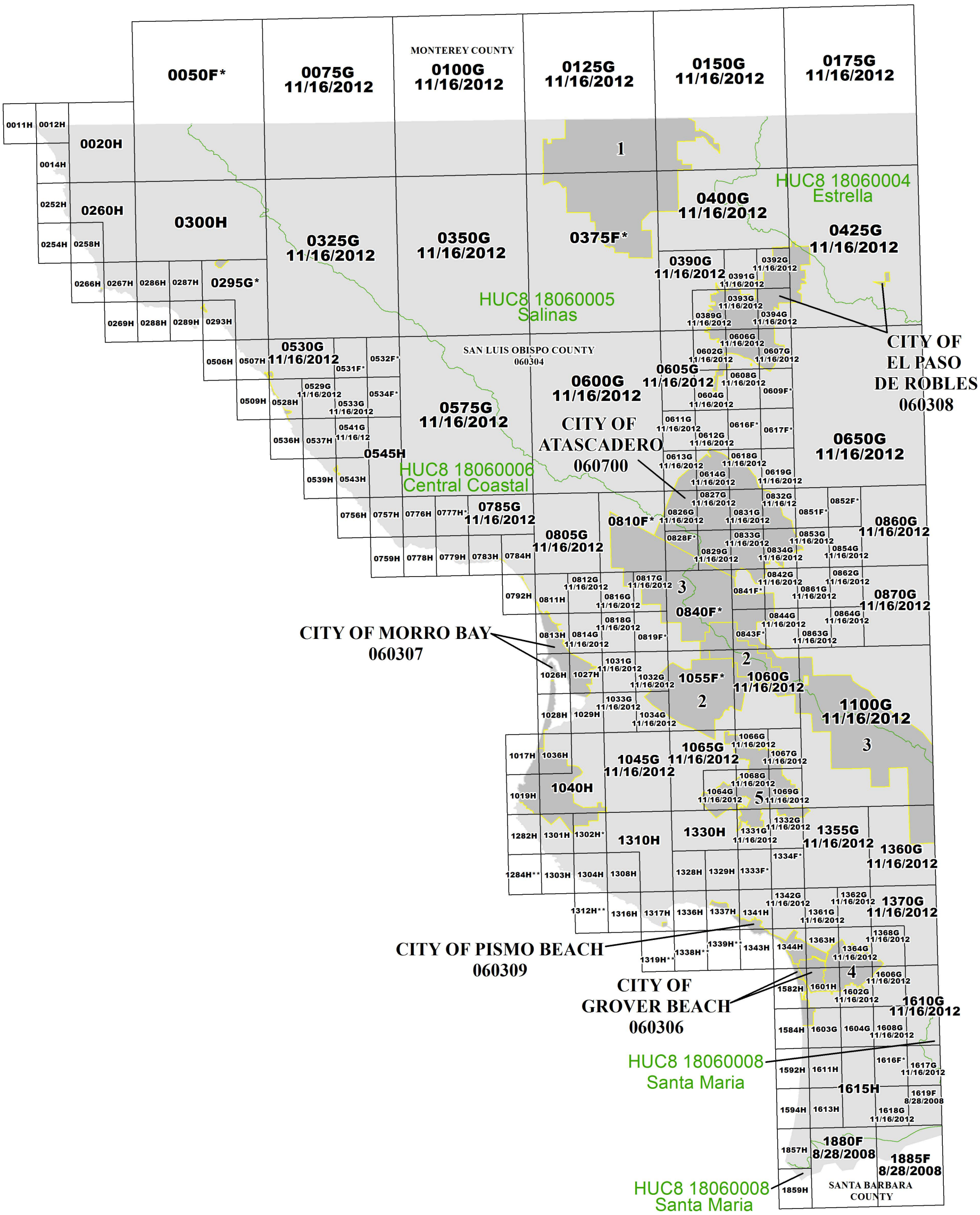
  The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Visit the FEMA Web site at www.fema.gov/national-flood-insurance-program-community-rating-system or contact your appropriate FEMA Regional Office for more information about this program.

- FEMA has developed a *Guide to Flood Maps* (FEMA 258) and online tutorials to assist users in accessing the information contained on the FIRM. These include how to read panels and step-by-step instructions to obtain specific information. To obtain this guide and other assistance in using the FIRM, visit the FEMA Web site at www.fema.gov/online-tutorials.

The FIRM Index in Figure 1 shows the overall FIRM panel layout within San Luis Obispo County, and also displays the panel number and effective date for each FIRM panel in the county. Other information shown on the FIRM Index includes community boundaries, flooding sources, watershed boundaries, and United States Geological Survey (USGS) Hydrologic Unit Code – 8 (HUC-8) codes.

KEY NUMBER	COMMUNITY	CID
1	Camp Roberts Military Reservation	
2	Camp San Luis Obispo Military Reservation	
3	Los Padres National Forest	
4	City of Arroyo Grande	060305
5	City of San Luis Obispo	060310

Figure 1 FIRM Panel Index



1 in = 5 miles

N

Miles 0 1.25 2.5 5 7.5 10

Map Projection:
Universal Transverse Mercator Zone 10 North;
North American Datum 1983

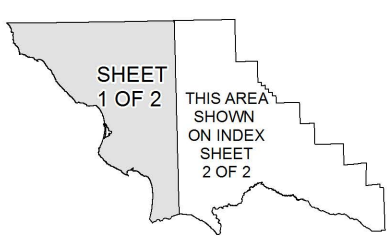
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

*PANEL NOT PRINTED - NO SPECIAL FLOOD HAZARD AREAS
**PANEL NOT PRINTED - OPEN WATER

SAN LUIS OBISPO COUNTY, CA
INDEX LOCATOR DIAGRAM



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP INDEX (Sheet 1 of 2)

SAN LUIS OBISPO COUNTY, CALIFORNIA And Incorporated Areas

PANELS PRINTED:

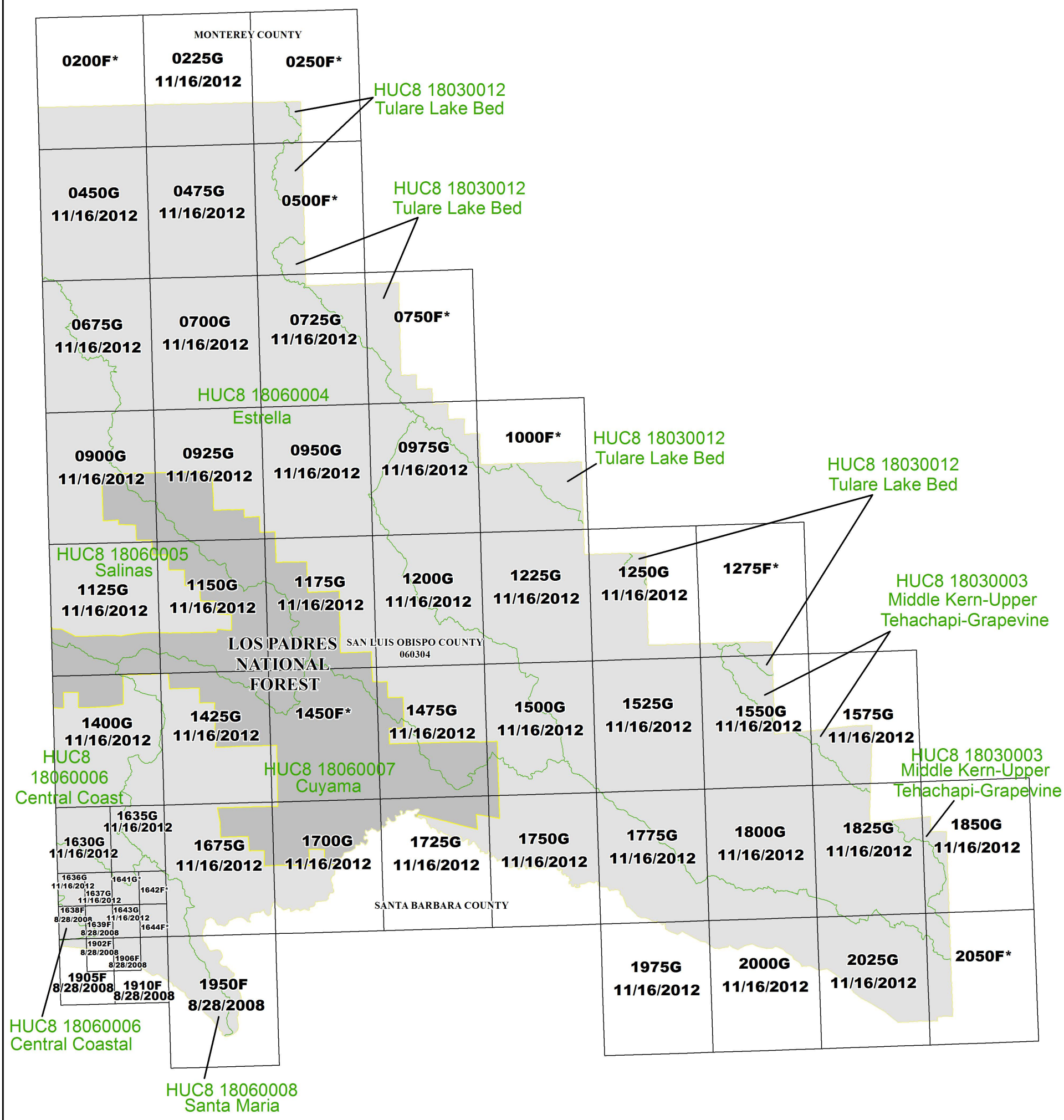
0011, 0012, 0014, 0020, 0075, 0100, 0125, 0150, 0175, 0252, 0254, 0258, 0260, 0266, 0267, 0269, 0286, 0287, 0288, 0289, 0293, 0300, 0325, 0350, 0389, 0390, 0391, 0392, 0393, 0394, 0400, 0425, 0506, 0507, 0509, 0530, 0528, 0529, 0533, 0536, 0537, 0539, 0541, 0543, 0545, 0575, 0600, 0602, 0604, 0605, 0606, 0607, 0608, 0611, 0612, 0613, 0614, 0618, 0619, 0650, 0756, 0757, 0759, 0776, 0778, 0779, 0783, 0784, 0785, 0792, 0805, 0811, 0812, 0813, 0814, 0816, 0817, 0818,0826, 0827, 0829, 0831, 0832, 0833, 0834, 0842, 0844, 0853, 0854, 0860, 0861, 0862, 0863, 0864, 0870, 1017, 1019, 1026, 1027, 1028,1029, 1031, 1032, 1033, 1034, 1036, 1040, 1045, 1060, 1064, 1065,1066, 1067, 1068, 1069, 1100, 1282, 1301, 1303, 1304, 1308, 1310,1316, 1317, 1328, 1329, 1330, 1331, 1332, 1336, 1337, 1341, 1342, 1343, 1344, 1355, 1360, 1361, 1362, 1363, 1364, 1368, 1370, 1582, 1584, 1592, 1594, 1601, 1602, 1603, 1604, 1606, 1608, 1610, 1611, 1613, 1615, 1617, 1618, 1619, 1857, 1859, 1880, 1885

FEMA

MAP NUMBER
06079CIND1C

MAP REVISED

Figure 1 FIRM Panel Index (Continued)



1 in = 7 miles

N

0 1.75 3.5 7 10.5 14 Miles

Map Projection:
Universal Transverse Mercator Zone 10 North;
North American Datum 1983

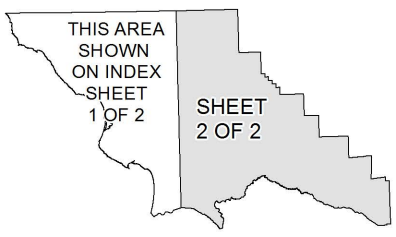
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

*PANEL NOT PRINTED - NO SPECIAL FLOOD HAZARD AREAS

COUNTY LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP INDEX (Sheet 2 of 2)

SAN LUIS OBISPO COUNTY, CALIFORNIA And Incorporated Areas

PANELS PRINTED:

0225, 0450, 0475, 0675, 0700, 0725, 0900, 0925, 0950, 0975, 1125, 1150, 1175, 1200, 1225, 1250, 1400, 1425, 1475, 1500, 1525, 1550, 1575, 1630, 1635, 1636, 1637, 1638, 1639, 1643, 1675, 1700, 1725, 1750, 1775, 1800, 1825, 1850, 1902, 1905, 1906, 1910, 1950, 1975, 2000, 2025

FEMA

MAP NUMBER
06079CIND2C

MAP REVISED

Each FIRM panel may contain specific notes to the user that provide additional information regarding the flood hazard data shown on that map. However, the FIRM panel does not contain enough space to show all the notes that may be relevant in helping to better understand the information on the panel. Figure 2 contains the full list of these notes.

Figure 2: FIRM Notes to Users

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products, or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Flood Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to Table 28 in this FIS Report.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

PRELIMINARY FIS REPORT: FEMA maintains information about map features, such as street locations and names, in or near designated flood hazard areas. Requests to revise information in or near designated flood hazard areas may be provided to FEMA during the community review period, at the final Consultation Coordination Officer's meeting, or during the statutory 90-day appeal period. Approved requests for changes will be shown on the final printed FIRM.

The map is for use in administering the NFIP. It may not identify all areas subject to flooding, particularly from local drainage sources of small size. Consult the community map repository to find updated or additional flood hazard information.

BASE FLOOD ELEVATIONS: For more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, consult the Flood Profiles and Floodway Data and/or Summary of Non-Coastal Stillwater Elevations tables within this FIS Report. Use the flood elevation data within the FIS Report in conjunction with the FIRM for construction and/or floodplain management.

Coastal Base Flood Elevations shown on the map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Coastal flood elevations are also provided in the Coastal Transect Parameters table in the FIS Report for this jurisdiction. Elevations shown in the Coastal Transect Parameters table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on the FIRM.

Figure 2. FIRM Notes to Users

FLOODWAY INFORMATION: Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the FIS Report for this jurisdiction.

FLOOD CONTROL STRUCTURE INFORMATION: Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 4.3 "Non-Levee Flood Protection Measures" of this FIS Report for information on flood control structures for this jurisdiction.

PROJECTION INFORMATION: The projection used in the preparation of the map was Universal Transverse Mercator (UTM) Zone 10N**.** The horizontal datum was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

ELEVATION DATUM: Flood elevations on the FIRM are referenced to the North American Vertical Datum of 1988**.** These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988**,** visit the National Geodetic Survey website at www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

Local vertical monuments may have been used to create the map. To obtain current monument information, please contact the appropriate local community listed in Table 31 of this FIS Report.

BASE MAP INFORMATION: Base map information shown on the FIRM was derived from Coastal California LiDAR and Digital Imagery dated 2011. USADA NAIP 2012 imagery is used in areas not covered by the Coastal California imagery. For information about base maps, refer to Section 6.2 “Base Map” in this FIS Report.

The map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map.

Corporate limits shown on the map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after the map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Figure 2. FIRM Notes to Users

NOTES FOR FIRM INDEX

REVISIONS TO INDEX: As new studies are performed and FIRM panels are updated within San Luis Obispo County, California, corresponding revisions to the FIRM Index will be incorporated within the FIS Report to reflect the effective dates of those panels. Please refer to Table 28 of this FIS Report to determine the most recent FIRM revision date for each community. The most recent FIRM panel effective date will correspond to the most recent index date.

SPECIAL NOTES FOR SPECIFIC FIRM PANELS

This Notes to Users section was created specifically for San Luis Obispo County, California**,** effective <date>**.**

FLOOD RISK REPORT: A Flood Risk Report (FRR) may be available for many of the flooding sources and communities referenced in the FIS Report. The FRR is provided to increase public awareness of flood risk by helping communities identify the areas within their jurisdictions that have the greatest risks. Although non-regulatory, the information provided within the FRR can assist communities in assessing and evaluating mitigation opportunities to reduce these risks. It can also be used by communities developing or updating flood risk mitigation plans. These plans allow communities in to identify and evaluate opportunities to reduce potential loss of life and property. However, the FRR is not intended to be the final authoritative source of all flood risk data for a project area; rather, it should be used with other data sources to paint a comprehensive picture of flood risk.

Each FIRM panel contains an abbreviated legend for the features shown on the maps. However, the FIRM panel does not contain enough space to show the legend for all map features. Figure 3 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in San Luis Obispo County.

Figure 3: Map Legend for FIRM

SPECIAL FLOOD HAZARD AREAS: *The 1% annual chance flood, also known as the base flood or 100-year flood, has a 1% chance of happening or being exceeded each year. Special Flood Hazard Areas are subject to flooding by the 1% annual chance flood. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights. See note for specific types. If the floodway is too narrow to be shown, a note is shown.*

	Special Flood Hazard Areas subject to inundation by the 1% annual chance flood (Zones A, AE, AH, AO, AR, A99, V and VE)
Zone A	The flood insurance rate zone that corresponds to the 1% annual chance floodplains. No base (1% annual chance) flood elevations (BFEs) or depths are shown within this zone.
Zone AE	The flood insurance rate zone that corresponds to the 1% annual chance floodplains. Base flood elevations derived from the hydraulic analyses are shown within this zone.
Zone AH	The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the hydraulic analyses are shown at selected intervals within this zone.
Zone AO	The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the hydraulic analyses are shown within this zone.
Zone AR	The flood insurance rate zone that corresponds to areas that were formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
Zone A99	The flood insurance rate zone that corresponds to areas of the 1% annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or flood depths are shown within this zone.
Zone V	The flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations are not shown within this zone.
Zone VE	Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations derived from the coastal analyses are shown within this zone as static whole-foot elevations that apply throughout the zone.

Figure 3: Map Legend for FIRM

	Regulatory Floodway determined in Zone AE.
OTHER AREAS OF FLOOD HAZARD	
	Shaded Zone X: Areas of 0.2% annual chance flood hazards and areas of 1% annual chance flood hazards with average depths of less than 1 foot or with drainage areas less than 1 square mile.
	Future Conditions 1% Annual Chance Flood Hazard – Zone X: The flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined based on future-conditions hydrology. No base flood elevations or flood depths are shown within this zone.
	Area with Reduced Flood Risk due to Levee: Areas where an accredited levee, dike, or other flood control structure has reduced the flood risk from the 1% annual chance flood.
OTHER AREAS	
	Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.
NO SCREEN	Unshaded Zone X: Areas of minimal flood hazard.
FLOOD HAZARD AND OTHER BOUNDARY LINES	
(ortho) (vector)	Flood Zone Boundary (white line on ortho-photography-based mapping; gray line on vector-based mapping)
	Limit of Study
	Jurisdiction Boundary
	Limit of Moderate Wave Action (LiMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet
GENERAL STRUCTURES	
Aqueduct *Channel* *Culvert* *Storm Sewer*	Channel, Culvert, Aqueduct, or Storm Sewer
Dam *Jetty* *Weir*	Dam, Jetty, Weir
	Levee, Dike, or Floodwall
Bridge	Bridge

Figure 3: Map Legend for FIRM

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AND OTHERWISE PROTECTED AREAS (OPA): *CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.*	
CBRS AREA 09/30/2009	Coastal Barrier Resources System Area: Labels are shown to clarify where this area shares a boundary with an incorporated area or overlaps with the floodway.
OTHERWISE PROTECTED AREA 09/30/2009	Otherwise Protected Area
REFERENCE MARKERS	
22.0	River mile Markers
CROSS SECTION & TRANSECT INFORMATION	
B 20.2	Lettered Cross Section with Regulatory Water Surface Elevation (BFE)
5280 21.1	Numbered Cross Section with Regulatory Water Surface Elevation (BFE)
17.5	Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)
8	Coastal Transect
	Profile Baseline: Indicates the modeled flow path of a stream and is shown on FIRM panels for all valid studies with profiles or otherwise established base flood elevation.
	Coastal Transect Baseline: Used in the coastal flood hazard model to represent the 0.0-foot elevation contour and the starting point for the transect and the measuring point for the coastal mapping.
513	Base Flood Elevation Line
ZONE AE (EL 16)	Static Base Flood Elevation value (shown under zone label)
ZONE AO (DEPTH 2)	Zone designation with Depth
ZONE AO (DEPTH 2) (VEL 15 FPS)	Zone designation with Depth and Velocity

Figure 3: Map Legend for FIRM

BASE MAP FEATURES	
Missouri Creek	River, Stream or Other Hydrographic Feature
234	Interstate Highway
234	U.S. Highway
234	State Highway
234	County Highway
MAPLE LANE	Street, Road, Avenue Name, or Private Drive if shown on Flood Profile
RAILROAD	Railroad
	Horizontal Reference Grid Line
	Horizontal Reference Grid Ticks
+	Secondary Grid Crosshairs
Land Grant	Name of Land Grant
7	Section Number
R. 43 W. T. 22 N.	Range, Township Number
$^{42}76^{000m}$E	Horizontal Reference Grid Coordinates (UTM)
365000 FT	Horizontal Reference Grid Coordinates (State Plane)
80° 16’ 52.5”	Corner Coordinates (Latitude, Longitude)

SECTION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS

2.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1% annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2% annual chance (500-year) flood is employed to indicate additional areas of flood hazard in the community.

Each flooding source included in the project scope has been studied and mapped using professional engineering and mapping methodologies that were agreed upon by FEMA and San Luis Obispo County as appropriate to the risk level. Flood risk is evaluated based on factors such as known flood hazards and projected impact on the built environment. Engineering analyses were performed for each studied flooding source to calculate its 1% annual chance flood elevations; elevations corresponding to other floods (e.g. 10-, 4-, 2-, 0.2-percent annual chance, etc.) may have also been computed for certain flooding sources. Engineering models and methods are described in detail in Section 5.0 of this FIS Report. The modeled elevations at cross sections were used to delineate the floodplain boundaries on the FIRM; between cross sections, the boundaries were interpolated using elevation data from various sources. More information on specific mapping methods is provided in Section 6.0 of this FIS Report.

Depending on the accuracy of available topographic data (Table 23), study methodologies employed (Section 5.0), and flood risk, certain flooding sources may be mapped to show both the 1% and 0.2% annual chance floodplain boundaries, regulatory water surface elevations (BFEs), and/or a regulatory floodway. Similarly, other flooding sources may be mapped to show only the 1% annual chance floodplain boundary on the FIRM, without published water surface elevations. In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% annual chance floodplain boundary is shown on the FIRM. Figure 3, "Map Legend for FIRM", describes the flood zones that are used on the FIRMs to account for the varying levels of flood risk that exist along flooding sources within the project area. Table 2 and Table 3 indicate the flood zone designations for each flooding source and each community within San Luis Obispo County, California, respectively.

Table 2, "Flooding Sources Included in this FIS Report," lists each flooding source, including its study limits, affected communities, mapped zone on the FIRM, and the completion date of its engineering analysis from which the flood elevations on the FIRM and in the FIS Report were derived. Descriptions and dates for the latest hydrologic and hydraulic analyses of the flooding sources are shown in Table 13. Floodplain boundaries for these flooding sources are shown on the FIRM (published separately) using the symbology described in Figure 3. On the map, the 1% annual chance floodplain corresponds to the SFHAs. The 0.2% annual chance floodplain shows areas that, although out of the regulatory floodplain, are still subject to flood hazards.

Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data. The procedures to remove these areas from the SFHA are described in Section 6.5 of this FIS Report.

Table 2: Flooding Sources Included in this FIS Report

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Arroyo Grande Creek	Arroyo Grande, City of; San Luis Obispo County, Unincorporated Areas	Approximately 70 feet downstream of confluence of Meadow Creek	Approximately 1600 feet upstream of Husana Road	18060006	7.0		Y	AE	
Arroyo Grande Creek	San Luis Obispo County, Unincorporated Areas	Approximately 1,600 feet upstream of Husana Road	Approximately 0.7 miles upstream of confluence of Saucelito Creek	18060006	11.2		N	A	
Atascadero Creek	Atascadero, City of	Confluence with Salinas River	Approximately 4,700 feet upstream of San Gabriel Road	18060005	0.9		Y	AE	
Carpenter Canyon Creek	Arroyo Grande, City of; San Luis Obispo County, Unincorporated Areas	Confluence with Corbett Canyon Creek	Approximately 530 feet upstream of confluence with Corbett Canyon Creek	18060006	0.1		Y	AE	
Carpenter Canyon Creek	San Luis Obispo County, Unincorporated Areas	Approximately 530 feet upstream of confluence with Corbett Canyon Creek	Approximately 263 feet upstream of Royal Oak Place	18060006	0.2		N	A	
Cayucos Creek	San Luis Obispo County, Unincorporated Areas	At North Ocean Avenue	Approximately 360 feet upstream of Private Farm Road	18060006	0.5		Y	AE	
Cayucos Creek	San Luis Obispo County, Unincorporated Areas	Approximately 360 feet upstream of Private Farm Road	Approximately 1,660 feet upstream of Picachio Road	18060006	1.8		N	A	

Table 2: Flooding Sources Included in this FIS Report, continued

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Chorro Creek	Morro Bay, City of	Approximately 710 feet downstream of South Bay Boulevard	Approximately 2,320 feet upstream of South Bay Boulevard	18060006	0.6		N	AE	
Chorro Creek	San Luis Obispo County, Unincorporated Areas	Approximately 2,320 feet upstream of South Bay Boulevard	Approximately 1.7 miles upstream of Beniamino Way	18060006	6.1		N	A, D	
Corbett Canyon Creek	Arroyo Grande, City of; San Luis Obispo County, Unincorporated Areas	Confluence with Arroyo Grande Creek	Approximately 760 feet upstream of confluence of Carpenter Canyon Creek	18060006	1.3		Y	AE	
Corbett Canyon Creek	Arroyo Grande, City of; San Luis Obispo County, Unincorporated Areas	Approximately 760 feet upstream of confluence of Carpenter Canyon Creek	Approximately 1,430 feet upstream of Wayne Way	18060006	1.2		N	A	
Deleissigues Creek	San Luis Obispo County, Unincorporated Areas	Confluence with Nipomo Creek	Approximately 765 feet upstream of Thompson Avenue	18060008	0.8		Y	AE	
Deleissigues Creek	San Luis Obispo County, Unincorporated Areas	Approximately 765 feet upstream of Thompson Avenue	Approximately 1,750 feet upstream of Thompson Avenue	18060008	0.2		N	A	

Table 2: Flooding Sources Included in this FIS Report, continued

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Graves Creek	Atascadero, City of; San Luis Obispo County, Unincorporated Areas	Confluence with Salinas River	Approximately 426 feet upstream of confluence of Paradise Valley Tributary	18060005	6.5		Y	AE	
Little Cayucos Creek	San Luis Obispo County, Unincorporated Areas	Approximately 65 feet downstream of Ocean Boulevard	Approximately 467 feet upstream of Cayucos Drive	18060006	0.5		Y	AE	
Little Cayucos Creek	San Luis Obispo County, Unincorporated Areas	Approximately 467 feet upstream of Cayucos Drive	Approximately 0.7 miles upstream of Cayucos Drive	18060006	0.6		N	A	
Little Morro Creek	San Luis Obispo County, Unincorporated Areas	Approximately 0.6 miles downstream of Nagano Road	Approximately 950 feet upstream of Little Morro Creek Road	18060006	1.6		Y	AE	
Little Morro Creek	San Luis Obispo County, Unincorporated Areas	Approximately 950 feet upstream of Little Morro Creek Road	Approximately 2 miles upstream of Little Morro Creek Road	18060006	1.8		N	A	
Los Berros Creek	Arroyo Grande, City of; San Luis Obispo County, Unincorporated Areas	At Valley Road	Approximately 1,155 feet upstream of U. S. Highway 101	18060006	4.6		Y	AE	

Table 2: Flooding Sources Included in this FIS Report, continued

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Meadow Creek	Arroyo Grande, City of; Grover Beach, City of ; Pismo Beach, City of; San Luis Obispo County, Unincorporated Areas	At Roosevelt Avenue	Approximately 0.6 miles upstream of James Way	18060006	4.5		Y	AE	
Morro Bay	Morro Bay, City of; San Luis Obispo County Unincorporated Areas	Entrance to Morro Bay	Entrance to Morro Bay	180600006		1.9	N	AE	
Morro Creek	Morro Bay, City of; San Luis Obispo County, Unincorporated Areas	Approximately 0.5 miles downstream of State Highway 1	Approximately 0.7 miles upstream of Private Road	18060006	2.9		Y	AE	
Morro Creek	San Luis Obispo County, Unincorporated Areas	Approximately 0.7 miles upstream of Private Road	Approximately 5 miles upstream of Private Road	18060006	4.2		N	A, D	
Mountain Springs Creek	El Paso de Robles, City of	At Vine Street	Approximately 34 feet upstream of Mountain Springs Road	18060005	0.3		Y	AE, AO	
Nipomo Creek	San Luis Obispo County, Unincorporated Areas	Approximately 1,700 feet downstream of Private Road	Approximately 1 mile upstream of Frontage Road	18060008	1.6		Y	AE	

Table 2: Flooding Sources Included in this FIS Report, continued

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Nipomo Creek	San Luis Obispo County, Unincorporated Areas	Approximately 2,240 feet downstream of W Tefft Street	Approximately 0.7 miles upstream of confluence of Deleissigues Creek	18060008	1.3		Y	AE	
Nipomo Creek	San Luis Obispo County, Unincorporated Areas	Approximately 1 mile upstream of Frontage Road	Approximately 2,240 feet downstream of W Tefft Street	18060008	2.5		N	A	
Nipomo Creek	San Luis Obispo County, Unincorporated Areas	Approximately 0.7 miles upstream of confluence of Deleissigues Creek	Approximately 2,638 feet upstream of confluence of Mehlschau Creek	18060008	1.3		N	A	
Noname Creek	Morro Bay, City of; San Luis Obispo County, Unincorporated Areas	Approximately 334 feet downstream of State Highway 1	Approximately 1,375 feet upstream of Panorama Drive	18060006	0.4		N	AE	
North Fork Los Berros Creek	Arroyo Grande, City of	Approximately 650 feet upstream of Orchard Avenue	Approximately 2,241 feet upstream of Orchard Avenue	18060006	0.3		N	AE	
North Fork Paloma Creek	Atascadero, City of	Confluence with Paloma Creek	Approximately 1,400 feet upstream of U. S. Highway 101	18060005	0.9		Y	AE	

Table 2: Flooding Sources Included in this FIS Report, continued

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
North Fork Paloma Creek	Atascadero, City of	Approximately 1,400 feet upstream of U. S. Highway 101	At Atascadero Avenue	18060005	0.4		N	A	
Old Garden Creek	San Luis Obispo, City of	Confluence with Stenner Creek	Approximately 30 feet upstream of Felton Way	18060006	1.3		N	AE	
Pacific Ocean	San Luis Obispo County, Unincorporated Areas	Entrance to Morro Bay	North Santa Barbara County border	18060006	11.2		N	VE, AE	
Pacific Ocean	San Luis Obispo County, Unincorporated Areas	South Monterey County border	Entrance to Morro Bay	18060006	13.4		N	VE, AE	
Paloma Creek	Atascadero, City of; San Luis Obispo County, Unincorporated Areas	Confluence with Salinas River	Approximately 4,825 feet above confluence of South Paloma Creek	18060005	2.9		Y	AE	
Peachy Canyon Creek	El Paso de Robles, City of; San Luis Obispo County, Unincorporated Areas	At Spring Street	Approximately 440 feet upstream of Vine Street	18060005	0.2		Y	AE	

Table 2: Flooding Sources Included in this FIS Report, continued

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Pismo Creek	Pismo Beach, City of; San Luis Obispo County, Unincorporated Areas	Approximately 150 feet downstream of Bello Street	Approximately 95 feet upstream of Private Drive	18060006	1.4		Y	AE	
Pismo Creek	San Luis Obispo County, Unincorporated Areas	Approximately 95 feet upstream of Private Drive	Approximately 330 feet upstream of Railroad	18060006	4.3		N	A	
Prefumo Canyon Creek	San Luis Obispo, City of	Approximately 230 feet downstream of Los Osos Valley Road	Approximately 3,167 feet upstream of Los Osos Valley Road	18060006	0.6		N	AE	
Prefumo Creek	San Luis Obispo, City of; San Luis Obispo County, Unincorporated Areas	Confluence with San Luis Obispo Creek	Approximately 106 feet upstream of Laguna Lake	18060006	1.3		N	AE, A	
Salinas River	Atascadero, City of; El Paso de Robles, City of; San Luis Obispo County, Unincorporated Areas	Approximately 1 mile downstream of State Highway 46	Approximately 530 feet above confluence of Santa Margarita Creek	18060005	19.8		Y	AE	

Table 2: Flooding Sources Included in this FIS Report, continued

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Salinas River	El Paso de Robles, City of; San Luis Obispo County, Unincorporated Areas	At San Luis Obispo County boundary	Approximately 1 mile downstream of State Highway 46	18060005	11.0		N	A, D	
Salinas River	San Luis Obispo County, Unincorporated Areas	Approximately 530 feet above confluence of Santa Margarita Creek	Approximately 4 miles upstream of Hi Mountain Lookout Road	18060005	34.0		N	A, D	
San Luis Obispo Creek	San Luis Obispo County, Unincorporated Areas	At Harford Drive	Approximately 230 feet upstream of Footbridge	18060006	0.5		Y	AE	
San Luis Obispo Creek	San Luis Obispo, City of	Approximately 330 feet downstream of confluence of Froom Creek	Approximately 1,000 feet upstream of U.S. Highway 101	18060006	5.3		Y	AE, AO	
San Luis Obispo Creek	San Luis Obispo County, Unincorporated Areas	Approximately 230 feet upstream of Footbridge	Approximately 1,100 feet downstream of confluence of Trout Creek	18060006	6.7		N	A	
San Luis Obispo Creek	San Luis Obispo County, Unincorporated Areas	Approximately 1,000 feet upstream of U.S. Highway 101	Approximately 0.7 miles upstream of Reservoir Canyon Road	18060006	1.7		N	A	

Table 2: Flooding Sources Included in this FIS Report, continued

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Santa Margarita Creek	San Luis Obispo County, Unincorporated Areas	Approximately 1,100 feet downstream of confluence of Trout Creek	Approximately 90 feet upstream of confluence of Yerba Buena Creek	18060005	2.6		Y	AE	
Santa Margarita Creek	San Luis Obispo County, Unincorporated Areas	Approximately 380 feet downstream of Yerba Buena Avenue	Approximately 0.5 miles upstream of Yerba Buena Avenue	18060005	0.7		Y	AE	
Santa Margarita Creek	San Luis Obispo County, Unincorporated Areas	Approximately 90 feet upstream of confluence of Yerba Buena Creek	Approximately 380 feet downstream of Yerba Buena Avenue	18060005	1.6		N	A	
Santa Margarita Creek	San Luis Obispo County, Unincorporated Areas	Approximately 0.5 miles upstream of Yerba Buena Avenue	At Highway 101	18060005	0.7		N	A	
Santa Rosa Creek	San Luis Obispo County, Unincorporated Areas	Approximately 1,500 feet downstream of Windsor Boulevard	Approximately 900 feet upstream of Ferrasci Road	18060006	3.5		Y	AE	
Santa Rosa Creek	San Luis Obispo County, Unincorporated Areas	Approximately 900 feet upstream of Ferrasci Road	Approximately 2.2 miles upstream of Ferrasci Road	18060006	2.0		N	A	

Table 2: Flooding Sources Included in this FIS Report, continued

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Santa Rosa Creek Split Flow	San Luis Obispo County, Unincorporated Areas	Convergence with Santa Rosa Creek	Divergence from Santa Rosa Creek, approximately 1,400 feet upstream of Cambria Road	18060006	0.7		N	AE	
See Canyon Creek	San Luis Obispo County, Unincorporated Areas	At Pippen Lane	Approximately 1,915 feet upstream of confluence of Davis Canyon Creek	18060006	0.8		N	AE	
See Canyon Creek	San Luis Obispo County, Unincorporated Areas	Confluence with San Luis Obispo Creek	At Pippen Lane	18060006	1.9		N	A	
See Canyon Creek	San Luis Obispo County, Unincorporated Areas	Approximately 1,915 feet upstream of confluence of Davis Canyon Creek	Approximately 3 miles upstream of confluence of Davis Canyon Creek	18060006	2.6		N	A	
South Branch Toad Creek	San Luis Obispo County, Unincorporated Areas	Confluence with Toad Creek	U.S. Highway 101	18060005	0.3		Y	AE	

Table 2: Flooding Sources Included in this FIS Report, continued

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
South Branch Unnamed Creek No. 1	El Paso de Robles, City of	Confluence with Unnamed Creek No. 1	Approximately 2,850 feet upstream of confluence with Unnamed Creek No. 1	18060005	0.5		Y	AE	
Stenner Creek	San Luis Obispo, City of	Confluence with San Luis Obispo Creek	Approximately 400 feet upstream of Index Station Road	18060006	1.7		N	AE	
Stenner Creek	San Luis Obispo County, Unincorporated Areas	Approximately 400 feet upstream of Index Station Road	Approximately 1,030 feet upstream of Union Pacific Railroad	18060006	2.2		N	A	
Tefft Road Tributary	San Luis Obispo County, Unincorporated Areas	Confluence with Nipomo Creek	Approximately 2,180 feet upstream of Tefft Street	18060008	1.0		N	AE	
Tefft Road Tributary	San Luis Obispo County, Unincorporated Areas	Approximately 2,180 feet upstream of Tefft Street	Approximately 0.7 miles upstream of Tefft Street	18060008	0.3		N	A	
Tefft Road Tributary East Fork	San Luis Obispo County, Unincorporated Areas	Confluence with Tefft Road Tributary	Approximately 2,110 feet upstream of confluence of Tefft Road Tributary	18060008	0.4		N	AE	

Table 2: Flooding Sources Included in this FIS Report, continued

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Tefft Road Tributary East Fork	San Luis Obispo County, Unincorporated Areas	Approximately 2,110 feet upstream of confluence with Tefft Road Tributary	Approximately 2,186 feet upstream of confluence with Tefft Road Tributary	18060008	0.1		N	A	
Toad Creek (Main and North Branch)	San Luis Obispo County, Unincorporated Areas	Confluence with Salinas River	U.S. Highway 101	18060005	2.0		Y	AE	
Toro Creek	Morro Bay, City of; San Luis Obispo County, Unincorporated Areas	Pacific Ocean	Approximately 460 feet upstream of State Highway 1	18060006	0.1		N	VE, AE	
Toro Creek	San Luis Obispo County, Unincorporated Areas	Approximately 460 feet upstream of State Highway 1	Approximately 2,340 feet upstream of Negranti Road	18060006	3.4		N	A	
Unnamed Creek No. 1	El Paso de Robles, City of	Confluence with Salinas River	Approximately 1,800 feet upstream of Airport Road	18060005	4.3		Y	AE	
Unnamed Creek No. 1	El Paso de Robles, City of	Approximately 1,800 feet upstream of Airport Road	Approximately 2,460 feet upstream of Airport Road	18060005	0.1		N	A	

Table 2: Flooding Sources Included in this FIS Report, continued

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Unnamed Creek (Alva Paul Creek)	Morro Bay, City of	State Beach	Approximately 1,145 feet upstream of Main Street	18060006	0.5		N	VE, AE	
Unnamed Creek (Alva Paul Creek)	San Luis Obispo County, Unincorporated Areas	Approximately 1,145 feet upstream of Main Street	Approximately 2,940 feet upstream of Main Street	18060006	0.3		N	A	
Unnamed Creek No. 1	El Paso de Robles, City of	Confluence with Salinas River	Approximately 1,820 feet upstream of Airport Road	18060005	4.3		Y	AE	
Unnamed Creek No. 1	El Paso de Robles, City of	Approximately 1,820 feet upstream of Airport Road	Approximately 2,475 feet upstream of Airport Road	18060005	0.1		N	A	
Unnamed Stream	San Luis Obispo County, Unincorporated Areas	Confluence with Santa Rosa Creek	Approximately 1,950 feet upstream of Santa Rosa Creek Road	18060006	0.7		N	A	
Willow Creek	San Luis Obispo County, Unincorporated Areas	Confluence with Pacific Ocean	Approximately 812 feet upstream of Ocean Boulevard	18060006	0.3		Y	VE, AE	
Willow Creek	San Luis Obispo County, Unincorporated Areas	Approximately 812 feet upstream of Ocean Boulevard	Approximately 2,540 feet upstream of Ocean Boulevard	18060006	0.3		N	A	

Table 2: Flooding Sources Included in this FIS Report, continued

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Yerba Buena Creek	San Luis Obispo County, Unincorporated Areas	Approximately 6,240 feet above the Confluence with Santa Margarita Creek	Approximately 2,880 feet upstream of Encina Avenue	18060005	1.1		Y	AE	
Yerba Buena Creek	San Luis Obispo County, Unincorporated Areas	Confluence with Santa Margarita Creek	Approximately 6,240 feet above the Confluence with Santa Margarita Creek	18060005	1.2		N	A	

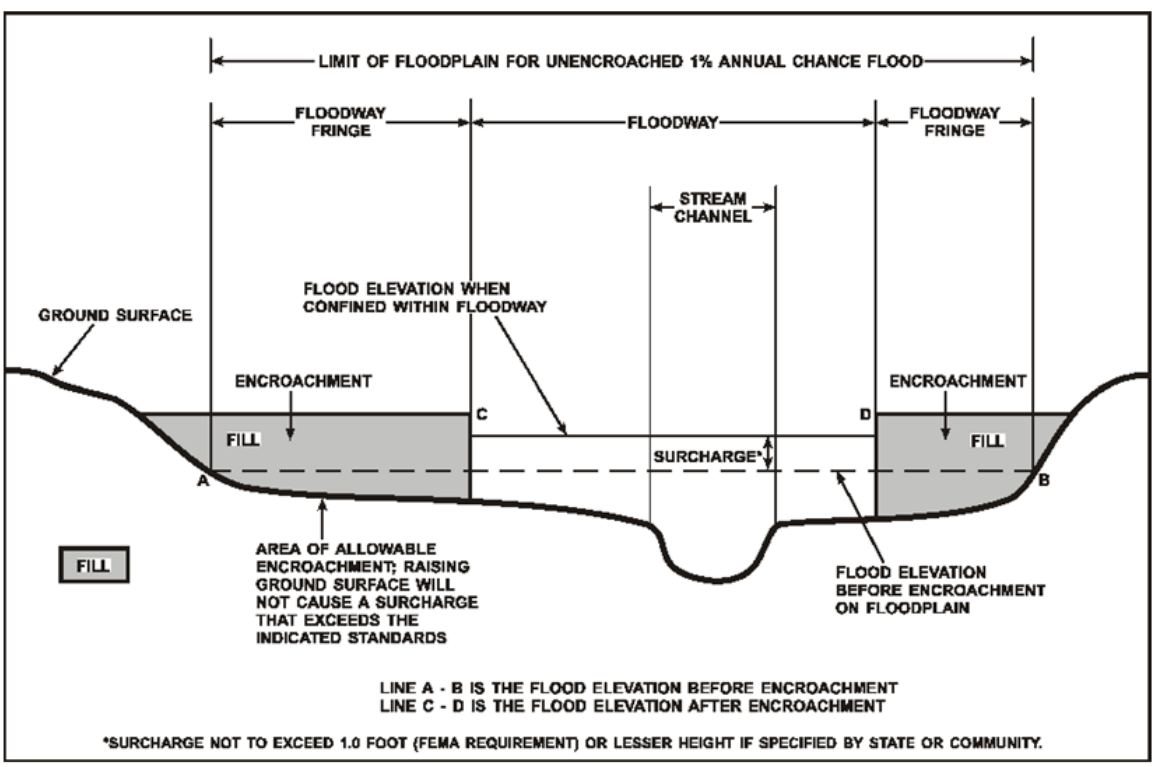
2.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard.

For purposes of the NFIP, a floodway is used as a tool to assist local communities in balancing floodplain development against increasing flood hazard. With this approach, the area of the 1% annual chance floodplain on a river is divided into a floodway and a floodway fringe based on hydraulic modeling. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order to carry the 1% annual chance flood. The floodway fringe is the area between the floodway and the 1% annual chance floodplain boundaries where encroachment is permitted. The floodway must be wide enough so that the floodway fringe could be completely obstructed without increasing the water surface elevation of the 1% annual chance flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.

To participate in the NFIP, Federal regulations require communities to limit increases caused by encroachment to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this project are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway projects.

Figure 4: Floodway Schematic



Floodway widths presented in this FIS Report and on the FIRM were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. For certain stream segments, floodways were adjusted so that the amount of floodwaters conveyed on each side of the floodplain would be reduced equally. The results of the floodway computations have been tabulated for selected cross sections and are shown in Table 24 "Floodway Data."

All floodways that were developed for this Flood Risk Project are shown on the FIRM using the symbology described in Figure 3. In cases where the floodway and l% annual chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown on the FIRM. For information about the delineation of floodways on the FIRM, refer to Section 6.3.

2.3 Base Flood Elevations

The hydraulic characteristics of flooding sources were analyzed to provide estimates of the elevations of floods of the selected recurrence intervals. The Base Flood Elevation (BFE) is the elevation of the 1% annual chance flood. These BFEs are most commonly rounded to the whole foot, as shown on the FIRM, but in certain circumstances or locations they may be rounded to 0.1 foot. Cross section lines shown on the FIRM may also be labeled with the BFE rounded to 0.1 foot. Whole-foot BFEs derived from engineering analyses that apply to coastal areas, areas of ponding, or other static areas with little elevation change may also be shown at selected intervals on the FIRM.

Cross sections with BFEs shown on the FIRM correspond to the cross sections shown in the Floodway Data table and Flood Profiles in this FIS Report. BFEs 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.

2.4 Non-Encroachment Zones

Some States and communities use non-encroachment zones to manage floodplain development. For flooding sources with medium flood risk, field surveys are often not collected and surveyed bridge and culvert geometry is not developed. Standard hydrologic and hydraulic analyses are still performed to determine BFEs in these areas. However, floodways are not typically determined, since specific channel profiles are not developed. To assist communities with managing floodplain development in these areas, a "non-encroachment zone" may be provided. While not a FEMA designated floodway, the non-encroachment zone represents that area around the stream that should be reserved to convey the 1% annual chance flood event. As with a floodway, all surcharges must fall within the acceptable range in the non-encroachment zone.

General setbacks can be used in areas of lower risk (e.g. unnumbered Zone A), but these are not considered sufficient where unnumbered Zone A is replaced by Zone AE. The NFIP requires communities to ensure that any development in a non-encroachment area causes no increase in BFEs. Communities must generally prohibit development within the area defined by the non-encroachment width to meet the NFIP requirement.

2.5 Coastal Flood Hazard Areas

For most areas along rivers, streams, and small lakes, BFEs and floodplain boundaries are based on the amount of water expected to enter the area during a 1% annual chance flood and the geometry of the floodplain. Floods in these areas are typically caused by storm events. However, for areas on or near ocean coasts, large rivers, or large bodies of water, BFE and floodplain boundaries may need to be based on additional components, including storm surges and waves. Communities on or near ocean coasts face flood hazards caused by offshore seismic events as well as storm events.

Coastal flooding sources that are included in this Flood Risk Project are shown in Table 2.

2.5.1 Water Elevations and the Effects of Waves

Specific terminology is used in coastal analyses to indicate which components have been included in evaluating flood hazards.

The stillwater elevation (SWEL or still water level) is the surface of the water resulting from astronomical tides, storm surge, and freshwater inputs, but excluding wave setup contribution or the effects of waves.

- *Astronomical tides* are periodic rises and falls in large bodies of water caused by the rotation of the earth and by the gravitational forces exerted by the earth, moon and sun.
- *Storm surge* is the additional water depth that occurs during large storm events. These events can bring air pressure changes and strong winds that force water up against the shore.
- *Freshwater inputs* include rainfall that falls directly on the body of water, runoff from surfaces and overland flow, and inputs from rivers**.**

The 1% annual chance stillwater elevation is the stillwater elevation that has been calculated for a storm surge from a 1% annual chance storm. The 1% annual chance storm surge can be determined from analyses of tidal gage records, statistical study of regional historical storms, or other modeling approaches. Stillwater elevations for storms of other frequencies can be developed using similar approaches.

The total stillwater elevation (also referred to as the mean water level) is the stillwater elevation plus wave setup contribution but excluding the effects of waves.

- *Wave setup* is the increase in stillwater elevation at the shoreline caused by the reduction of waves in shallow water. It occurs as breaking wave momentum is transferred to the water column.

Like the stillwater elevation, the total stillwater elevation is based on a storm of a particular frequency, such as the 1% annual chance storm. Wave setup is typically estimated using standard engineering practices or calculated using models, since tidal gages are often sited in areas sheltered from wave action and do not capture this information.

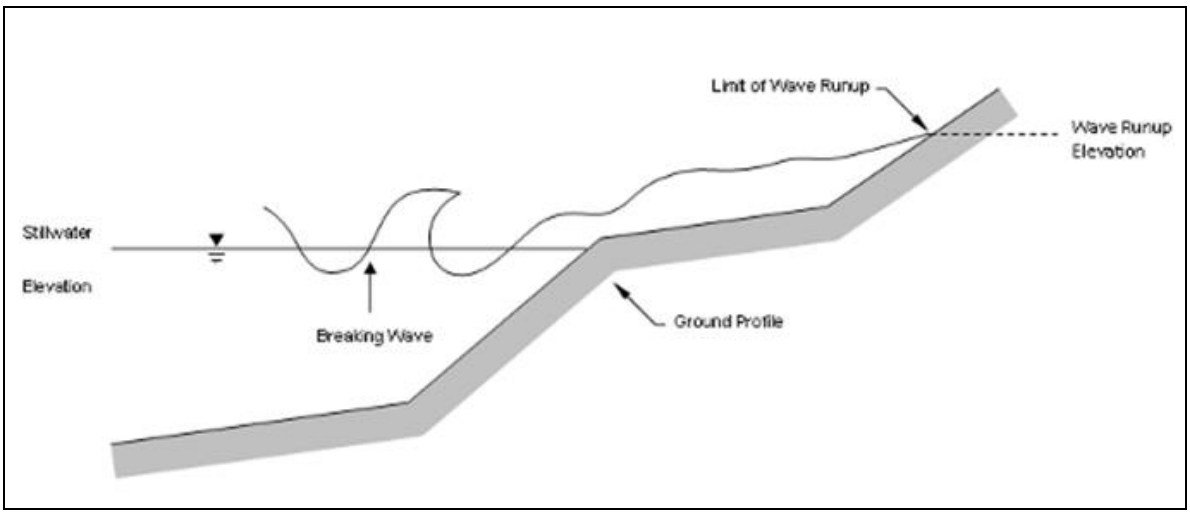
Coastal analyses may examine the effects of overland waves by analyzing storm-induced erosion, overland wave propagation, wave runup, and/or wave overtopping.

- *Storm-induced erosion* is the modification of existing topography by erosion caused by a specific storm event, as opposed to general erosion that occurs at a more constant rate.
- *Overland wave propagation* describes the combined effects of variation in ground

elevation, vegetation, and physical features on wave characteristics as waves move onshore.

- *Wave runup* is the uprush of water from wave action on a shore barrier. It is a function of the roughness and geometry of the shoreline at the point where the stillwater elevation intersects the land.
- *Wave overtopping* refers to wave runup that occurs when waves pass over the crest of a barrier.

Figure 5: Wave Runup Transect Schematic



2.5.2 Floodplain Boundaries and BFEs for Coastal Areas

For coastal communities along the Atlantic and Pacific Oceans, the Gulf of Mexico, the Great Lakes, and the Caribbean Sea, flood hazards must take into account how storm surges, waves, and extreme tides interact with factors such as topography and vegetation. Storm surge and waves must also be considered in assessing flood risk for certain communities on rivers or large inland bodies of water.

Beyond areas that are affected by waves and tides, coastal communities can also have riverine floodplains with designated floodways, as described in previous sections.

Floodplain Boundaries

In many coastal areas, storm surge is the principle component of flooding. The extent of the 1% annual chance floodplain in these areas is derived from the total stillwater elevation (stillwater elevation including storm surge plus wave setup) for the 1% annual chance storm. The methods that were used for calculation of total stillwater elevations for coastal areas are described in Section 5.3 of this FIS Report. Location of total stillwater elevations for coastal areas are shown in **Error! Reference source not found.**, "1% Annual Chance Total Stillwater Levels for Coastal Areas."

In some areas, the 1% annual chance floodplain is determined based on the limit of wave runup or wave overtopping for the 1% annual chance storm surge. The methods that were used for calculation of wave hazards are described in Section 5.3 of this FIS Report.

Table 26 presents the types of coastal analyses that were used in mapping the 1% annual chance floodplain in coastal areas.

Coastal BFEs

Coastal BFEs are calculated as the total stillwater elevation (stillwater elevation including storm surge plus wave setup) for the 1% annual chance storm plus the additional flood hazard from overland wave effects (storm-induced erosion, overland wave propagation, wave runup and wave overtopping).

Where they apply, coastal BFEs are calculated along transects extending from offshore to the limit of coastal flooding onshore. Results of these analyses are accurate until local topography, vegetation, or development type and density within the community undergoes major changes.

Parameters that were included in calculating coastal BFEs for each transect included in this FIS Report are presented in Table 17, "Coastal Transect Parameters." The locations of transects are shown in Figure 9, "Transect Location Map." More detailed information about the methods used in coastal analyses and the results of intermediate steps in the coastal analyses are presented in Section 5.3 of this FIS Report. Additional information on specific mapping methods is provided in Section 6.4 of this FIS Report.

2.5.3 Coastal High Hazard Areas

Certain areas along the open coast and other areas may have higher risk of experiencing structural damage caused by wave action and/or high-velocity water during the 1% annual chance flood. These areas will be identified on the FIRM as Coastal High Hazard Areas.

- *Coastal High Hazard Area (CHHA)* is a SFHA extending from offshore to the inland limit of the primary frontal dune (PFD) or any other area subject to damages caused by wave action and/or high-velocity water during the 1% annual chance flood.
- *Primary Frontal Dune (PFD)* is a continuous or nearly continuous mound or ridge of sand with relatively steep slopes immediately landward and adjacent to the beach. The PFD is subject to erosion and overtopping from high tides and waves during major coastal storms.

CHHAs are designated as "V" zones (for "velocity wave zones") and are subject to more stringent regulatory requirements and a different flood insurance rate structure. The areas of greatest risk are shown as VE on the FIRM. Zone VE is further subdivided into elevation zones and shown with BFEs on the FIRM.

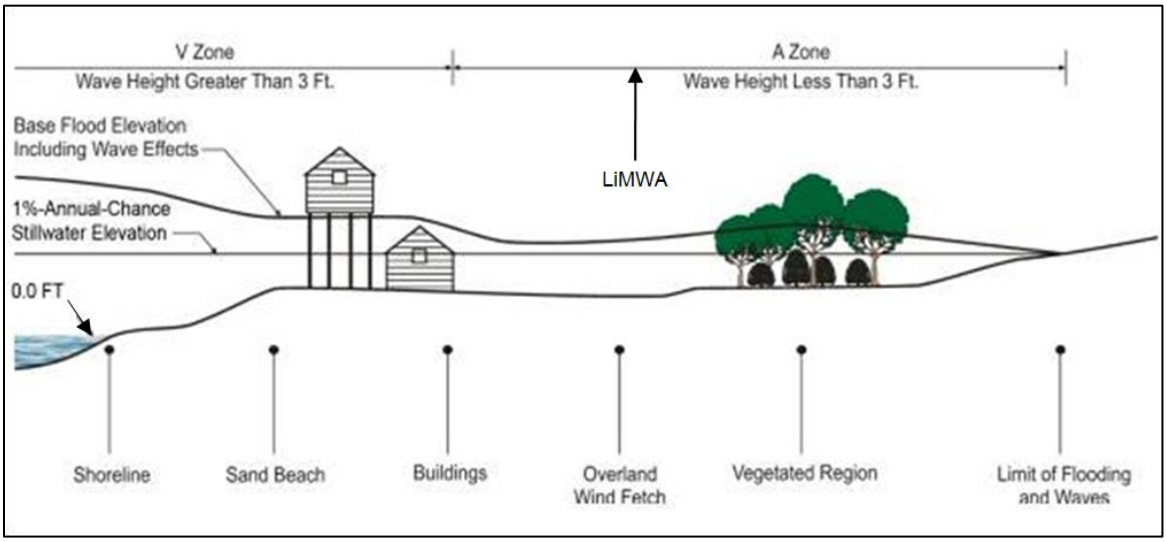
The landward limit of the PFD occurs at a point where there is a distinct change from a relatively steep slope to a relatively mild slope; this point represents the landward extension of Zone VE. Areas of lower risk in the CHHA are designated with Zone V on the FIRM. More detailed information about the identification and designation of Zone VE is presented in Section 6.4 of this FIS Report.

Areas that are not within the CHHA but are SFHAs may still be impacted by coastal flooding and damaging waves; these areas are shown as "A" zones on the FIRM.

Figure 6, "Coastal Transect Schematic," illustrates the relationship between the base flood elevation, the 1% annual chance stillwater elevation, and the ground profile as well as the

location of the Zone VE and Zone AE areas in an area without a PFD subject to overland wave propagation. This figure also illustrates energy dissipation and regeneration of a wave as it moves inland.

Figure 6: Coastal Transect Schematic



Methods used in coastal analyses in this Flood Risk Project are presented in Section 5.3 and mapping methods are provided in Section 6.4 of this FIS Report.

Coastal floodplains are shown on the FIRM using the symbology described in Figure 3, "Map Legend for FIRM." In many cases, the BFE on the FIRM is higher than the stillwater elevations shown in Table 17 due to the presence of wave effects. The higher elevation should be used for construction and/or floodplain management purposes.

2.5.4 Limit of Moderate Wave Action

This section is not applicable to this Flood Risk Project.

SECTION 3.0 – INSURANCE APPLICATIONS

3.1 National Flood Insurance Program Insurance Zones

For flood insurance applications, the FIRM designates flood insurance rate zones as described in Figure 3, "Map Legend for FIRM." Flood insurance zone designations are assigned to flooding sources based on the results of the hydraulic or coastal analyses. Insurance agents use the zones shown on the FIRM and depths and base flood elevations in this FIS Report in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

The 1% annual chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (e.g. Zones A, AE, V, VE, etc.), and the 0.2% annual chance floodplain boundary corresponds to the boundary of areas of additional flood hazards.

Table 3 lists the flood insurance zones in San Luis Obispo County.

Table 3: Flood Zone Designations by Community

Community	Flood Zone(s)
Arroyo Grande, City of	A, AE, AH, X
Atascadero, City of	A, AE, AH, AO, D, X
El Paso de Robles, City of	A, AE, AH, AO, X
Grover Beach, City of	A, AE, VE, X
Morro Bay, City of	A, AE, VE, X
Pismo Beach, City of	A, AE, VE, X
San Luis Obispo, City of	A, AE, AO, X
San Luis Obispo County, Unincorporated Areas	A, AE, AH, AO, D, VE, X

3.2 Coastal Barrier Resources System

This section is not applicable to this Flood Risk Project.

Table 4: Coastal Barrier Resources System Information

[Not Applicable to this Flood Risk Project]

SECTION 4.0 – AREA STUDIED

4.1 Basin Description

Table 5 contains a description of the characteristics of the HUC-8 sub-basins within which each community falls. The table includes the main flooding sources within each basin, a brief description of the basin, and its drainage area.

Table 5: Basin Characteristics

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description of Affected Area	Drainage Area (square miles)
Carrizo Plain	18060003	*	*	*
Central Coastal	18060006	*	*	*
Cuyama	18060007	Cuyama River	*	*
Estrella	18060004	*	*	*
Middle Kern-Upper Tehachapi-Grapevine	18030003	*	*	*

Table 5: Basin Characteristics, continued

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description of Affected Area	Drainage Area (square miles)
Salinas	18060005	Salinas River	The Salinas River drainage basin runs from northern San Luis Obispo County to its discharge into the Pacific Ocean at Monterey Bay.	*
Santa Maria	18060008	*	*	*
Tulare Lake Bed	18030012	*	*	*

*Data not available

4.2 Principal Flood Problems

Table 6 contains a description of the principal flood problems that have been noted for San Luis Obispo County by flooding source.

Table 6: Principal Flood Problems

Flooding Source	Description of Flood Problems
All Sources	Streamflow throughout most of San Luis Obispo County is highly seasonal and the runoff from all the streams is very small. Significant streamflows occur only during and immediately following precipitation because climatic and drainage area characteristics are not conducive to continuous runoff. During large storms, streamflow increases rapidly in response to effective precipitation. The floodwaters often contain high debris volumes and cause major flood damage. The major causes of riverine flooding in the county are undersized channels, the obstructions within them, small bridge openings at several highways, small culverts across local roads, and dense vegetation growth in the channels. Investigation of flooding from 1911 through 1978 indicates that flood conditions and flood damage were experienced in portions of San Luis Obispo County in March 1911, January 1914, February 1922, November 1926, December 1931, February 1938, March 1941, January 1943, February 1945, January 1952, January 1956, April 1958, February 1962, December 1966, January and February 1969, February 1973, and February 1978. In rural areas, flooding in early years was often viewed as an asset rather than a liability. The need for water to irrigate agricultural crops outweighed the damage done by floodwaters. In later years, as development increased, damage became a more important consideration. Most of the coastal communities in San Luis Obispo County experienced unprecedented damage as a result of two separate floods occurring in January and February 1969. Not since 1914 had the county experienced any flooding causing significant property damage. In the intervening years, tremendous agricultural, residential, and business development had taken place.

Table 6: Principal Flood Problems, continued

Flooding Source	Description of Flood Problems
All Sources, continued	Total damage in the county during the 1969 floods was then estimated at approximately $4.5 million (USACE, 1974).
Pacific Ocean	The southern California coastline is exposed to waves generated by winter and summer storms originating in the Pacific Ocean. It is not uncommon for these storms to cause 15-foot breakers. The occurrence of such a storm event in combination with high astronomical tides and strong winds can cause significant wave runup and allow storm waves to reach higher-than-normal elevations along the coastline. When this occurs, shoreline erosion and coastal flooding frequently result in damage to inadequately protected structures and facilities located along low-lying portions of the county shoreline. In addition to flooding from runup of wind waves and swell generated by meteorological events, the southern California coastline is also susceptible to flooding by tsunamis (tidal waves) generated by large submarine earthquakes. These earthquakes occur along the rim of the Pacific Ocean and have been known to produce devastating effects many hundreds of miles across the Pacific Ocean.

Table 7 contains information about historic flood elevations in the communities within San Luis Obispo County.

Table 7: Historic Flooding Elevations

[Not Applicable to this Flood Risk Project]

4.3 Non-Levee Flood Protection Measures

Table 8 contains information about non-levee flood protection measures within San Luis Obispo County such as dams, jetties, and or dikes. Levees are addressed in Section 4.4 of this FIS Report.

Table 8: Non-Levee Flood Protection Measures

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Arroyo Grande Creek	Lopez Dam	Dam	N/A	Outside the detail study area, on Arroyo Grande Creek, The San Luis Obispo County Flood Control and Water Conservation District constructed Lopez Dam in 1969 as part of the Lopez Water Supply. The 1-percent-annual-chance flood event is expected to flow out of the reservoir over its ungated spillway.

Table 8: Non-Levee Flood Protection Measures, continued

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Arroyo Grande Creek	N/A	Trapezoidal earthen channel improvements	Lower 5 miles of Arroyo Grande Creek	In 1958, the Natural Resources Conservation Service (NRCS) constructed trapezoidal earthen channel improvements on the lower 5 miles of Arroyo Grande Creek. These channels are subject to severe deposition of sediment during major floods and would not contain a 1- percent-annual-chance flood event.
Arroyo Grande Creek	N/A	Perched Levee	On the lower 2.84 miles of Arroyo Grande Creek	The NRCS has also constructed a perched levee system that is approximately 5 feet above ground. The levees were designed to carry approximately a 2-percent-annual-chance flood event. For floods of greater magnitude, the levees will be overtopped and erode to the natural streambank.
Los Berros Creek	N/A	Trapezoidal earthen channel improvements	Lower 0.6 mile of Los Berros Creek	In 1958, the Natural Resources Conservation Service (NRCS) constructed trapezoidal earthen channel improvements on the lower 0.6 mile of Los Berros Creek. These channels are subject to severe deposition of sediment during major floods and would not contain a 1-percent-annual-chance flood event.
Meadow Creek	N/A	Flood-control retention basin	Upstream of U.S. Highway 101	There is a small flood-control retention basin on Meadow Creek just upstream of U.S. Highway 101. This basin has no effect on reducing the 1-percent-annual- chance flood event peak on Meadow Creek.

Table 8: Non-Levee Flood Protection Measures, continued

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Nacimiento River	Nacimiento Dam	Dam	15 miles northwest of the City of El Paso de Robles and is situated on the Nacimiento River	The dam was constructed in 1957 by Monterey County and intercepts runoff from a drainage area of 319 square miles. Nacimiento Dam has spilled twice since being constructed, in April 1958 and February 1969. The larger spill, 3,000 cubic feet per second (cfs), occurred on February 25, 1969, at the same time that 3,770 cfs were being discharged through the outlet works, for a total discharge of 6,770 cfs.
Old Garden Creek and Tributary	N/A	Concrete block box channel	From the downstream side of Broad Street to the upstream side of Lincoln Street	A new concrete block box channel was placed from the downstream side of Broad Street to the upstream side of Lincoln Street. There is also a concrete block channel between Foothill Boulevard and Felton Way and on a tributary of Old Garden Creek, from its confluence with the main creek to Jeffery Drive.
Pacific Ocean	N/A	Breakwaters, seawalls and revetments	Various locations	Breakwaters have been constructed at the entrance to Morro Bay, at Post San Luis, at Cayucos, and at the site of the Diablo Canyon nuclear power plant. Timber and concrete seawalls and concrete revetments have been built along a few areas of the coastline, including in the vicinity of Cayucos and Pismo Beach. The seawalls and revetments provide some coastal flood protection from storm swells and wave runup to developed areas.
Prefumo Creek	N/A	Bank protection and channel maintenance programs	Laguna Lake	The outlet structure into Prefumo Creek and spillway has been improved to accommodate the 1-percent-annual-chance flood event.

Table 8: Non-Levee Flood Protection Measures, continued

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Prefumo Creek	N/A	Concrete lined trap channel	Approximately 1,200 feet above the confluence with San Luis Obispo Creek	The first, approximately 1,200 feet above the confluence with San Luis Obispo Creek, is a concrete lined trap channel.
Salinas River	Salinas Dam	Dam	On the Salinas River near Santa Margarita	Salinas Dam was completed in 1942 as a water-supply facility for Camp San Luis Obispo. The dam is approximately 2 miles upstream from Pilitas Creek and 7.5 miles northwest of the Town of Pozo, and it intercepts runoff from drainage areas of 112 square miles. The dam impounds a usable water-supply capacity of approximately 26,000 acre-feet to its spillway crest and has a maximum capacity of 44,500 acre-feet to the dam crest (U.S. Department of the Interior, 1978).
San Luis Obispo Creek	N/A	Bank protection and channel maintenance programs	Various locations	A 1,200-foot, under-city channel that runs under the downtown business district. Recent improvements were made to the entrance conditions, but the channel still does not have the capacity to carry the 1-percent-annual-chance flood event. In 1979, channel improvements were completed on San Luis Obispo Creek from Holley Street within Silver City Mobile Home Park, downstream past the mouth of Prefumo Creek to the mouth of Froom Creek.

4.4 Levees

For purposes of the NFIP, FEMA only recognizes levee systems that meet, and continue to meet, minimum design, operation, and maintenance standards that are consistent with comprehensive floodplain management criteria. The Code of Federal Regulations, Title 44, Section 65.10 (44 CFR 65.10) describes the information needed for FEMA to determine if a levee system reduces

the risk from the 1% annual chance flood. This information must be supplied to FEMA by the community or other party when a flood risk study or restudy is conducted, when FIRMs are revised, or upon FEMA request. FEMA reviews the information for the purpose of establishing the appropriate FIRM flood zone.

Levee systems that are determined to reduce the risk from the 1% annual chance flood are accredited by FEMA. FEMA can also grant provisional accreditation to a levee system that was previously accredited on an effective FIRM and for which FEMA is awaiting data and/or documentation to demonstrate compliance with Section 65.10. These levee systems are referred to as Provisionally Accredited Levees, or PALs. Provisional accreditation provides communities and levee owners with a specified timeframe to obtain the necessary data to confirm the levee's certification status. Accredited levee systems and PALs are shown on the FIRM using the symbology shown in Figure 3 and in Table 9. If the required information for a PAL is not submitted within the required timeframe, or if information indicates that a levee system not longer meets Section 65.10, FEMA will de-accredit the levee system and issue an effective FIRM showing the levee-impacted area as a SFHA.

FEMA coordinates its programs with USACE, who may inspect, maintain, and repair levee systems. The USACE has authority under Public Law 84-99 to supplement local efforts to repair flood control projects that are damaged by floods. Like FEMA, the USACE provides a program to allow public sponsors or operators to address levee system maintenance deficiencies. Failure to do so within the required timeframe results in the levee system being placed in an inactive status in the USACE Rehabilitation and Inspection Program. Levee systems in an inactive status are ineligible for rehabilitation assistance under Public Law 84-99.

FEMA coordinated with the USACE, the local communities, and other organizations to compile a list of levees that exist within San Luis Obispo County. Table 9, "Levees," lists all accredited levees, PALs, and de-accredited levees shown on the FIRM for this FIS Report. Other categories of levees may also be included in the table. The Levee ID shown in this table may not match numbers based on other identification systems that were listed in previous FIS Reports. Levees identified as PALs in the table are labeled on the FIRM to indicate their provisional status.

Please note that the information presented in Table 9 is subject to change at any time. For that reason, the latest information regarding any USACE structure presented in the table should be obtained by contacting USACE and accessing the USACE national levee database. For levees owned and/or operated by someone other than the USACE, contact the local community shown in Table 31.

Table 9: Levees

Community	Flooding Source	Levee Location	Levee Owner	USACE Levee	Levee ID	Covered Under PL84-99 Program?	FIRM Panel(s)
Atascadero, City of	Atascadero Creek	Left Bank	*	*	06079C_328	*	06079C0833G
San Luis Obispo County, Unincorporated Areas	Arroyo Grande Creek	Left Bank	*	*	06079C_304	*	06079C1601H 06079C1602G
San Luis Obispo County, Unincorporated Areas	Arroyo Grande Creek	Right Bank	*	*	06079C_305	*	06079C1582H 06079C1601H
San Luis Obispo County, Unincorporated Areas	Arroyo Grande Creek	Left Bank	*	*	06079C_306	*	06079C1601H
San Luis Obispo County, Unincorporated Areas	Arroyo Grande Creek	Left Bank	*	*	06079C_307	*	06079C1601H
San Luis Obispo County, Unincorporated Areas	Arroyo Grande Creek	Right Bank	*	*	06079C_326	*	06079C1601H 06079C1602G
San Luis Obispo County, Unincorporated Areas	Arroyo Grande Creek	Left Bank	*	*	06079C_327	*	06079C1602G
San Luis Obispo County, Unincorporated Areas	Arroyo Grande Creek	Left Bank	*	*	06079C_477	*	06079C1602G
San Luis Obispo County, Unincorporated Areas	Santa Maria Creek	Right Bank	*	*	06079C_418	*	06079C1902F 06079C1905F

Table 9: Levees, continued

Community	Flooding Source	Levee Location	Levee Owner	USACE Levee	Levee ID	Covered Under PL84-99 Program?	FIRM Panel(s)
San Luis Obispo County, Unincorporated Areas	Santa Maria Creek	Left Bank	*	*	06079C_419	*	06079C1885F
San Luis Obispo County, Unincorporated Areas	Santa Maria Creek	Left Bank	*	*	06079C_420	*	06079C1902F 06079C1906F
San Luis Obispo County, Unincorporated Areas	Santa Maria Creek	Right Bank	*	*	06079C_421	*	06079C1885F
San Luis Obispo County, Unincorporated Areas	Toad Creek	Left Bank	*	*	06079C_325	No	06079C0604G 06079C0612G

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**Error! Reference source not found.**.) 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
Arroyo Grande Creek	At Arroyo Grande Avenue	138.6	2,800	*	10,000	15,800	*	41,000
Arroyo Grande Creek	At U.S. Highway 101	109.3	1,900	*	6,700	10,500	*	27,800
Arroyo Grande Creek	At Husana Road	82.5	1,100	*	5,100	8,700	*	25,800
Atascadero Creek	At confluence with Salinas River	19.9	2,320	*	5,400	6,700	*	8,690
Atascadero Creek	At U.S. Highway 101	18.3	2,290	*	5,300	6,550	*	8,490
Atascadero Creek	At Portola Road	16.5	2,250	*	5,200	6,340	*	8,230
Atascadero Creek	Approximately 4,300 feet above San Gabriel Road	13.7	2,180	*	4,880	5,860	*	7,610
Carpenter Canyon Creek	At confluence with Corbett Canyon Creek	1.0	130	*	420	600	*	1,300
Cayucos Creek	At State Highway 1	9.5	1,500	*	4,900	7,000	*	15,200
Chorro Creek	At mouth	43.9	2,700	*	11,900	18,900	*	50,000
Corbett Canyon Creek	At confluence with Arroyo Grande Creek	4.7	580	*	1,800	2,600	*	5,700
Corbett Canyon Creek	At confluence with Poorman Canyon Creek	3.9	500	*	1,600	2,300	*	5,000

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
Deleissigues Creek	At confluence with Corbett Canyon Creek	2.5	330	*	1,000	1,500	*	3,300
Deleissigues Creek	Approximately 800 feet above Merry Hill Road	0.6	70	*	220	270	*	360
Graves Creek	At confluence with Salinas River	15.3	2,050	*	5,020	6,190	*	7,990
Graves Creek	At Del Rio Road	12.2	1,910	*	4,500	5,500	*	6,990
Graves Creek	Downstream of Long Valley Tributary, approximately 5,000 feet upstream of Monterey Road	9.8	1,670	*	3,850	4,660	*	6,000
Graves Creek	At Santa Lucia Road Bridge	6.8	1,440	*	3,160	3,750	*	4,820
Little Cayucos Creek	At State Highway 1	1.7	360	*	1,200	1,700	*	3,600
Little Morro Creek	At confluence with Morro Creek	5.2	640	*	2,000	2,800	*	6,200
Los Berros Creek	At confluence with Arroyo Grande Creek	26.9	2,400	*	7,700	11,000	*	24,000
Los Berros Creek	At Outlet at El Campo Road	22.71	1,030	*	3,820	6,080	*	14,340
Los Berros Creek	Above confluence with North Fork Los Berros Creek	22.2	2,200	*	7,000	10,000	*	21,700

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
Los Berros Creek	Approximately 0.3 miles upstream of El Campo Road	20.80	1,000	*	3,630	5,730	*	13,420
Los Berros Creek	Approximately 1.8 miles upstream of El Campo Road	17.16	980	*	3,410	5,200	*	11,930
Los Berros Creek	At U.S. Highway 101	16.1	1,700	*	5,400	7,700	*	16,700
Los Berros Creek	At gaging station approximately 4.1 miles upstream of El Campo Road	15.03	1,012	*	3,328	5,005	*	11,255
Meadow Creek	At Pismo Lake	6.5	760	*	2,400	3,500	*	7,500
Meadow Creek	At U.S. Highway 101	4.4	560	*	1,800	2,600	*	5,600
Morro Creek	At mouth	24.82	5,700	*	9,670	11,800	*	18,280
Morro Creek	At State Highway 1	24.0	5,680	*	9,600	11,700	*	18,060
Mountain Springs Creek	At intersection of Mountain Springs Road and Paso Robles Road	1.8	180	*	620	770	*	1,030
Nipomo Creek	At confluence with Santa Maria River	19.3	1,740	*	5,600	8,000	*	17,400
Nipomo Creek	At Tefft Road	10.5	1,290	*	4,100	5,900	*	12,800
Noname Creek	At Mouth[1]	0.5	100	*	170	210	*	390
Noname Creek	At Yerba Buena Street[1]	0.5	100	*	170	210	*	480

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
Noname Creek	At Tide Avenue[1]	0.5	100	*	240	340	*	880
Noname Creek	At Panorama Drive[1]	0.5	105	*	615	1,010	*	2,600
Noname Creek	At Whidbey Way (extended)	0.5	180	*	700	1,100	*	2,700
North Fork Los Berros Creek	At confluence with Los Berros Creek	2.6	270	*	870	1,200	*	2,700
North Fork Paloma Creek	At U.S. Highway 101	1.6	160	*	500	660	*	830
Old Garden Creek	At Lincoln Avenue	1.46	360	*	860	1,100	*	2,100
Old Garden Creek	At Northwest of Murray Street	1.08	260	*	620	800	*	1,500
Old Garden Creek	At Verde Drive	0.92	220	*	530	700	*	1,300
Old Garden Creek	At Cuesta Drive	0.76	180	*	430	600	*	1,100
Old Garden Creek	At Tassajara Drive	0.57	140	*	340	400	*	830
Old Garden Creek	At Rockview Place	0.33	100	*	190	250	*	470
Paloma Creek	At Union Pacific Railroad	5.8	600	*	1,730	2,290	*	2,880
Paloma Creek	At U.S. Highway 101	3.4	440	*	1,180	1,550	*	1,940

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
Paloma Creek	Approximately 6,400 feet upstream of U.S. Highway 101	1.1	108	*	450	570	*	720
Peachy Canyon Creek	Downstream of Vine Street	0.9	65[2]	*	145[2]	380[2]	*	560
Peachy Canyon Creek	Upstream of Vine Street	0.9	100	*	340	420	*	560
Pismo Creek	At U.S. Highway 101	37.9	3,200	*	10,200	14,700	*	32,000
Prefumo Canyon Creek	At Prefumo Canyon Road	3.4	600	*	1,400	1,900	*	3,500
Prefumo Creek	Upstream of confluence of San Luis Obispo Creek	14.3	1,000	*	2,400	3,100	*	5,800
Salinas River	At USGS gage at Paso Robles	387	16,000	*	33,000	43,000	*	66,000
Salinas River	Downstream of Paso Robles Creek	331	15,500	*	32,000	42,000	*	62,500
Salinas River	Downstream of Santa Margarita Creek	200	7,800	*	14,500	21,000	*	31,000
San Luis Obispo Creek	At Mouth	83.1	4,900	*	15,300	22,000	*	50,700
San Luis Obispo Creek	Downstream of confluence of Prefumo Creek	42.60	4,300	*	10,200	13,400	*	25,100

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
San Luis Obispo Creek	Upstream of confluence of Prefumo Creek	26.40	4,100[2]	*	9,800[2]	12,900[2]	*	24,200[2]
San Luis Obispo Creek	At intersection of Marsh Street and Archer Street	23.40	4,300	*	10,300	13,500	*	25,400
San Luis Obispo Creek	At intersection of Carmel Street and Higuera Street	12.60	2,500	*	6,000	7,800	*	14,600
San Luis Obispo Creek	South of U.S. Highway 101	11.50	2,400	*	5,800	7,600	*	14,300
Santa Margarita Creek	At confluence with Trout Creek	23.2	4,800	*	11,300	13,800	*	18,100
Santa Margarita Creek	At El Camino Real	22.4	3,450	*	7,850	9,435	*	12,300
Santa Margarita Creek	At confluence of Yerba Buena Creek	11.2	2,130	*	4,580	5,400	*	7,040
Santa Margarita Creek	Near El Camino Real approximately 400 feet southwest of Wilhelmina Avenue	11.2	2,130	*	4,580	5,400	*	7,040
Santa Rosa Creek	At Mouth	46.4	3,900	*	12,500	18,000	*	39,200
Santa Rosa Creek	At State Highway 41	20.9	2,900	*	9,200	13,300	*	28,800

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
Santa Rosa Creek Split Flow	At Cambria Road	–[3]	–[3]	*	1,800	2,700	*	7,600
See Canyon Creek	Approximately 600 feet upstream of confluence with Davis Canyon Creek	3.93	–[3]	*	–[3]	2,538	*	–[3]
See Canyon Creek	At confluence with Davis Canyon Creek	6.30	–[3]	*	–[3]	2,790	*	–[3]
See Canyon Creek	Approximately 450 feet upstream of Pippin Lane	6.74	–[3]	*	–[3]	3,222	*	–[3]
South Branch Toad Creek	Downstream of U. S. Highway 101	1.1	160[2]	*	290[2]	*	320[2]	380[2]
South Branch Toad Creek	Upstream of U. S. Highway 101	1.1	290	*	600	*	720	920
South Branch Unnamed Creek No. 1	At confluence with Unnamed Creek No. 1	1.3	30	*	240	320	*	450
Stenner Creek	At Broad Street	10.80	2,100	*	5,100	6,700	*	12,600
Stenner Creek	At Dana Street	9.13	1,800	*	4,200	5,500	*	10,400
Stenner Creek	Downstream of confluence of Brizzolari Creek	8.27	1,600	*	4,000	5,200	*	9,700
Stenner Creek	Upstream of confluence of Brizzolari Creek	5.70	1,100	*	2,700	3,600	*	6,700

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
Tefft Road Tributary	At confluence with Nipomo Creek	3.3	440	*	1,400	2,000	*	4,400
Tefft Road Tributary, East Fork	At confluence with Tefft Road Tributary	1.4	225	*	730	1,100	*	2,300
Toad Creek (Main and North Branches)	At Confluence with Salinas River	8.0	910	*	1,680	1,910	*	2,270
Toad Creek (Main and North Branches)	At Main Street	7.2	880	*	1,590	1,790	*	2,090
Toad Creek (Main and North Branches)	Downstream of U.S. Highway 101	1.0	180[2]	*	290[2]	340[2]	*	390[2]
Toad Creek (Main and North Branches)	Upstream of U.S. Highway 101	1.0	270	*	560	670	*	860
Toro Creek	At Mouth	15.1	1,700	*	7,200	11,900	*	29,000
Unnamed Creek (Alva Paul Creek)	At Mouth[4]	1.8	450	*	850	920	*	975
Unnamed Creek (Alva Paul Creek)	At Main Street[4]	0.3	450	*	1,350	2,200	*	3,800
Unnamed Creek (Alva Paul Creek)	At Tide Avenue (extended)[4]	0.3	450	*	1,800	2,900	*	7,300

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 Creek No. 1	At confluence with Salinas River	5.7	190	*	910	1,180	*	1,650
Unnamed Creek No. 1	At River Road	5.0	120	*	730	960	*	1,350
Unnamed Creek No. 1	At confluence of South Branch Unnamed Creek No. 1	3.3	100	*	510	670	*	930
Unnamed Creek No. 1	Approximately 15.7 miles Upstream of Creston Road	2.0	30	*	300	410	*	580
Unnamed Creek No. 3	At River Road	1.0	70	*	270	330	*	460
Willow Creek	At Mouth	3.3	490	*	1,500	2,200	*	4,800
Yerba Buena Creek	At Union Pacific Railroad	4.4	1,040	*	2,150	2,570	*	3,310
Yerba Buena Creek	Approximately 3,000 feet upstream of Encina Avenue	3.5	830	*	1,720	2,050	*	*

*Not calculated for this Flood Risk Project

[1]Channel flow only; does not include overflow from channel

[2]Reduced or constant flow values due to capacity restriction

[3]Data not available

[4]Decrease in discharge due to overbank storage

Figure 7: Frequency Discharge-Drainage Area Curves

[Not Applicable to this Flood Risk Project]

Table 11: Summary of Non-Coastal Stillwater Elevations

Flooding Source	Location	Elevations[1] (feet NAVD88)				
		10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Laguna Lake	San Luis Obispo, City of	124.1	*	*	124.1	129.3
Prefumo Creek	San Luis Obispo, City of; San Luis Obispo County, Unincorporated Areas	*	*	*	129.0	*
Unnamed Ponding	Morro Bay, City of	*	*	*	44.0	*

*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
Arroyo Grande Creek	11141500	USGS	City of Arroyo Grande	*	*	*
Jack Creek	11147000	USGS	Jack Creek	*	1950	1978
Salinas River	11144600	USGS	Salinas River near Pozo	*	1943	1978
Salinas River	11147500	USGS	Salinas River at El Paso de Robles	*	1940	1965
Salinas River	11147500	USGS	Salinas River at El Paso de Robles	*	1970	1978
Santa Rita Creek	11147070	USGS	Santa Rita Creek	*	1962	1978
Sisquoc River	11140000	USGS	Sisquoc River at Garey	471	1951	2005

*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
Arroyo Grande Creek	Confluence with Pacific Ocean	Approximately 1,600 feet upstream of Husana Road	Regression Analysis	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	Peak discharges for Arroyo Grande Creek were determined from an analytical frequency curve derived from 28 years of record at USGS gage No. 11141500, at the City of Arroyo Grande. Peak discharges were determined from an analytical frequency curve derived from 28 years of record at USGS gage No. 11141500, at the City of Arroyo Grande. Starting water-surface elevations were determined by normal-depth computations. Due to the configuration of the channel and the right overbank area downstream of River Mile 0.99, the floodflow is diverted from North Fork Los Berros Creek into the Arroyo Grande Creek floodplain. The depths of flooding in this area were determined using the Manning formula. No profiles are presented for this portion of Arroyo Grande Creek. No floodway was designated in the downstream channelized portion of the creek because a significant portion of the 1-percent-annual-chance flood leaves the main channel and does not return.
Arroyo Grande Creek	Approximately 1,600 feet upstream of Husana Road	Approximately 0.7 miles upstream of confluence of Saucelito Creek	*	*	*	A	*
Atascadero Creek	Confluence with Salinas River	Approximately 4,700 feet upstream of San Gabriel Road	HEC-1	Slope/Area Method	*	AE w/ Floodway	The USACE HEC-1 computer program (USACE, 1973) was used to generate flood hydrographs and calculate floodplain routing effects.

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
Atascadero Creek, continued	Confluence with Salinas River	Approximately 4,700 feet upstream of San Gabriel Road	HEC-1	Slope/Area Method	*	AE w/ Floodway	The major drainage areas were separated into smaller subbasins, where necessary and separate hydrographs were generated for each subbasin. The basin parameters used in the model consist of the drainage area of the basin, Clark's unit hydrograph parameters, and infiltration loss rate for the basin, a storm depth for each flood recurrence interval, and a typical rainfall pattern. Unit hydrograph parameters and basin loss rates were estimated based on reconstitution studies of the January 18-21 and February 23-28, 1969, flood events and calibration of the models to the stream gage peak discharge-frequency analysis results for Santa Rita Creek (USGS gage No. 11147070, 1962-1978) and Jack Creek (USGS gage No. 11147000, 1950-1978). A log-Pearson Type III (U.S. Water Resources Council, 1976) was used to estimate the peak discharges at the gages for each recurrence interval. A 2-hour storm pattern was used based on the maximum 24-hour period of the January 1969 storm event at the City of El Paso de Robles. Starting water surface elevations were calculated using the slop/area method.
Carpenter Canyon Creek	Confluence with Corbett Canyon Creek	Approximately 530 feet upstream of confluence with Corbett Canyon Creek	Regression Analysis	Slope/Area Method	*	AE w/ Floodway	Peak discharges were determined by the use of a computed regional frequency curve (U.S. Department of the Interior, 1977). Starting water surface elevations were calculated using the slop/area method.

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
Carpenter Canyon Creek	Approximately 530 feet upstream of confluence with Corbett Canyon Creek	Approximately 263 feet upstream of Royal Oak Place	*	*	*	A	*
Cayucos Creek	At North Ocean Avenue	Approximately 360 feet upstream of Private Farm Road	*	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	Starting water-surface elevations were based on known elevations.
Cayucos Creek	Approximately 360 feet upstream of Private Farm Road	Approximately 1,660 feet upstream of Picachio Road	*	*	*	A	*
Chorro Creek	Approximately 710 feet downstream of South Bay Boulevard	Approximately 2,320 feet upstream of South Bay Boulevard	Regression Equation	HEC-2 step-backwater (USACE, 1973)	*	AE	Peak flow rates were computed by use of the multiple regression equation developed by A. O. Waananen and J. R. Crippen (U.S. Department of the Interior, Magnitude and Frequency of Floods in California: Menlo Park, California, 1977). Runoff was computed using synthetic hydrographs derived from S-graphs (USACE, 1974). Water-surface elevations were computed through use of the USGS backwater analysis program E-431 (U.S. Department of the Interior, 1976).
Chorro Creek	Approximately 2,320 feet upstream of South Bay Boulevard	Approximately 1.7 miles upstream of Beniamino Way	*	*	*	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
Corbett Canyon Creek	Confluence with Arroyo Grande Creek	Approximately 760 feet upstream of confluence of Carpenter Canyon Creek	Regression Analysis	Slope/Area Method	*	AE w/ Floodway	Peak discharges were determined by the use of a computed regional frequency curve (U.S. Department of the Interior, 1977). Starting water surface elevations were calculated using the slop/area method. Starting water-surface elevations were determined from rating curves developed at the East Branch Road culvert.
Corbett Canyon Creek	Approximately 760 feet upstream of confluence of Carpenter Canyon Creek	Approximately 1,430 feet upstream of Wayne Way	*	*	*	A	*
Deleissigues Creek	Confluence with Nipomo Creek	Approximately 765 feet upstream of Thompson Avenue		HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	Starting water surface elevations were calculated using the slop/area method.
Deleissigues Creek	Approximately 765 feet upstream of Thompson Avenue	Approximately 1,750 feet upstream of Thompson Avenue	*	*	*	A	*
Graves Creek	Confluence with Salinas River	Approximately 426 feet upstream of confluence of Paradise Valley Tributary	HEC-1	Slope/Area Method	*	AE w/ Floodway	The USACE HEC-1 computer program (USACE, 1973) was used to generate flood hydrographs and calculate floodplain routing effects. The major drainage areas were separated into smaller subbasins, where necessary and separate hydrographs were generated for each subbasin. The basin parameters used in the model consist of the drainage area of the basin, Clark's unit hydrograph parameters, and infiltration loss rate for the basin, a storm depth for each flood recurrence interval, and a typical rainfall pattern.

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
Graves Creek, continued	Confluence with Salinas River	Approximately 426 feet upstream of confluence of Paradise Valley Tributary	HEC-1	Slope/Area Method	*	AE w/ Floodway	Unit hydrograph parameters and basin loss rates were estimated based on reconstitution studies of the January 18-21 and February 23-28, 1969, flood events and calibration of the models to the stream gage peak discharge-frequency analysis results for Santa Rita Creek (USGS gage No. 11147070, 1962-1978) and Jack Creek (USGS gage No. 11147000, 1950-1978). A log-Pearson Type III (U.S. Water Resources Council, 1976) was used to estimate the peak discharges at the gages for each recurrence interval. A 2-hour storm pattern was used based on the maximum 24-hour period of the January 1969 storm event at the City of El Paso de Robles. Starting water surface elevations were calculated using the slop/area method. The 1-percent-annual-chance floodflow remains within the channel, resulting in no difference between the floodway and 1-percent-annual-chance floodplain boundaries.
Laguna Lake on Prefumo Creek	At Madonna Road	Approximately 1.3 miles upstream of Madonna Road	Modified Puls Method	HEC-2 step-backwater (USACE, 1973)	*	A	Significant flood retention occurs at one location in the study area; Laguna Lake on Prefumo Creek. Its waters are spread over 156 acres of what was once an intermittent lake marsh. Floods were routed through the lake using the Modified Puls Method. It is assumed that the controlled lake outlet will operate at its full- rated capacity.
Little Cayucos Creek	Approximately 65 feet downstream of Ocean Boulevard	Approximately 467 feet upstream of Cayucos Drive	*	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	Starting water-surface elevations were based on known elevations. No floodway was designated upstream of State Highway 1 because of ponding behind the highway embankment.

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 Cayucos Creek	Approximately 467 feet upstream of Cayucos Drive	Approximately 0.7 miles upstream of Cayucos Drive	*	*	*	A	*
Little Morro Creek	Approximately 0.6 miles downstream of Nagano Road	Approximately 950 feet upstream of Little Morro Creek Road	*	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	No floodway was designated downstream of RM 1.05 because a breakout occurs along the right overbank, causing shallow flooding downstream.
Little Morro Creek	Approximately 950 feet upstream of Little Morro Creek Road	Approximately 2 miles upstream of Little Morro Creek Road	*	*	*	A	*
Los Berros Creek	At Valley Road	Approximately 1,155 feet upstream of U.S. Highway 101	Regression Analysis	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	Peak discharges were determined by the use of a computed regional frequency curve (U.S. Department of the Interior, 1977). Starting water surface elevations were calculated using the slop/area method. Downstream of Valley Road, Los Berros Creek produced only sheet flooding; therefore, no profiles are presented for this stream segment.
Meadow Creek	At Roosevelt Avenue	Approximately 0.6 miles upstream of James Way	Regression Analysis	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	Peak discharges were determined by the use of a computed regional frequency curve (U.S. Department of the Interior, 1977). Starting water-surface elevations were taken from reservoir routing computations in Oceano Lake, initially assuming a condition of inflow equals outflow through Pismo Lake upstream.
Morro Creek	Approximately 0.5 miles downstream of State Highway 1	Approximately 0.7 miles upstream of Private Road	Regression Equation	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	Peak flow rates were computed by use of the multiple regression equation developed by A. O. Waananen and J. R. Crippen (U.S. Department of the Interior, Magnitude and Frequency of Floods in California: Menlo Park, California, 1977).

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
Morro Creek, continued	Approximately 0.5 miles downstream of State Highway 1	Approximately 0.7 miles upstream of Private Road	Regression Equation	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	Runoff was computed using synthetic hydrographs derived from S-graphs (USACE, 1974). Water-surface elevations were computed through use of the USGS backwater analysis program E-431 (U.S. Department of the Interior, 1976). No floodway was designated downstream of RM 1.61 because a breakout occurs along the left overbank, causing shallow flooding downstream.
Morro Creek	Approximately 0.7 miles upstream of Private Road	Approximately 5 miles upstream of Private Road	*	*	*	A	*
Mountain Springs Creek	At Vine Street	Approximately 34 feet upstream of Mountain Springs Road	HEC-1	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	The USACE HEC-1 computer program (USACE, 1973) was used to generate flood hydrographs and calculate floodplain routing effects. The major drainage areas were separated into smaller subbasins, where necessary and separate hydrographs were generated for each subbasin. The basin parameters used in the model consist of the drainage area of the basin, Clark's unit hydrograph parameters, and infiltration loss rate for the basin, a storm depth for each flood recurrence interval, and a typical rainfall pattern. Unit hydrograph parameters and basin loss rates were estimated based on reconstitution studies of the January 18-21 and February 23-28, 1969, flood events and calibration of the models to the stream gage peak discharge-frequency analysis results for Santa Rita Creek (USGS gage No. 11147070, 1962-1978) and Jack Creek (USGS gage No. 11147000, 1950-1978).

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
Mountain Springs Creek, continued	At Vine Street	Approximately 34 feet upstream of Mountain Springs Road	HEC-1	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	A log-Pearson Type III (U.S. Water Resources Council, 1976) was used to estimate the peak discharges at the gages for each recurrence interval. A 2-hour storm pattern was used based on the maximum 24-hour period of the January 1969 storm event at the City of El Paso de Robles. Starting water-surface elevations were based on the depth of the sheet flow leading away from the lower ends of the reaches studied using HEC-2.
Nipomo Creek	Approximately 1,700 feet downstream of Private Road	Approximately 1 mile upstream of Frontage Road	*	Slope/Area Method	*	AE w/ Floodway	Starting water surface elevations were calculated using the slop/area method.
Nipomo Creek	Approximately 2,240 feet downstream of W Tefft Street	Approximately 0.7 miles upstream of confluence of Deleissigues Creek	*	*	*	AE w/ Floodway	*
Nipomo Creek	Approximately 1 mile upstream of Frontage Road	Approximately 2,240 feet downstream of W Tefft Street	*	*	*	A	*
Nipomo Creek	Approximately 0.7 miles upstream of confluence of Deleissigues Creek	Approximately 2,638 feet upstream of confluence of Mehlschau Creek	*	*	*	A	*
Noname Creek	Approximately 334 feet downstream of State Highway 1	Approximately 1,375 feet upstream of Panorama Drive	Regression Equation	HEC-2 step-backwater (USACE, 1973)	*	AE	Peak flow rates were computed by use of the multiple regression equation developed by A. O. Waananen and J. R. Crippen (U.S. Department of the Interior, Magnitude and Frequency of Floods in California: Menlo Park, California, 1977).

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
Noname Creek, continued	Approximately 334 feet downstream of State Highway 1	Approximately 1,375 feet upstream of Panorama Drive	Regression Equation	HEC-2 step-backwater (USACE, 1973)	*	AE	Runoff was computed using synthetic hydrographs derived from S-graphs (USACE, 1974). Water-surface elevations were computed through use of the USGS backwater analysis program E-431 (U.S. Department of the Interior, 1976). Between Tide Avenue and Panorama Drive a condominium complex is adjacent to the channel and has one building over the channel, with a 36-inch culvert to carry the low flows under the building. This building was assumed to be an obstruction to the flow, and its area was removed from the cross section. The flows around the building were proportioned on the basis of the cross-sectional area on each side of the building. These would then flow down Tahiti Street on the left side and down Whidbey Way on the right side. These two streets split the flow for Noname Creek. From field inspection, it was estimated that 25 percent of the flow down Tahiti Street would return to the channel and 75 percent would not; and 75 percent of the flow down Whidbey Way would return to the channel in the vicinity of the condominium complex and 25 percent would return to the channel downstream of Tide Avenue. At Tide Avenue, all the road overflow will leave Noname Creek and flow down Tide Avenue, Tahiti Street, Vashon Street, and the areas between them toward Main Street. This a flooding would continue downhill in the area between Tide Avenue and Main Street.
North Branch Los Berros Creek	*	*	*	Slope/Area Method	*	*	Starting water surface elevations were calculated using the slop/area method.

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
North Fork Los Berros Creek	Approximately 650 feet upstream of Orchard Avenue	Approximately 2,241 feet upstream of Orchard Avenue	Regression Analysis	HEC-2 step-backwater (USACE, 1973)	*	AE	Peak discharges were determined by the use of a computed regional frequency curve (U.S. Department of the Interior, 1977). Starting water-surface elevations were determined by normal-depth computations.
North Fork Paloma Creek	Confluence with Paloma Creek	Approximately 1,400 feet upstream of U. S. Highway 101	HEC-1	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	The USACE HEC-1 computer program (USACE, 1973) was used to generate flood hydrographs and calculate floodplain routing effects. The major drainage areas were separated into smaller subbasins, where necessary and separate hydrographs were generated for each subbasin. The basin parameters used in the model consist of the drainage area of the basin, Clark's unit hydrograph parameters, and infiltration loss rate for the basin, a storm depth for each flood recurrence interval, and a typical rainfall pattern. Unit hydrograph parameters and basin loss rates were estimated based on reconstitution studies of the January 18-21 and February 23-28, 1969, flood events and calibration of the models to the stream gage peak discharge-frequency analysis results for Santa Rita Creek (USGS gage No. 11147070, 1962-1978) and Jack Creek (USGS gage No. 11147000, 1950-1978). A log-Pearson Type III (U.S. Water Resources Council, 1976) was used to estimate the peak discharges at the gages for each recurrence interval. A 2-hour storm pattern was used based on the maximum 24-hour period of the January 1969 storm event at the City of El Paso de Robles.

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
North Fork Paloma Creek, continued	Confluence with Paloma Creek	Approximately 1,400 feet upstream of U. S. Highway 101	HEC-1	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	The 1-percent-annual-chance floods coincide with their main stems; therefore, the water-surface elevations in the main stream channels were used for the tributary starting water-surface elevations.
North Fork Paloma Creek	Approximately 1,400 feet upstream of U. S. Highway 101	At Atascadero Avenue	*	*	*	A	*
Old Garden Creek	Confluence with Stenner Creek	Approximately 30 feet upstream of Felton Way	Rainfall data, synthetic hydrographs, composite frequency curve	HEC-2 step-backwater (USACE, 1973)	*	AE	A standard project storm was developed using rainfall data collected from the storm of January 18, 1973. The storm was transposed from the original centering to the study area by ratios of the 2-year 6-hour precipitation compiled by the national Weather Service. Runoff was computed using synthetic hydrographs derived from S-graphs (USACE, 1974). Discharge-frequency data were based on a composite frequency curve developed from streamflow gages from nearby drainage basins.
Old Garden Creek, continued	Confluence with Stenner Creek	Approximately 30 feet upstream of Felton Way	Rainfall data, synthetic hydrographs, composite frequency curve	HEC-2 step-backwater (USACE, 1973)	*	AE	Starting water-surface elevations were determined by the slope/area method starting one mile downstream of the study reach. Overbank cross-sectional data were determined from topographic maps at a scale of 1:2,400, with a contour interval of 5 feet, provided by the City and County of San Luis Obispo (City of San Luis Obispo, 1974). Channel cross sections below Foothill Boulevard, were taken from the 5 feet contour mapping.

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
Paloma Creek	Confluence with Salinas River	Approximately 4,825 feet above confluence of South Paloma Creek	HEC-1	Slop/Area Method	*	AE w/ Floodway	The USACE HEC-1 computer program (USACE, 1973) was used to generate flood hydrographs and calculate floodplain routing effects. The major drainage areas were separated into smaller subbasins, where necessary and separate hydrographs were generated for each subbasin. The basin parameters used in the model consist of the drainage area of the basin, Clark's unit hydrograph parameters, and infiltration loss rate for the basin, a storm depth for each flood recurrence interval, and a typical rainfall pattern. Unit hydrograph parameters and basin loss rates were estimated based on reconstitution studies of the January 18-21 and February 23-28, 1969, flood events and calibration of the models to the stream gage peak discharge-frequency analysis results for Santa Rita Creek (USGS gage No. 11147070, 1962-1978) and Jack Creek (USGS gage No. 11147000, 1950-1978). A log-Pearson Type III (U.S. Water Resources Council, 1976) was used to estimate the peak discharges at the gages for each recurrence interval. A 2-hour storm pattern was used based on the maximum 24-hour period of the January 1969 storm event at the City of El Paso de Robles. Starting water surface elevations were calculated using the slop/area method.
Peachy Canyon Creek	At Spring Street	Approximately 440 feet upstream of Vine Street	HEC-1	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	The USACE HEC-1 computer program (USACE, 1973) was used to generate flood hydrographs and calculate floodplain routing effects. The major drainage areas were separated into smaller subbasins, where necessary and separate hydrographs were generated for each subbasin.

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
Peachy Canyon Creek, continued	At Spring Street	Approximately 440 feet upstream of Vine Street	HEC-1	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	The basin parameters used in the model consist of the drainage area of the basin, Clark's unit hydrograph parameters, and infiltration loss rate for the basin, a storm depth for each flood recurrence interval, and a typical rainfall pattern. Unit hydrograph parameters and basin loss rates were estimated based on reconstitution studies of the January 18-21 and February 23-28, 1969, flood events and calibration of the models to the stream gage peak discharge-frequency analysis results for Santa Rita Creek (USGS gage No. 11147070, 1962-1978) and Jack Creek (USGS gage No. 11147000, 1950-1978). A log-Pearson Type III (U.S. Water Resources Council, 1976) was used to estimate the peak discharges at the gages for each recurrence interval. A 2-hour storm pattern was used based on the maximum 24-hour period of the January 1969 storm event at the City of El Paso de Robles. Starting water-surface elevations were based on the depth of the sheet flow leading away from the lower ends of the reaches studied using HEC-2.
Pismo Creek	Approximately 150 feet downstream of Bello Street	Approximately 95 feet upstream of Private Drive	Regression Analysis	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	Peak discharges were determined by the use of a computed regional frequency curve (U.S. Department of the Interior, 1977). Starting water-surface elevations were computed using critical-depth calculations. Between River Miles 0.5 and 0.8, the left overbank would be inundated by floods equal to or greater than the 2-percent-annual-chance flood. In analyzing those floods, in this reach, flood profile computations were performed assuming the levee is totally destroyed.

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
Pismo Creek, continued	Approximately 150 feet downstream of Bello Street	Approximately 95 feet upstream of Private Drive	Regression Analysis	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	Within the City of Pismo Beach, a breakout occurs along Pismo Creek in the vicinity of U.S. Highway 101. This area is subject to flooding that is broad and flows overland; therefore, a floodway was not computed in this area.
Pismo Creek	Approximately 95 feet upstream of Private Drive	Approximately 330 feet upstream of Union Pacific Railroad	*	*	*	A	*
Prefumo Canyon Creek	Approximately 230 feet downstream of Los Osos Valley Road	Approximately 3,167 feet upstream of Los Osos Valley Road	*	*	*	AE	*
Prefumo Creek	Confluence with San Luis Obispo Creek	Approximately 106 feet upstream of Laguna Lake	Rainfall data, synthetic hydrographs, composite frequency curve	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	A standard project storm was developed using rainfall data collected from the storm of January 18, 1973. The storm was transposed from the original centering to the study area by ratios of the 2-year 6-hour precipitation compiled by the national Weather Service. Runoff was computed using synthetic hydrographs derived from S-graphs (USACE, 1974). Discharge-frequency data were based on a composite frequency curve developed from streamflow gages from nearby drainage basins. Starting water-surface elevations were determined by the slope/area method starting one mile downstream of the study reach.

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
Prefumo Creek, continued	Confluence with San Luis Obispo Creek	Approximately 106 feet upstream of Laguna Lake	Rainfall data, synthetic hydrographs, composite frequency curve	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	Overbank cross-sectional data were determined from topographic maps at a scale of 1:2,400, with a contour interval of 5 feet, provided by the City and County of San Luis Obispo (City of San Luis Obispo, 1974). Channel cross sections below Foothill Boulevard, were taken from the 5 feet contour mapping.
Salinas River	Approximately 1 mile downstream of State Highway 46	Approximately 530 feet above confluence of Santa Margarita Creek	HEC-1	Slope/Area Method and HEC-2	*	AE w/ Floodway	The USACE HEC-1 computer program (USACE, 1973) was used to generate flood hydrographs and calculate floodplain routing effects. The major drainage areas were separated into smaller subbasins, where necessary and separate hydrographs were generated for each subbasin. The basin parameters used in the model consist of the drainage area of the basin, Clark's unit hydrograph parameters, and infiltration loss rate for the basin, a storm depth for each flood recurrence interval, and a typical rainfall pattern. Because of the presence of Salinas Dam upstream, a log-Pearson Type III analysis of the stream gage record for the Salinas River at El Paso de Robles (USGS gage No. 11147500, 1940-1965, 1970-1978) was not considered reliable enough to predict the discharges for rare flood events. A 1-percent-annual-chance flood discharges at the City of El Paso de Robles was estimated, based on the HEC-1 rainfall-runoff model, to test the analysis results of that gage. Starting water surface elevations were calculated using the slop/area method.

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
Salinas River, continued	Approximately 1 mile downstream of State Highway 46	Approximately 530 feet above confluence of Santa Margarita Creek	HEC-1	Slope/Area Method and HEC-2	*	AE w/ Floodway	The channel roughness factors were based on calibration of the HEC-2 model with January 18 through 21 and February 23 through 28, 1969, flooding high-water marks (USACE, 1970). Stage-discharge data for the February 1978 flood event at the stream gage in El Paso Robles were also used in calibration (USGS, 1978). This accounted for changes in elevation of the alluvial bed during the flood event, as well as channel roughness. Because of the presence of Salinas Dam upstream, a log-Pearson Type III analysis of the stream gage record for the Salinas River at El Paso de Robles (USGS gage No. 11147500, 1940-165, 1970-1978) was not considered reliable enough to predict the discharges for rare flood events. A 1-percent-annual-chance flood discharges at the City of El Paso de Robles was estimated, based on the HEC-1 rainfall model, to test the analysis results of that gage. Stationing of the Salinas River was based on the Pacific Southwest Inter-Agency Committee River Mile Index. A correlation was made at the river mile locations described, resulting in some minor distortion between suck locations because of scale change and uncertainties in the location of the channel centerline. Because of the sandy bed material comprising the Salinas River/Salinas Creek, floodway velocities were primary concern in the determination of the floodway boundaries. Care was taken to minimized excessive velocities in the channel under encroached conditions. Where velocities in the channel were in excess of 6 feet per second, floodway velocities were held to a maximum increase of 0.5 foot per second.

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
Salinas River, continued	Approximately 1 mile downstream of State Highway 46	Approximately 530 feet above confluence of Santa Margarita Creek	HEC-1	Slope/Area Method and HEC-2	*	AE w/ Floodway	For 1-percent-annual-chance flood velocities less than 6 feet per second, a maximum increase of 1 foot per second in floodway velocities was observed. In no case was more than a 1-foot rise in the 1-percent-annual-chance water-surface elevation allowed.
Salinas River	At San Luis Obispo County boundary	Approximately 1 mile downstream of State Highway 46	*	*	*	A	*
Salinas River	Approximately 530 feet above confluence of Santa Margarita Creek	Approximately 4 miles upstream of Hi Mountain Lookout Road	*	*	*	A	*
San Luis Obispo Creek	At Hertford Drive	Approximately 230 feet upstream of Footbridge	Rainfall data, synthetic hydrographs, composite frequency curve	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	A standard project storm was developed using rainfall data collected from the storm of January 18, 1973. The storm was transposed from the original centering to the study area by ratios of the 2-year 6-hour precipitation compiled by the national Weather Service. Runoff was computed using synthetic hydrographs derived from S-graphs (USACE, 1974). Discharge-frequency data were based on a composite frequency curve developed from streamflow gages from nearby drainage basins. Starting water-surface elevations were determined by the slope/area method starting one mile downstream of the study reach. Starting water-surface elevations were computed using critical-depth calculations.

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
San Luis Obispo Creek, continued	At Hertford Drive	Approximately 230 feet upstream of Footbridge	Rainfall data, synthetic hydrographs, composite frequency curve	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	Overbank cross-sectional data were determined from topographic maps at a scale of 1:2,400, with a contour interval of 5 feet, provided by the City and County of San Luis Obispo (City of San Luis Obispo, 1974). The water-surface profiles of San Luis Obispo Creek have been revised to include the effects of channelization upstream of the confluence with Froom Creek. Cross sections were taken from as-built construction drawings (Butler, Chambers, and Hughes, 1979). Three sources of information – Aerial Topographic Survey, Interferometric Synthetic Aperture Radar (IFSAR), and USGS digital elevation models – were combined to create a TIN representing the ground surface within the floodplain area. Cross-sectional data was obtained from this TIN. In addition, the cross-section data was augmented with field surveying carried out in 2005 (Penfield & Smith, 2007) and 2007 (Penfield & Smith, 2007). Information on the bridge and culvert crossings was obtained from the 2007 survey, as-built plans, and field observations.
San Luis Obispo Creek	Approximately 330 feet downstream of confluence of Froom Creek	Approximately 1,000 feet upstream of U.S. Highway 101	*	*	*	AE w/ Floodway	*
San Luis Obispo Creek	Approximately 230 feet upstream of Footbridge	Approximately 1,100 feet downstream of confluence of Trout Creek	*	*	*	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
San Luis Obispo Creek	Approximately 1,000 feet upstream of U.S. Highway 101	Approximately 0.7 miles upstream of Reservoir Canyon Road	*	*	*	A	*
Santa Margarita Creek	Approximately 1,100 feet downstream of confluence of Trout Creek	Approximately 90 feet upstream of confluence of Yerba Buena Creek	HEC-1	Slope/Area Method	*	AE w/ Floodway	The USACE HEC-1 computer program (USACE, 1973) was used to generate flood hydrographs and calculate floodplain routing effects. The major drainage areas were separated into smaller subbasins, where necessary and separate hydrographs were generated for each subbasin. The basin parameters used in the model consist of the drainage area of the basin, Clark's unit hydrograph parameters, and infiltration loss rate for the basin, a storm depth for each flood recurrence interval, and a typical rainfall pattern. Unit hydrograph parameters and basin loss rates were estimated based on reconstitution studies of the January 18-21 and February 23-28, 1969, flood events and calibration of the models to the stream gage peak discharge-frequency analysis results for Santa Rita Creek (USGS gage No. 11147070, 1962-1978) and Jack Creek (USGS gage No. 11147000, 1950-1978). A log-Pearson Type III (U.S. Water Resources Council, 1976) was used to estimate the peak discharges at the gages for each recurrence interval. A 2-hour storm pattern was used based on the maximum 24-hour period of the January 1969 storm event at the City of El Paso de Robles. Starting water surface elevations were calculated using the slop/area method. Stationing of the Salinas River was based on the Pacific Southwest Inter-Agency Committee River Mile Index.

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 Margarita Creek, continued	Approximately 1,100 feet downstream of confluence of Trout Creek	Approximately 90 feet upstream of confluence of Yerba Buena Creek	HEC-1	Slope/Area Method	*	AE w/ Floodway	A correlation was made at the river mile locations described, resulting in some minor distortion between suck locations because of scale change and uncertainties in the location of the channel centerline. From 800 feet downstream of Chestnut Avenue to 50 feet upstream of Linden Avenue, the designated floodway boundary approximated the 1-percent-annual-chance floodplain boundary. This was necessary to avoid further encroachment into the 1-percent-annual-chance floodplain and because of a spill at the confluence with Yerba Buena Creek, the limit of detailed study. Containment of the spill at Yerba Buena Creek or encroachment into the 1-percent-annual-chance floodplain results in a rise of more than 1 foot in water-surface elevation.
Santa Margarita Creek	Approximately 380 feet downstream of Yerba Buena Avenue	Approximately 0.5 miles upstream of Yerba Buena Avenue	*	*	*	AE w/ Floodway	*
Santa Margarita Creek	Approximately 90 feet upstream of confluence of Yerba Buena Creek	Approximately 380 feet downstream of Yerba Buena Avenue	*	*	*	A	*
Santa Margarita Creek	Approximately 0.5 miles upstream of Yerba Buena Avenue	At Highway 101	*	*	*	A	*
Santa Rosa Creek	Approximately 1,500 feet downstream of Windsor Boulevard	Approximately 900 feet upstream of Ferrasci Road	*	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	Starting water-surface elevations were computed using critical-depth calculations.

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 Rosa Creek, continued	Approximately 1,500 feet downstream of Windsor Boulevard	Approximately 900 feet upstream of Ferrasci Road	*	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	Results of the hydraulic analyses showed a portion of the 2-, 1-, and 0.2-percent-annual-chance flood flow diverted to the right side of State Highway 1. The right side split flow ponds up behind the embankment formed by Cambria Road and State Highway 1. Profiles are based on backwater analyses and analyses of ponding behind roadway embankments. The entire 1-percent-annual-chance floodplain was designated as a floodway in the vicinity of the split flow. The State Highway 1 embankment has already caused a significant increase in the 1-percent-annual-chance flood elevations. If the split flow is contained, forcing the entire flow into the main channel, the resulting flood elevations will increase by more than 1 foot across the floodplain.
Santa Rosa Creek	Approximately 900 feet upstream of Ferrasci Road	Approximately 2.2 miles upstream of Ferrasci Road	*	*	*	A	*
Santa Rosa Creek Split Flow	Convergence with Santa Rosa Creek	Divergence from Santa Rosa Creek, approximately 1,400 feet upstream of Cambria Road	*	*	*	AE	Results of the hydraulic analyses for Santa Rosa Creek showed a portion of the 2-, 1-, and 0.2-percent-annual-chance flood flow diverted to the right side of State Highway 1. The right side split flow ponds up behind the embankment formed by Cambria Road and State Highway 1. Santa Rosa Creek Split Flow profiles reflect the ground surface and flood elevations along the path followed by the diverted flow. No floodway was designated for Santa Rosa Creek Split flow because the area is already extensively developed and flooding is caused by the inadequate State Highway 1 bridge.

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 Rosa Creek Split Flow, continued	Convergence with Santa Rosa Creek	Divergence from Santa Rosa Creek, approximately 1,400 feet upstream of Cambria Road	*	*	*	AE	Encroachment at any place other than Cambria Road will not increase flood elevations on the mainstream or the split flow. However, it is important to realize that blocking off the split flow at Cambria Road will result in increased flood elevations on the mainstream.
See Canyon Creek	At Pippen Lane	Approximately 1,915 feet upstream of confluence of Davis Canyon Creek	*	*	*	AE	*
See Canyon Creek	Confluence with San Luis Obispo Creek	At Pippen Lane	*	*	*	A	*
South Branch Toad Creek	Confluence with Toad Creek	U.S. Highway 101	HEC-1	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	The USACE HEC-1 computer program (USACE, 1973) was used to generate flood hydrographs and calculate floodplain routing effects. The major drainage areas were separated into smaller subbasins, where necessary and separate hydrographs were generated for each subbasin. The basin parameters used in the model consist of the drainage area of the basin, Clark's unit hydrograph parameters, and infiltration loss rate for the basin, a storm depth for each flood recurrence interval, and a typical rainfall pattern. Unit hydrograph parameters and basin loss rates were estimated based on reconstitution studies of the January 18-21 and February 23-28, 1969, flood events and calibration of the models to the stream gage peak discharge-frequency analysis results for Santa Rita Creek (USGS gage No. 11147070, 1962-1978) and Jack Creek (USGS gage No. 11147000, 1950-1978).

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 Branch Toad Creek, continued	Confluence with Toad Creek	U.S. Highway 101	HEC-1	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	A log-Pearson Type III (U.S. Water Resources Council, 1976) was used to estimate the peak discharges at the gages for each recurrence interval. A 2-hour storm pattern was used based on the maximum 24-hour period of the January 1969 storm event at the City of El Paso de Robles. The 1-percent-annual-chance floods coincide with their main stems; therefore, the water-surface elevations in the main stream channels were used for the tributary starting water-surface elevations.
South Branch Unnamed Creek No. 1	Confluence with Unnamed Creek No. 1	Approximately 2,850 feet upstream of confluence with Unnamed Creek No. 1	HEC-1	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	The USACE HEC-1 computer program (USACE, 1973) was used to generate flood hydrographs and calculate floodplain routing effects. The major drainage areas were separated into smaller subbasins, where necessary and separate hydrographs were generated for each subbasin. The basin parameters used in the model consist of the drainage area of the basin, Clark's unit hydrograph parameters, and infiltration loss rate for the basin, a storm depth for each flood recurrence interval, and a typical rainfall pattern. Unit hydrograph parameters and basin loss rates were estimated based on reconstitution studies of the January 18-21 and February 23-28, 1969, flood events and calibration of the models to the stream gage peak discharge-frequency analysis results for Santa Rita Creek (USGS gage No. 11147070, 1962-1978) and Jack Creek (USGS gage No. 11147000, 1950-1978). A log-Pearson Type III (U.S. Water Resources Council, 1976) was used to estimate the peak discharges at the gages for each recurrence interval.

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 Branch Unnamed Creek No. 1, continued	Confluence with Unnamed Creek No. 1	Approximately 2,850 feet upstream of confluence with Unnamed Creek No. 1	HEC-1	HEC-2 step-backwater (USACE, 1973)	*	AE w/ Floodway	A 2-hour storm pattern was used based on the maximum 24-hour period of the January 1969 storm event at the City of El Paso de Robles. The 1-percent-annual-chance floods coincide with their main stems; therefore, the water-surface elevations in the main stream channels were used for the tributary starting water-surface elevations. Starting water-surface elevations were set equal to the water-surface elevation at its mouth at Unnamed Creek No. 1. This was done because the peak flows in the two creeks are nearly coincident.
Stenner Creek	Confluence with San Luis Obispo Creek	Approximately 400 feet upstream of Index Station Road	Rainfall data, synthetic hydrographs, composite frequency curve	HEC-2 step-backwater (USACE, 1973)	*	AE	A standard project storm was developed using rainfall data collected from the storm of January 18, 1973. The storm was transposed from the original centering to the study area by ratios of the 2-year 6-hour precipitation compiled by the national Weather Service. Runoff was computed using synthetic hydrographs derived from S-graphs (USACE, 1974). Discharge-frequency data were based on a composite frequency curve developed from streamflow gages from nearby drainage basins. Starting water-surface elevations were determined by the slope/area method starting one mile downstream of the study reach. Channel cross sections below Foothill Boulevard, were taken from the 5 feet contour mapping.

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
Stenner Creek	Approximately 400 feet upstream of Index Station Road	Approximately 1,030 feet upstream of Union Pacific Railroad	*	*	*	A	*
Tefft Road Tributary	Confluence with Nipomo Creek	Approximately 2,180 feet upstream of Tefft Street	*	Slope/Area Method	*	AE	Starting water surface elevations were calculated using the slop/area method. No floodway was designated for the entire study of Tefft Road Tributary reach because a number of breakout flows, caused by low capacity culverts and bridges, occur.
Tefft Road Tributary	Approximately 2,180 feet upstream of Tefft Street	Approximately 0.7 miles upstream of Tefft Street	*	*	*	A	*
Tefft Road Tributary East Fork	Confluence with Tefft Road Tributary	Approximately 2,110 feet upstream of confluence with Tefft Road Tributary	*	Slope/Area Method	*	AE	Starting water surface elevations were calculated using the slop/area method. No floodway was designated for the entire study of Tefft Road Tributary East Fork because the 1-percent-annual-chance flood is well contained within the channel section.
Tefft Road Tributary East Fork	Approximately 2,110 feet upstream of confluence with Tefft Road Tributary	Approximately 2,168 feet upstream of confluence with Tefft Road Tributary	*	*	*	A	*
Toad Creek (Main and North Branches)	Confluence with Salinas River	U.S. Highway 101	HEC-1	Slope/Area Method	*	AE w/ Floodway	The USACE HEC-1 computer program (USACE, 1973) was used to generate flood hydrographs and calculate floodplain routing effects. The major drainage areas were separated into smaller subbasins, where necessary and separate hydrographs were generated for each subbasin.

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
Toad Creek (Main and North Branches), continued	Confluence with Salinas River	U.S. Highway 101	HEC-1	Slope/Area Method	*	AE w/ Floodway	The basin parameters used in the model consist of the drainage area of the basin, Clark's unit hydrograph parameters, and infiltration loss rate for the basin, a storm depth for each flood recurrence interval, and a typical rainfall pattern. Unit hydrograph parameters and basin loss rates were estimated based on reconstitution studies of the January 18-21 and February 23-28, 1969, flood events and calibration of the models to the stream gage peak discharge-frequency analysis results for Santa Rita Creek (USGS gage No. 11147070, 1962-1978) and Jack Creek (USGS gage No. 11147000, 1950-1978). A log-Pearson Type III (U.S. Water Resources Council, 1976) was used to estimate the peak discharges at the gages for each recurrence interval. A 2-hour storm pattern was used based on the maximum 24-hour period of the January 1969 storm event at the City of El Paso de Robles. Starting water surface elevations were calculated using the slop/area method. Between the Union Pacific Railroad and Main Street bridges was leveed. This reach was modeled as a perched channel with the levee not failing. When channel velocities were in excess of 6.0 feet per second, the encroachments were set such that these velocities did not increase by more than 0.5 foot per second. In no case did the water-surface elevation change by more than 1.0 foot. The reach between the Union Pacific Railroad and Main Street bridges is leveed. The 1-percent-annual-chance flood flow could not be contained without exceeding a 1-foot rise in water-surface elevation. No floodway was designated in this reach.

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
Toro Creek	Confluence with Pacific Ocean	Approximately 460 feet upstream of State Highway 1	Regression Equation	HEC-2 step-backwater (USACE, 1973)	*	VE, AE	Peak flow rates were computed by use of the multiple regression equation developed by A. O. Waananen and J. R. Crippen (U.S. Department of the Interior, Magnitude and Frequency of Floods in California: Menlo Park, California, 1977). Runoff was computed using synthetic hydrographs derived from S-graphs (USACE, 1974). Water-surface elevations were computed through use of the USGS backwater analysis program E-431 (U.S. Department of the Interior, 1976).
Toro Creek	Approximately 460 feet upstream of State Highway 1	Approximately 2,340 feet upstream of Negranti Road	*	*	*	A	*
Unnamed (Alva Paul Creek) Creek	State Beach	Approximately 1,145 feet upstream of Main Street	Regression Equation	HEC-2 step-backwater (USACE, 1973)	*	VE, AE	Peak flow rates were computed by use of the multiple regression equation developed by A. O. Waananen and J. R. Crippen (U.S. Department of the Interior, Magnitude and Frequency of Floods in California: Menlo Park, California, 1977). Runoff was computed using synthetic hydrographs derived from S-graphs (USACE, 1974). Water-surface elevations of floods of the selected recurrence intervals were computed through use of the USGS backwater analysis program E-431 (U.S. Department of the Interior, 1976).

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
Unnamed (Alva Paul Creek) Creek, continued	State Beach	Approximately 1,145 feet upstream of Main Street	Regression Equation	HEC-2 step-backwater (USACE, 1973)	*	VE, AE	The overflows over the low divide were computed by making a number of trial backwater computations, varying the discharge at each cross section, thus representing losses from the channel between sections. The final profile was determined using the discharge-elevation combination from the backwater computations such that the velocities in the overflow section did not exceed 12 feet per second. This approximate method was chosen rather than a weir or embankment-type overflow method because of the uncertainties in defining a discharge coefficient for the overflow conditions.
Unnamed (Alva Paul Creek) Creek	Approximately 1,145 feet upstream of Main Street	Approximately 2,940 feet upstream of Main Street	*	*	*	A	*
Unnamed Creek No. 1	Confluence with Salinas River	Approximately 1,800 feet upstream of Airport Road	HEC-1	Slope/Area Method	*	AE w/ Floodway	The USACE HEC-1 computer program (USACE, 1973) was used to generate flood hydrographs and calculate floodplain routing effects. The major drainage areas were separated into smaller subbasins, where necessary and separate hydrographs were generated for each subbasin. The basin parameters used in the model consist of the drainage area of the basin, Clark's unit hydrograph parameters, and infiltration loss rate for the basin, a storm depth for each flood recurrence interval, and a typical rainfall pattern. Unit hydrograph parameters and basin loss rates were estimated based on reconstitution studies of the January 18-21 and February 23-28, 1969, flood events and calibration of the models to the stream gage peak discharge-frequency analysis results for

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
Unnamed Creek No. 1, continued	Confluence with Salinas River	Approximately 1,800 feet upstream of Airport Road	HEC-1	Slope/Area Method	*	AE w/ Floodway	Santa Rita Creek (USGS gage No. 11147070, 1962-1978) and Jack Creek (USGS gage No. 11147000, 1950-1978). A log-Pearson Type III (U.S. Water Resources Council, 1976) was used to estimate the peak discharges at the gages for each recurrence interval. A 2-hour storm pattern was used based on the maximum 24-hour period of the January 1969 storm event at the City of El Paso de Robles. Starting-water surface elevations were calculated using the slop/area method.
Unnamed Creek No. 1	Approximately 1,800 feet upstream of Airport Road	Approximately 2,460 feet upstream of Airport Road	*	*	*	A	*
Unnamed Stream	Confluence with Santa Rosa Creek	Approximately 1,950 feet upstream of Santa Rosa Creek Road	*	*	*	A	*
Willow Creek	Confluence with Pacific Ocean	Approximately 812 feet upstream of Ocean Boulevard	*	HEC-2 step-backwater (USACE, 1973)	*	VE, AE w/ Floodway	Starting water-surface elevations for Willow Creek were determined from rating curves developed at the State Highway 1 culvert.
Willow Creek	Approximately 812 feet upstream of Ocean Boulevard	Approximately 2,540 feet upstream of Ocean Boulevard	*	*	*	A	*
Yerba Buena Creek	Approximately 1.2 miles above the Confluence with Santa Margarita Creek	Approximately 2880 feet upstream of Encina Avenue	HEC-1	Slope/Area Method	*	AE w/ Floodway	The USACE HEC-1 computer program (USACE, 1973) was used to generate flood hydrographs and calculate floodplain routing effects. The major drainage areas were separated into smaller subbasins, where necessary and separate hydrographs were generated for each subbasin.

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
Yerba Buena Creek, continued	Approximately 1.2 miles above the Confluence with Santa Margarita Creek	Approximately 2880 feet upstream of Encina Avenue	HEC-1	Slope/Area Method	*	AE w/ Floodway	The basin parameters used in the model consist of the drainage area of the basin, Clark's unit hydrograph parameters, and infiltration loss rate for the basin, a storm depth for each flood recurrence interval, and a typical rainfall pattern. Unit hydrograph parameters and basin loss rates were estimated based on reconstitution studies of the January 18-21 and February 23-28, 1969, flood events and calibration of the models to the stream gage peak discharge-frequency analysis results for Santa Rita Creek (USGS gage No. 11147070, 1962-1978) and Jack Creek (USGS gage No. 11147000, 1950-1978). A log-Pearson Type III (U.S. Water Resources Council, 1976) was used to estimate the peak discharges at the gages for each recurrence interval. A 2-hour storm pattern was used based on the maximum 24-hour period of the January 1969 storm event at the City of El Paso de Robles. Starting water surface elevations were calculated using the slop/area method. Floodways could not be designated from El Camino Real upstream to J Street. The channel overbanks could not contain the 1-percent-annual-chance flood without exceeding the 1-foot rise in water surface.
Yerba Buena Creek	Confluence with Santa Margarita Creek	Approximately 1.2 miles above the Confluence with Santa Margarita Creek	*	*	*	A	*